Ahmed Salahudeen, MD

"Transfusion"
Water color on paper
11" X 8"
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Nausea and Vomiting in Pregnancy

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Abstract

Around 80% of pregnant women suffer from nausea and vomiting during their pregnancy. Generally, nausea and vomiting in pregnancy (NVP) termed “morning sickness” is a mild, self-limited condition that usually resolves with conservative measures. But, when the symptoms are severe enough to cause persistent vomiting with dehydration, the patient needs urgent care to prevent maternal and fetal morbidity. This condition is known as hyperemesis gravidarum. Although various hormonal, neuromuscular and psychosocial factors have been postulated to play a role in NVP, the exact pathophysiology of this condition still remains unknown. Conservative management which consists of dietary changes, emotional support and avoiding triggers are usually sufficient for mild symptoms. For severe symptoms, once other pathologic causes have been ruled out, management generally consists of intravenous hydration, multivitamins and anti-emetic agents. In this review, we will outline the etiology, risk factors, pathophysiology, outcomes and treatments for NVP.

Introduction

Nausea and vomiting in pregnancy (NVP) are common and uncomfortable symptoms associated with pregnancy that often severely impact the quality of life of women and their families. It affects nearly 80% of pregnant women. While 52% of women were found to have both nausea and vomiting, 28% experienced nausea alone.1

The symptoms usually start within 4-7 weeks after the last menstrual period and typically peak around 9 weeks of gestation. Nausea and vomiting usually resolve by 14 weeks and 20 weeks of gestation in 60% and 97% of women respectively.2 However, some women experience re-emergence of symptoms in the last few weeks before delivery.3

It was widely believed that symptoms of nausea and vomiting occur mostly in the morning and therefore the term “morning sickness” was coined. In fact, this popular term is a misnomer. Multiple studies have shown that symptoms can persist throughout the day in more than 80% of women.3

Pregnancy complicated by vomiting and requiring hospitalization occurs in a small group of women. The more severe form of NVP, Hyperemesis gravidarum (HG), has been reported to occur in approximately 0.3-2% of all pregnancies.4
NVP is more common in Westernized countries, especially in urban populations, and is rare amongst Africans, Native Americans, Eskimos and most Asian populations.5 Demographic factors influencing the incidence of symptoms of NVP include ethnicity, occupational status, maternal age, parity, history of infertility, inter-pregnancy interval, alcohol and tobacco use.6

The etiology and patho-physiology of NVP is still not well understood although several possible factors have been implicated. Various metabolic and hormonal factors have been implicated as possible causes for NVP including as human chorionic gonadotropin (hCG), estrogen, progesterone and others. Alterations in gastrointestinal motility have also been shown to play a role in NVP. Additionally, chronic infection with *Helicobacter pylori* and psychosocial factors are also well recognized to be associated with NVP.5

Since persistent NVP can have a serious impact on mother, fetus, and overall quality of life, early recognition and management are strongly encouraged. The management of NVP largely depends on the severity of symptoms. While initial treatment for mild symptoms includes dietary adjustments, avoiding triggers and emotional support, more serious conditions such as HG require more aggressive approaches. Women suffering from HG generally require hospitalization for intravenous hydration, pharmacologic therapies such as anti-emetics, multivitamins and nutritional support in the form of enteral tube feeding and total parenteral nutrition.7

Epidemiology

It has been reported that NVP is more common in women actively influenced by western culture. Incidence of NVP in native African, Eskimo and oriental populations are uncommon except in industrialized Japan.5 In all cultures, incidences of these symptoms are more common in urban compared to rural population.5,8 While the incidence of HG is similar to NVP in Western populations, a higher incidence is seen in the United Kingdom, India, Pakistan, Asia, Africa, New Zealand, and Pacific Island women.9

A prospective study done in Canada concluded that Black and Asian women suffer less symptoms as compared to Caucasians.10 Several other demographic factors, such as the occupational status and lifestyle changes also influence the incidence of NVP. For example, housewives tend to have more symptoms, while regular alcohol consumption and tobacco use prior to pregnancy tend to decrease the incidence of vomiting.11,12

Risk Factors

Several studies over the years have identified many risk factors contributing to symptoms of NVP. Whether these risk factors are truly responsible for producing the symptoms is still matters of debate. The fact that almost 80% of pregnant women suffer from these symptoms that resolve with the end of pregnancy suggests that the patho-physiology may be associated with pregnancy itself.

Risk factors associated with vomiting in pregnancy were extensively investigated in a Collaborative Perinatal Project among 9098 first-trimester pregnant women.13 Studies from that project showed that vomiting was more common among primigravidas, younger women, and women with less than 12 years of education and women weighing 170 lbs or more. Additionally, it was found that women with recurrent vomiting during one pregnancy have a higher likelihood of having similar symptoms in subsequent pregnancies.13 Employment has also been shown to affect incidences of NVP. Being in a low-income bracket, part-time employee, or housewife increased the risk of symptoms.3,11 Women with concurrent medical conditions including bulimia nervosa, allergies, symptomatic gallbladder disease, gastritis, GERD, motion sickness, or migraine headaches have also been found to have increased risk for NVP.6,14-17 Genetic factors are also strongly linked to NVP, since increased
prevalence of symptoms has been reported in any relatives of affected individual.\textsuperscript{18} Furthermore, NVP is twice as common in women who have monozygotic twins compared to dizygotic twins.\textsuperscript{19}

Risk factors for HG appear to be similar to NVP. Additionally, HG is more common in pregnancies with multiple gestation, molar pregnancy, fetal abnormalities, and women with medical conditions such as hyperthyroid disorders, preexisting diabetes, obesity and asthma.\textsuperscript{5,20}

Patho-physiology

The patho-physiologic basis for NVP is not well characterized. However, results from several studies have postulated various factors that could potentially explain the basis for NVP (Figure 1).

Since the duration of nausea and vomiting during pregnancy closely correlates with the level of human chorionic gonadotropin (hCG) in the serum, hCG is thought to be responsible for NVP.\textsuperscript{21} Several studies have supported the notion that hCG might be the hormonal factor that is responsible for the symptoms. An increased incidence of NVP is seen in conditions such as molar pregnancy, multiple gestations, and trisomy 21 where levels of hCG is usually higher than normal.\textsuperscript{22} Similarly, concentrations of hCG also strongly correlate with the severity of symptoms.\textsuperscript{23} Some studies have suggested that hCG indirectly increases the likelihood of NVP by inducing thyroid hormones and estrogen (hormones known to induce gestational emesis).\textsuperscript{24-26} Roles of other hormones in NVP have been explored. For example, estrogen and progesterone may contribute to NVP by reducing intestinal motility and gastric emptying via the nitric oxide pathway. A higher incidence of NVP was found in multiple gestations where levels of both of these hormones were elevated.\textsuperscript{5} It has also been shown that a strong relationship exists between serum levels of prostaglandin E2 (PGE2) and periods of NVP.\textsuperscript{27} PGE2 was found to effect NVP by regulating gastric slow wave frequency and peristalsis.\textsuperscript{28} Other hormones, such as serotonin and leptin have also been hypothesized to play a role in NVP, but substantial evidence is lacking to validate this relationship.\textsuperscript{5}

The role of immunological homeostasis and sympathetic tone in NVP has also been explored. During pregnancy, there is a increase in certain subsets of immune cell (e.g., granulocyte, natural killer and extrathymic T cells).\textsuperscript{29} Functional activation of these cells has been speculated to play a role in pregnancy associated disorders including hyperemesis.\textsuperscript{29} Furthermore, levels of several immune markers including interleukin 4, interleukin 6, tumor necrosis factor alpha, immunoglobulins IgG and IgM, and complements have been found to be increased in HG.\textsuperscript{5}

*Helicobacter pylori* (*H. pylori*) infection of the stomach has also been associated with an increased incidence of NVP.\textsuperscript{5} A number of studies have shown *H. pylori* seropositivity to correlate with a higher likelihood of NVP and HG.\textsuperscript{5} Additionally, the resolution of symptoms with treatment for *H. pylori* further validates the claim of this association.\textsuperscript{30} Despite the link between *H. pylori* and NVP, there is no current guideline that recommends evaluation and treatment for *H. pylori* in pregnant women suffering from nausea and vomiting. However, findings from several studies have alluded to screening for *H. pylori* in women suffering from intractable symptoms.\textsuperscript{31} Gastroesophageal reflux disease (GERD), alterations in lower esophageal sphincter (LES) tone and gastric dysmotility have all been associated with NVP.\textsuperscript{5} Data from several studies have shown estrogen and progesterone mediated LES relaxation and gastric dysrhythmia also precipitate symptoms of NVP.\textsuperscript{32,33}

Psychosocial factors also predispose pregnant women to symptoms of nausea and vomiting during pregnancy.\textsuperscript{34} Pregnancies is viewed as unwanted, unplanned, or associated with socioeconomic
burdens can lead worsening of NVP symptoms.\textsuperscript{34} Anxiety, NVP associated with prior pregnancies, and underlying emotional distress all trigger NVP or exacerbate symptoms.\textsuperscript{35}

Outcomes

Despite the distress and suffering associated with NVP, milder forms of the condition are associated with improved pregnancy outcomes.\textsuperscript{5} A meta-analysis on this topic has shown a lower risk of miscarriages associated with NVP.\textsuperscript{36} Additionally, fewer rates of stillbirths, pre-term deliveries and growth retardation have been associated with NVP.\textsuperscript{37, 38} However, severe symptoms such as HG have been linked to both adverse pregnancy and fetal outcomes. Adverse maternal events include severe weight loss, dehydration, nutrient deficiency, Mallory Weiss tear, peripheral neuropathy, hepatic insufficiency, psychosomatic illness and others.\textsuperscript{5, 39} Adverse fetal outcomes generally involve pre-term birth, low birth weight infant, pre-eclampsia, placental abruption and smaller gestational size.\textsuperscript{5, 40} Unfavorable fetal outcomes were more likely to be present in pregnant women who have lost more than 5\% of their pre-pregnancy body weight or gained less than 7 kg during pregnancy.\textsuperscript{4, 40}

Treatment

Generally, very little attention is given towards the management of NVP. One common reason is the belief that it will improve on its own as pregnancy progresses. Additionally, the risks associated with using pharmacologic agents to control the symptoms likely contribute to the reluctance to prescribe medicines. Management largely depends on the severity of symptoms. While non-pharmacologic measures such as dietary changes, avoidance of triggers, reassurance and rest are employed when symptoms are less severe, medical management is necessary when initial non-pharmacologic measures fail to control symptoms. Table 1 lists some of the medications approved for use in NVP.

Non-pharmacologic therapy

Pregnant women with NVP are generally advised to consume frequent small meals rather than a few large meals. Meals that increase gastric emptying such as bland, low fat, protein rich meals, and a preference of liquids over solids may help.\textsuperscript{41} It is also advised to avoid an empty stomach especially in the morning.

Pregnant women suffering from severe symptoms or women suffering from psychological conditions that might have played a role in NVP, will likely benefit from psychiatric consultation. Additionally, family support, encouragement, and reassurance are often helpful in reducing symptoms.\textsuperscript{42, 43}

Studies have shown that acupressure of the Neiguan point (three finger breaths above the wrist on volar surface) is helpful in controlling nausea in early pregnancy.\textsuperscript{44} However, evidence is inconclusive in validating the role of acupressure on symptom relief. However, since this intervention is free from any adverse effects it ought to be recommended to patients for symptom relief.

Ginger, a popular spice, has been used in ancient medicine for various disorders. Randomized crossover trials have shown beneficial effects of ginger for symptom relief by increasing GI motility.\textsuperscript{5, 45} Although it is generally safe during pregnancy, the presence of thromboxane synthetase inhibitor in ginger roots increases chances of bleeding. Therefore, ginger should be avoided in women with an increased bleeding risk.\textsuperscript{46}

Pharmacologic therapy
Approximately 10% of women suffering from NVP require pharmacologic management. The following are the medications used to treat NVP:

Vitamin B6 (pyridoxine) has been shown to be effective against NVP in randomized trials compared to placebo.\textsuperscript{2} The combination of Vitamin B6 with doxylamine (anti-histamine) was removed from the U.S. market in 1983 because of a possible link to teratogenic effects. However, subsequent meta-analyses have refuted a teratogenic link. Currently, the American College of Obstetrics and Gynecology (ACOG) recommends B6 and doxylamine as first-line therapy for NVP.\textsuperscript{47}

Phenothiazines, such as chlorpromazine, promethazine, prochlorperazine are dopamine antagonists reduce the symptoms of NVP. These drugs are listed as pregnancy category C drugs since some risk of negative outcomes have been observed in studies.\textsuperscript{48} Another dopamine antagonist, droperidol, was associated with shorter hospital length of stay in patients suffering from NVP without any adverse fetal outcomes. However, due to their risk for cardiac arrhythmia, the use of these agents is limited.\textsuperscript{49}

Metoclopramide acts as gastric promotility agent to control nausea and vomiting by decreasing gastric transit time.\textsuperscript{5} However, this drug has a black-box warning due to an increased risk of tardive dyskinesia and should be avoided.

Medications such as diphenhydramine, meclizine, and dimenhydrinate effect central vomiting centers by directly inhibiting histamine receptors. These drugs have been successfully used to treat NVP. Although some studies have linked meclizine and diphenhydramine to congenital malformation, other studies have shown its safety during pregnancy.\textsuperscript{7} Hence, these medications should only be used with caution to treat NVP.

Ondansetron is a 5-hydroxytryptamine\textsubscript{3} receptor antagonist and that has been increasingly used in NVP and HG.\textsuperscript{2} Randomized trials have shown similar efficacy of ondansetron and promethazine in controlling nausea and vomiting. However, ondansetron tends to have less sedating effects. Some studies have linked this medicine to congenital malformation but other studies have found no significant risk associated with its use.\textsuperscript{50, 51} Similar to antihistamines, use of ondansetron for the treatment of NVP should only be used in a case by case basis.

Since gastro-esophageal reflux disease (GERD) has been associated with NVP, antacids have become first line agents for symptom relief in patients with NVP and GERD like symptoms. Magnesium containing agents are avoided due to their associated risk for fetal respiratory distress and hypotonia.\textsuperscript{52} Acid suppression with H\textsubscript{2} blockers and proton pump inhibitors are safe to use in pregnancy and often help alleviate symptoms of NVP associated with GERD.\textsuperscript{53, 54}

The role of corticosteroids in NVP is controversial. Therefore, its use is limited to refractory cases of HG. Corticosteroids act by exerting anti-emetic effect on the chemoreceptor trigger zone of the brain. A meta-analysis showed an increased incidence of cleft lip and cleft palate if corticosteroid were used before 10 weeks of gestation. Therefore, it is recommended to avoid steroids and utilize them only in refractory cases of HG after 10 weeks of gestation.\textsuperscript{55}

Intravenous hydration is often required in severe symptoms to correct dehydration and electrolyte disturbance. Also, if caloric deficits are found, supplemental nutrition can be administered via nasogastric or nasojejunal feeding. Except in very severe cases, enteral nutrition is preferred over parenteral due to an increased risk for infection and fetal complications associated with parenteral feeds. Thiamine and folate supplementation should always be considered in severe cases of nausea and vomiting.\textsuperscript{7}
Summary

NVP is a very common condition affecting many of women during their pregnancy. The pathophysiology of NVP is complex and multi-factorial. Symptoms usually range from benign and self-limiting in nature to severe cases of HG that require hospitalization. Self-limiting conditions usually have no adverse fetal outcomes. However, more severe forms may have harmful effects on both mother and fetus unless they are detected and treated early. Given the potential for adverse feto-maternal outcomes, psycho-social impacts, and recurrence in subsequent pregnancies, early recognition and appropriate management are extremely important.

Figure 1: Potential factors causing NVP.

| Table 1. Non-Pharmacologic and Pharmacologic therapy for Nausea and Vomiting in Pregnancy |
|-----------------------------------------------|----------------|-----------------|----------------|
| Medication                                   | Dose            | Side effects    | FDA category   |
| Non-Pharmacologic therapy                    |                 |                 |                |
| Ginger                                       | 125 to 250 mg PO q6h | Reflux, heartburn | C              |
| Pharmacologic therapy                        |                 |                 |                |
| Vitamin B₆ (pyridoxine)                       | 10 to 25 mg PO q8h | None            | A              |
| Pyridoxine-doxylamine combination            | Pyridoxine 10 to 25 mg PO q8h; doxylamine 25 mg PO at bedtime with 12.5 mg in the | Sedation | A |
morning PRN plus 12.5 mg in the afternoon PRN

### Dopamine antagonist

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose / Route / Frequency</th>
<th>Side Effects</th>
<th>Risk Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promethazine (Phenergan)</td>
<td>25 mg PO/IM/PR q4 to 6h</td>
<td>Sedation, extrapyramidal symptoms</td>
<td>C</td>
</tr>
<tr>
<td>Prochlorperazine (Compazine)</td>
<td>5 to 12.5 mg PO/IV/IM q6h</td>
<td>Sedation, extrapyramidal symptoms</td>
<td>C</td>
</tr>
<tr>
<td>Droperidol (Inapsine)</td>
<td>1.25 to 2.5 mg IM/IV</td>
<td>Cardiac arrhythmia</td>
<td>C</td>
</tr>
</tbody>
</table>

### Promotility agent

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose / Route / Frequency</th>
<th>Side Effects</th>
<th>Risk Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metoclopramide (Reglan)</td>
<td>10 mg PO/IV/IM q6h</td>
<td>Sedation, extrapyramidal symptoms</td>
<td>B</td>
</tr>
</tbody>
</table>

### Anti-histamine/Anti-cholinergic

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose / Route / Frequency</th>
<th>Side Effects</th>
<th>Risk Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diphenhydramine (Benadryl)</td>
<td>25 to 50 mg PO q4 to 6h or 10 to 50 mg IV q4 to 6h</td>
<td>Sedation</td>
<td>B</td>
</tr>
<tr>
<td>Meclizine (Bonine)</td>
<td>25 mg PO q4 to 6h</td>
<td>Sedation</td>
<td>B</td>
</tr>
<tr>
<td>Dimenhydrinate (Dramamine)</td>
<td>50 to 100 mg PO/IV q4 to 6h</td>
<td>Sedation</td>
<td>B</td>
</tr>
</tbody>
</table>

### Serotonin antagonist

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose / Route / Frequency</th>
<th>Side Effects</th>
<th>Risk Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ondansetron (Zofran)</td>
<td>4 to 8 mg PO q6h</td>
<td>Constipation, diarrhea, headache, dizziness, drowsiness</td>
<td>B</td>
</tr>
</tbody>
</table>

### Anti-acidity agents

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose / Route / Frequency</th>
<th>Side Effects</th>
<th>Risk Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranitidine (H₂ blocker)</td>
<td>150 mg PO q12h</td>
<td>Headache, dizziness, constipation/diarrhea</td>
<td>B</td>
</tr>
<tr>
<td>Lansoprazole/Esomeprazole (PPI)</td>
<td>30 mg or 40 mg PO/IV q24h</td>
<td>Diarrhea, headache, rash</td>
<td>B</td>
</tr>
</tbody>
</table>

### Corticosteroids

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose / Route / Frequency</th>
<th>Side Effects</th>
<th>Risk Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylprednisolone</td>
<td>16 mg PO q8h X 3 days then taper over 1 to 2 weeks if initially effective</td>
<td>Small increased risk of cleft lip/palate if used before 10 weeks of gestation</td>
<td>C</td>
</tr>
</tbody>
</table>

†FDA denotes Food and Drug Administration. FDA categories: A – Controlled studies have found no risk to fetus. B - No evidence of risk in humans although some adverse findings have occurred in
animals. C – Chance of fetal harm but benefits may outweigh risks. D – Evidence showing fetal risk but benefits may outweigh risks. X – Contraindicated in pregnancy.

\$This list of medications is not all inclusive and includes some of the medications that is used to treat NVP.

\^This table is adapted and modified from Niebyl, J. R. 2

References


Implementation of a Recall System for Well-Child Visits, Dental Well Exams, and Outstanding Immunizations to Meet Patient Centered Medical Home Standards

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Abstract

A patient recall system was developed to help increase pediatric patient compliance with annual wellness exams, biannual dental exams, and immunizations. The recall systems were designed to help the Federally Qualified Health Center, El Centro de Corazon, advance its progress in achieving Patient Centered Medical Home recognition status, as defined by the National Committee for Quality Assurance. The wellness exam recall yielded the highest recall success rate, while the immunization recall success rate was lowest. The recommendations for improvement of all three recall systems are discussed.

Introduction

The idea of a Patient Centered Medical Home (PCMH) is centered on improving three aspects: patient experience, cost of care, and health outcomes. The PCMH concept has become a key driver for enhancing the value of health services to meet the ongoing challenges of improving quality and containing costs1. The Agency for Healthcare Research and Quality (AHRQ) defines a medical home as a model of primary care that encompasses five features: comprehensive care, patient-centered treatment, coordinated care, accessible services, and quality and safety2. Through the PCMH model, clinical practices can focus on improving quality, effectiveness, and efficiency of the services they deliver to address the individual needs of each patient3.

There is increasing evidence showing PCMHs are cutting costs by decreasing hospital and emergency room visits, reducing health disparities, and improving health outcomes. A 2015 study found NCQA PCMHs cut growth in outpatient Emergency Department (ED) visits by 11% over non-PCMHs for Medicare patients4. Medicare fee-for-service beneficiaries had lower total annual Medicare spending in PCMHs compared to other non-PCMH practices5. A 2012 study that included 31,032 PCMH and 350,015 non-PCMH patients concluded that PCMH-treated patients had higher rates of chronic disease screenings, better cholesterol control, and lower financial rates for lower back pain imaging. Additionally, PCMH patients had a lower percentage of hospitalization and utilization of ED services6. Another study found PCMH programs improved screenings and treatment for diabetes, leading to better and measurable clinical outcomes (viz. blood pressure and cholesterol)7. New York State reported in April 2013 that PCMH models resulted in better rates of quality performance compared to non-PCMH practices, as defined by national standardized measures8. Taken altogether, it is likely that
PCMH models are beneficial in improving patient experience, the cost of care, and health outcomes.

The comprehensive and coordinated care provided by clinical practices that have adapted PCMH models focus on preventative services. This decreases costs on hospitalizations and emergency room visits. NCQA Patient-Centered Medical Home Recognition is the most common method of transforming practices to fit this model. The PCMH Standards and Guidelines define what measures must be met before a practice can reach PCMH status. There is an arduous process of application, clinical practice transformation, NCQA revision, and evaluation. Many of the standards to be met include implementation of preventative care services. These services include annual well visits, biannual dental exams, and immunizations, whose benefits have been published previously.

El Centro de Corazon is a Federally Qualified Health Center (FQHC), also known as a Community Health Center (CHC), located in Houston, Texas. FQHCs are clinical practices that receive grants under Section 330 of the Public Health Service Act (PHS). El Centro consists of three clinic sites that span a variety of specialties including: pediatrics, family medicine, obstetrician and gynecology, behavioral health services, and medical and dental insurance eligibility services. The Dunn pediatric clinic, one of the three sites of El Centro, recently underwent the process of achieving Patient Centered Medical Home status.

According to NCQA PCMH 2014 Standards and Guidelines, El Centro was required, among other responsibilities, to annually identify populations of patients and remind them of needed care based on patient information, clinical data, health assessments and evidence-based guidelines including: at least two different preventive care services, and at least two different immunizations.

Annual wellness visits and biannual dental visits were chosen to fulfill the two different preventative care services. All immunizations within the first two years of age immunization series were chosen to fulfill the immunization reminders.

A recall system was implemented to meet those standards, by recalling patients who were overdue for any of these services, thus potentially increasing El Centro de Corazon’s patient population’s access to healthcare and preventative medicine.

Methods

Recalling annual well exams and biannual dental exams

El Centro de Corazon identified the adolescent (ages 11-16) population as a population that historically does not complete their annual well visits and biannual dental exams on a regular basis. The report to identify this population was generated using Business Objects, an application of patient population data analysis. The ARPB 009 Visit List for Specific Diagnoses was the report on Business Objects used to identify the adolescent populations that had not completed their annual well visit or biannual dental visit. A total of 110 patients and 97 patients were identified needing their annual well exam and biannual dental visit, respectively.
A recall script was created to be used by Customer Service Representatives (CSRs) of El Centro to call the parent of the patient to offer them the missing services and help with scheduling as desired by the parent of the patient. The script is shown in Box 1 and Box 2.

**Adolescent Needing Annual Well Visit:**

**If the parent is contacted:**

Hello.

I’m calling from El Centro de Corazon Dunn clinic.

The pediatric care team at El Centro has reviewed your child’s medical record and seen that child’s name has not had his/her annual well visit recently. Annual well visits help your care team stay on track of your child’s health progress, and can prevent him/her from developing any serious diseases that will affect their quality of life.

It would be highly beneficial for him/her to come in for a well visit. I can schedule an appointment for you now if you’d like.

IF YES: (check and verify eligibility, schedule appointment and confirm date and time with them). Thank you very much again for choosing El Centro as your medical provider. I’d also like to remind you to please bring your shot record to the clinic so your care team can better address any other needs your child might have.

IF NO: That’s okay you can always call or visit the clinic to schedule it when you’re ready. As always, thank you for choosing El Centro.

Thank you.

**Box 1. Annual well exam recall script**
Box 2. Biannual dental exam recall script

Adolescent Needing Six-Month Dental Exam:

If the parent is contacted:

Hello.

I’m calling from El Centro de Corazon Dunn clinic, dental department.

The pediatric care team at El Centro has reviewed your child’s dental record and seen that child’s name has not had his/her biannual dental visit recently. Biannual dental visits help your care team stay on track of your child’s dental health, and can prevent him/her from developing any serious conditions like cavities or gum disease that will affect their quality of life.

It would be highly beneficial for him/her to come in for a dental visit. I can schedule an appointment for you now if you’d like.

IF YES: (check and verify eligibility, schedule appointment and confirm date and time with them). Thank you very much again for choosing El Centro as your dental provider

IF NO: That’s okay you can always call or visit the clinic to schedule it when you’re ready. As always thank you for choosing El Centro.

Thank you.

Immunization recall

El Centro generated a report of children (less than three years old) that had not completed their two-year immunization series. The appropriate vaccines included were DTaP, IPV, MMR, Hib, HepB, Rotavirus, VZV and PCV. The report to identify this population was generated using Business Objects. The identified pediatric population with outstanding (missing) vaccinations within their two-year series was compared to Immtrac, the Texas Immunization Registry, to verify if the immunization series was up-to-date on the Electronic Medical Record (EMR).
There were 23 patients who were identified on the EMR to be missing one or more vaccinations. The patients that were not up-to-date were recalled by CSRs of El Centro using the script shown in Box 3.

**Box 3. Immunization recall script**

The responses of each phone encounter for all three recall systems were recorded and analyzed.
Results

Annual Wellness Exams

From the 110 pediatric patients that were recalled, 43 patients were scheduled for a wellness exam within the coming month, 37 patients did not answer the phone and either a voice message was left or their voicemail was not active, 14 patients stated they had an alternate primary care physician that they were seeing, 9 patients were not ready (mostly due to eligibility and financial purposes), 5 numbers were incorrect and out-of-date numbers, and 2 patients were not scheduled due to having reallocated. The data is displayed in terms of percentage in Figure 1.

![Patient Population Recalled for Annual Wellness Exam](image)

Figure 1. Patient Population Recalled for Annual Wellness Exam. Data displayed in terms of percentage.

Biannual Dental Exams

From the 97 pediatric patients that were recalled, 22 patients were scheduled for a dental exam within the coming month, 39 patients did not answer the phone and either a voice message was left or their voicemail was not active, 19 patients stated they had an alternate dentist that they were seeing, 7 patients were not ready (mostly due to eligibility and financial purposes), 8 numbers were incorrect and out-of-date numbers, and 2 patients were not scheduled due to having reallocated. The data is displayed in terms of percentage in Figure 2.
Outstanding Immunizations

From the 23 pediatric patients that were found to have outstanding immunizations on the electronic medical record (EMR), 2 patients were scheduled for a wellness exam (which would include administration of the immunizations) within the coming month, 8 patients were up-to-date on their immunizations according to ImmTrac, 7 patients did not answer the phone and either a voice message was left or their voicemail was not active, 2 patients stated they had an alternate primary care physician that they were seeing and preferred to go elsewhere for their vaccinations, 2 patients were not ready (mostly due to eligibility and financial purposes), and 2 patients were not scheduled due to direct refusal and incorrect phone number. The data is displayed in terms of percentage in Figure 3.
Figure 3. Percentage of Patients Recalled for Outstanding Immunizations. Data displayed in terms of percentage.

Discussion and Recommendations

All three recall systems were developed with the intention of being continued annually for well visits, biannually for dental visits, and quarterly for outstanding immunizations. This would satisfy the NCQA PCMH 2014 Standards and Guidelines requiring El Centro to annually identify populations of patients and remind them of needed care, furthering El Centro’s progress in achieving NCQA PCMH recognition status.16

The wellness exam yielded a 39% successful recall rate (assuming the newly scheduled appointments were kept). The dental exam yielded a 23% successful recall rate. The outstanding immunization recall only yielded a successful recall of 8% (two patients), however the total number of patients recalled was initially low. Other factors to consider regarding the immunization recall were that 35% of patients not up-to-date on the EMR actually were up-to-date with their two-year immunization series as reported by Immtrac. Adjusting for this difference, the successful recall of those two patients actually yielded a 13% successful recall.

The Community Preventative Services Task Force reviewed 12 studies and reported a 5.1% increase in vaccination coverage using client reminder and recall alone between 1997 and 2007.17 Whether a 5.1% increase in vaccination coverage is significant enough to justify the efforts of a recall system will not be discussed here, however this data shows that a 13% successful recall rate using this method for pediatric patients with outstanding immunizations can be expected. The immunization recall system itself requires reconciliation of vaccination documentation differences between the EMR and Immtrac systems in order to know which
patients are missing vaccinations. The added benefit of accurate vaccination reconciliation in these two electronic systems leads to a greater awareness of which patients are getting their vaccinations according to the state of Texas. While the immunization recall system was limited in number of patients compared to the other two recall systems, reminding patients of at least two different preventive care services, and at least two different immunizations was required to meet NCQA PCMH 2014 Standards and Guidelines.

All three recall systems could benefit from several improvements. One common factor between the three recall systems was a high rate of patients who did not answer the phone calls. These rates were 34%, 40%, and 30% for wellness, dental, and immunization recalls, respectively. As mentioned, these phone calls resulted in voice messages, or nothing at all (if the patient did not have an active voicemail). Reducing this category of encounters should be the main focus for improvement. In attempt to correct this, patients may be called again at varying times of different days, and sent letters if there is still no response. The letter would explain why the wellness and/or dental exam, or immunization would be highly beneficial (in more detail than described in the recall scripts), and could even potentially include, if possible, a small discount for the overdue service as an incentive to schedule an appointment.

Medical assistants and all who interact with the patient regarding scheduling and payment should also attempt to confirm the updated contact information once with every patient visit. Finally, the patients who could not be reached should be recalled again in the next recall cycle. Should these recommendations be implemented, there is a possibility for a substantial increase in recall success for all three recall systems.

Conclusion

A recall system serving to increase patient wellness/dental exams, and immunizations can have varying levels of success. The systems implemented at El Centro de Corazon need improvement specifically to increase recall success with patients who did not answer the phone. Despite the low success rate of the outstanding immunizations recall, the additional benefits of reconciling vaccination documentation between two electronic record systems may be sufficient to continue the system quarterly. These preventative services will help El Centro de Corazon further its progress in achieving NCQA PCMH recognition status.

References

Understanding Cultural and Linguistic Competency Training in Local Health Departments

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Abstract

The U.S. is progressively becoming a more multi-ethnic and linguistically diverse country, and this is evident especially in the health care field as health care providers are encountering unique cultural illnesses while also overcoming language barriers. Similarly, due to the understanding that these types of situations are becoming increasingly more prevalent, health departments and other local health-related organizations are implementing programs and standards that provide greater opportunities to become more culturally competent among the workforce in order to increase efficiency and empathy while also decreasing the preventable mistakes that are made by a lack of cultural and linguistic awareness. Thus, many national public health organizations have created standards that help health departments and similar organizations create protocols that would allow for such measures to be easily implemented into the daily workforce environment.

Introduction

In order to change the current opinions of competency adapted by health care workers, it is important to be able to define the term “cultural competency”. The Commonwealth fund, a national organization that promotes a high-performing health care systems, defines cultural competency as the ability of systems to provide care to patients with diverse values, beliefs, and behaviors. This includes tailoring patient care in order to meet their social, cultural, and linguistic needs. Similarly, language provides a method to transmit culture. Thus, it becomes one of the most vital components in keeping culture alive and accessible. To be able to implement an intervention, it is important to determine the current workforce's diversity and culturally competency while exploring ideas and protocols that would enhance cultural and linguistic competency.

Discussion

One of the greatest potential barriers to care seen is the lack of diversity in the current health care workforce. Although, minorities only make up 28% of the total U.S. population they only compose about 3% of the medical school faculty, 16% of the public health school faculty, and 17% of all county and city health officers. In local health departments, minorities make up about 27% of the workforce. However, this number declines when considering minority demographics of health department executives.

Another major complication that further hinders the facilitation of cultural competency is the lack of a comprehensive system that facilitates ease of communication among health care groups and reliable translation services across health care encounters. These systemic failures combined with the sociocultural differences between health care providers and those receiving
services can lead to many individual-based issues such as a lack of patient adherence to medication regimens, patient dissatisfaction, further deterioration in patient health, and a general lack of quality care. It can also lead to larger-scale public health issues such as a higher prevalence of certain chronic or acute disease rates, greater preventable comorbidities and mortalities, and other culturally-based systemic problems.

Increasing diversity by focusing on cultural and linguistic competency can be advantageous since it promotes equality among a diverse group of individuals, better health care, increased compassion, and improved resource utilization. In order to promote this model of health care throughout medical and public health organizations, there need to be tools that assess health outcomes and create a standard of care for the evaluation of care. Thus, a measurable tool that translates cultural competence into quality indicators and outcomes needs to be created in order to improve these barriers and disparities. This tool should be able to measure qualitative and quantitative components and integrate these measurements into a report that provides insight into the group being measured. Components that should be measured in a group assessment include areas for individual change and areas for organizational and overall structural change. Individual components include: how much does the group value or accept diversity, how diverse is the group itself, how do they adapt and respond to cultural differences. Organizations components include: engaging the workforce in activities that foster a diverse environment, creating self-assessment tools to provide feedback and improve overall employee attitude, adapting service and delivery supports, and instituting cultural knowledge and policies around the organization to promote equal opportunities and a more amiable environment. Because cultural competency is not an easily quantifiable entity, it can also be measured by classifying the three essential components of becoming a competent individual: knowledge, beliefs and attitudes, and skills.

Many models have been created in order to mend the lack of cultural integration in health care departments in the U.S. One such article from the Cochrane Collaboration cites four necessary components needed to make an intervention for cultural and linguistic competence: educational content, pedagogical approaches, structure of intervention, and participant characteristics. When tailoring the intervention to an organization, the educational content is one of the most important determinants in how the group will respond to the intervention. This includes determining the content necessary to make the greatest impact on the health care team. The educational domain should focus on the content of knowledge, how to assess and apply the information to the pertinent group, the specific skill sets needed to make a culturally competent individual, and the breadth of knowledge needed to consider oneself competent and free from bias. The pedagogical approach focuses on facilitating teaching by integrating theoretical and sociocultural frameworks into the curriculum. The structure of the intervention includes logistics needed to provide proper training to the targeted group. This should include the format, frequency of the intervention, and an assessment of the efficacy of the intervention in order to optimize the intervention and distribute resources optimally. Participant characteristics include the demographics of all participants involved in creating, delivering, and undergoing the intervention. Helping tailor the intervention to the group may further increase the chance of the intervention being successful.
When looking at a model for cultural and linguistic competency, the intervention needs to address how the health care provider can assess their inner cultural and linguistic needs. Only then will the provider be able to assess the needs of those they serve. There should be tools available for providers to introspectively determine how much they are competent. These tools should also help them elicit the competency of others in their surroundings. Such as tool, will help foster an environment that emphasizes the similarities between groups, but also provide a ‘safety zone’ where cultural and linguistic differences are accepted and appreciated. This can only stem from addressing the basic issues of critical cultural competence defined as “one’s beliefs, values, norms, and patterns of behavior are socially constructed and culturally relative to a particular context.” This suggests culture is a dynamic concept based on understanding that each individual’s idea of normacy is unique and constructed as a by-product of their sociocultural settings.5

One such tool that has proved to be useful to the Houston health department by incorporating ideas of critical cultural competence is the toolkit created by the Bay Area Regional Inequalities Health Initiative (BARHII): the ‘Organizational Self-Assessment for Addressing Health Inequalities Toolkit’. It provides health departments with tools and guidelines necessary to identify skills, organizational practices, and infrastructure in order to evaluate and ensure that they are providing adequate services to meet the needs of the diverse community they serve.6 The toolkit is intended to assess the baseline measures of capacity, skills, and areas for improvement to support health-equity focused activities. It functions to create a set of research-based organizational and individual traits that will provide adequate performance of the necessary work, information to guide strategic planning, policies to improve intra-organizational capacity, and ongoing feedback on the progress of the organization’s goals.6

Initially, there should be a small team comprised of hardworking, motivated, and proficient health department staff to implement and oversee the project. The Houston health department created the Cultural and Linguistic Competency (CLC) team to determine what changes need to be made to the health department in order to improve awareness of this issue, create an efficient intervention, supervise the progression of the project, and determine the health department’s staff competency. Similarly, other divisions of the health care sector that are focusing on becoming more culturally competent, such as the pediatric workforce, are also creating similar groups in order to determine the state of diversity in their pediatric workforce and assess what needs should be met in order to become more culturally and linguistically competent. Their group, the Federation of Pediatric Organizations Diversity and Inclusion Working Group (FOPO-DIWG), assesses the current diversity guidelines in health care organizations such as medical schools and hospitals based on the Institute of Medicine’s current recommendations for accreditation that includes increasing racial and ethnic diversity in the workforce.7

In order for a workforce of diversity and inclusion to be effective, they must create some sort of ‘staff survey’ to determine what changes and implementations need to be made in the department to create a more cultural and linguistically competent workforce. This survey needed since it will cultivate data about the overall “attitude, practices, competencies, and structures that indicate the capacity to address root causes”, “hear from all staff about what supports their ability to address these inequalities and what makes it challenging to do so”, and also “identify staff areas for developing staff capacity and improving organizational
functioning”. It is important to keep in mind while creating the survey that it should be written to the level of comprehension for each tier at the health department. Cultural competency, health inequalities, and similar terms should be defined in an appendix to avoid any confusion. Additionally, focus groups that are a part of the planning team can be created in order to address the more specific issues elicited from these surveys. The creation of specific teams such as “cultural events teams” or the “accreditation teams” may help facilitate the completion of required tasks. The teams can help compile the staff survey results into tangible data and integrate the data into creating interventions focused on a cultural and linguistically competent health department workforce.

In order to create a successful intervention, evidenced-based or governmental guidelines should be followed. The Houston health department focuses their CLC workgroup intervention around the Public Health Accreditation Board (PHAB) Standards and Measures, which serve as the “official standards, required documentation, and guidance blueprint for PHAB national public health department accreditation”. The PHAB board has created 12 domains under which there are standards and measures for health departments to follow in order to get accredited. Domain 11, titled “Maintaining Administrative and Management Capacity”, sets Standard 11.1 to “Develop and maintain an operational infrastructure to support the performance of public health functions” and Measure 11.1.4 A to set “policies, programs, and interventions provided that are socially, culturally, and linguistically appropriate to specific populations with higher health risks and poorer health outcomes”. The purpose of Measure 11.1.4 A is to “assess the health department’s social, cultural, and linguistic competence in providing public health programs to specific populations.” It also determines whether the health department has policies and programs in place that will meet the needs of the specific population to whom the health department caters to. These policies are important because they set the tone for what should be considered a priority to the health care organization. Also, they directly impact the delivery of health care services. The PHAB board recommends using certain standards that would allow all health departments to become more consistent in terms of cultural and linguistic competency with similar ideals and methods of measurement. One recommendation from PHAB includes the National Standards for Culturally and Linguistically Appropriate Services in Health Care (National CLAS Standards), created by the U.S. Department of Health and Human Services Office of Minority Health. These National CLAS Standards are “intended to advance health equity, improve quality, and help eliminate health care disparities by providing a blueprint for individuals and health care organizations to implement culturally and linguistically appropriate services” and was created because of the increasingly ever-changing, diverse nation that our health departments are providing services to. Thus, these standards provide structure and guidance to local health departments, such as the Houston health department, and create measures that will help unify all health departments without sacrificing the quality and tailoring of services specific to the unique community they serve.

These types of standards and guidelines used by the Houston health department are also seen in other areas of health care, including mental health establishments and hospital-based settings. The general organizational values and policies all mimic those of the health department. The benefits of cultural and linguistic competency in a mental health setting include increasing the efficiency of the mental health services provided through increasing the amount of help-seeking behaviors in underrepresented populations. This boosts the satisfaction of those who are receive services and increases minority perceptions regarding quality care from competent health care providers. However, these mental health
organizations use a different method to assess their organization's level of cultural and linguistic competency than the Houston health department. The mental health organizations use the 'System of Care Assessment (SOCA)' as an assessment tool which is subdivided into two domains: infrastructure and service delivery. The infrastructure domain determines the level of competency on the organizational and administrative level of cultural and linguistic competency in service delivery. The service delivery domain assesses the processes directly related to the services provided. A study found that the service delivery domain is better implemented in the specific mental health institutions measured than the infrastructure domain. However, over time the infrastructure domain slowly improved. Additionally, there were variances among the different sites measured indicating that there needs to be greater uniformity across sites in order to provide equal services to recipients. The sites that improved the most created the culturally competent programs and increased the caregiver's role in all aspects of systems of care. This lead to an increase in the families' participation of the total care process. Another method of measurement used by hospital systems in the U.S. to assess for cultural and linguistic competency, attitudes, beliefs, and skills involved in becoming a culturally competent individual. These three measurable components of cultural and linguistic competency can be further divided into five factors: language skills, communication skills, awareness, knowledge, and relationships. These measures can be useful in determining if the health department's program is efficient and can be compared with other programs to evaluate various interventions that began with similar cultural and linguistic competency goals.

Hospitals are one of the largest health care settings in which cultural and linguistic competency training has been implemented in order to break some of the common, preexisting barriers hindering patient access to quality care. One of the most common cultural barriers seen in the hospital or public health setting are language barriers. For this reason, Kaiser Permanente created a cultural and linguistic assessment Initiative for clinicians to provide language concordance and break language barrier complications. Linguistic minorities are shown to suffer more serious adverse outcomes and get less quality care than those who can speak English. Thus, their initiative was to “develop an assessment that would accurately measure clinician linguistic proficiency, establish a standard level in which clinicians can communicate in a non-English language effectively and independent of an interpreter, set standards in language concordance, and develop education and training interventions to enhance clinical language skills”. Their method of determining clinical language competency creates an examination that can provide objective and subjective scores to determine the validity of a candidate's level of proficiency in a language. This would allow more health care providers to become their own translators while establishing a foundation to help coordinate and maintain culturally competent language services. These type of endeavors created by hospitals such as Kaiser Permanente prove that cultural and linguistic competency is a major domain of public health that needs to be addressed. Only through creating standards and conformity throughout a health care system can an intervention can be successfully implemented. Just as the PHAB board or National CLAS requirements are providing standards to address the need for creating a more competent workforce in health departments, other health care fields are also adapting to the more diverse population demographic that received health related services.

Conclusion

Although the idea of creating a more culturally and linguistically competent workforce is a relatively new phenomenon due to the growing diverse population of the U.S., it is currently
being implemented as a part of everyday workforce education and training. More evidence is supporting the importance of cultural competency in providing quality health care and health services. The Houston health department is one health care organization committed to creating the proper assessment tools (following PHAB board requirements, the National CLAS standards, and other standardized tools such as the BARHII ‘Organizational Self-Assessment for Addressing Health Inequalities Toolkit’) in order to evaluate the current competency of the health department workforce, create methods and interventions to meet the current standards of cultural and linguistic competency, assess whether interventions placed in the health department are increasing the quality of health services provided, and creating an environment that is representative of the current demographic population of the city they serve.

References


Toxoplasma retinochoroiditis: the right diagnosis; the right treatment.

Fundusscopic images

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Introduction

Toxoplasmosis is one of the most common human parasitic infection worldwide. In most adults, it does not cause serious illness, but in immunocompromised individuals, it can cause more severe but also atypical manifestations. We present a patient who complained of progressive vision loss, with newly diagnosed HIV infection, in whom polymerase chain reaction (PCR) of the vitreous humor was a definitive tool to achieve the diagnosis.

Case report

A 36-year-old woman with newly diagnosed nephrotic syndrome presented with a ten-day history of progressive vision loss. She denied history of immunosupression, including HIV. On ophthalmological exam, visual acuity was 20/800 in both eyes. The left eye showed grade four disc edema and both retina had vitreous and intraretinal hemorrhages (Figures 1 and 2, panels A). HIV serology was positive, CD4 count of 17 cells/µl and viral load of 375,000 copies/ml. Computed Tomography of the head was normal. Cerebrospinal fluid (CSF) analysis was unremarkable. Serum and CSF immunoglobulins against *Toxoplasma spp*, Polymerase Chain Reaction (PCR) for herpes simplex virus 1 and 2, varicella-zoster (VZV) and cytomegalovirus (CMV) were negative. Empirical treatment with ganciclovir, trimethoprim-sulfamethoxazole, and prednisolone was started. PCR of the vitreal fluid was positive for toxoplasma antigen and negative for CMV and VZV in both eyes. The diagnosis of toxoplasma retinochoroiditis was confirmed and ganciclovir was discontinued. The patient continued a six-week course of antibiotics with clinical improvement after four weeks (Figures 1 and 2, panels A).

Figure 1. Panel A: Funduscopy of the left eye demonstrating grade four disc edema (white arrow) with peripapillary and intraretinal hemorrhages (arrowhead) and subretinal whitening. Panel B: Improvement of the disc edema (white arrow) and intraretinal hemorrhage (arrowhead) after a four-week of treatment.
Figure 2. Panel A: Funduscopy of right eye demonstrating a pink papilla without disc edema, patchy intraretinal hemorrhages (arrowhead) and diffuse subretinal whitening. Panel B: Improvement of the intraretinal hemorrhage (arrowhead) after a four-week course of intravenous and intravitreal antibiotics.

Figure 3. Fundus fluorescein angiography of the right eye (Panel A) and left eye (Panel B) at the time of presentation, demonstrating the old lesions with hypofluorescence in the center (arrows) and the hyperfluorescence at the margins corresponds to active lesions (arrowheads).
Conclusion

In immunocompromised patients it is difficult to establish a diagnosis of ocular toxoplasmosis based upon the lesions appearance. In these patients, atypical lesions are common and obtaining reliable results for immunodiagnostic assays is more difficult, as immunoglobulin levels may be decreased or absent in severely immunodeficient patients. The best clue to diagnosis is recognition of the clinical presentation and the direct detection of the agent in ocular samples by molecular biology, using PCR\(^1\). Confirmation of diagnosis is higher for PCR of vitreous samples compared to aqueous humor\(^2\)\(^-\)\(^5\). This is due to the fact that, anatomically, the vitreous humor is closer to the necrotic lesions, leading to a better sampling of the parasitic DNA. In summary, a positive PCR study for *T. gondii* is a dependable alternative to diagnose retinochoroiditis in an immunocompromised patient.

References

Systemic Lupus Erythematosus Presenting as Diffuse Alveolar Hemorrhage

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Abstract

Diffuse alveolar hemorrhage (DAH) is a rare and life-threatening pulmonary complication that can be seen in individuals with systemic lupus erythematosus (SLE). Timely diagnosis and management of DAH is imperative to decrease the significant morbidity and mortality associated with this complication. For the majority DAH associated with SLE, SLE was diagnosed months to years prior to the episode of DAH. We report a case in which DAH was amongst the initial presenting manifestations leading to the diagnosis of SLE.

Case Presentation

A 29 year-old Hispanic female with no significant past medical history presented to the emergency department after she was found to be severely anemic by her primary care physician. The patient is a housewife and mother who spends the majority of her time working at home. In the two weeks prior to admission, she had been feeling increasingly fatigued and short of breath. She was unable to keep up with her children and required multiple breaks when vacuuming a small area of her home because of her symptoms. When she presented to her primary care physician on the day of admission, she was immediately referred to our institution for severe anemia. She denied any bleeding other than her menstrual periods, which had decreased in severity and duration over the last two to three months. She manifested no other associated symptoms, including fevers, chills, headache, cough, chest pain, abdominal pain, constipation, diarrhea, urinary complaints, musculoskeletal weakness, or rash. She, along with her family, had travelled to Mexico approximately three months prior to admission. No family members had exhibited any symptoms of illness at the time of the patient’s presentation. Although her mother had a history of anemia of unknown etiology, the patient was not aware of any personal and family history of medical conditions.

On initial evaluation, the patient was febrile to 102.1 F° and tachycardic to 113 beats per minute. Her blood oxygen saturation level (SpO₂) nadir was 85% on room air that rapidly corrected to 100% on 2L nasal cannula oxygen supplementation. Blood pressure was within normal limits. Respiratory examination revealed mild tachypnea and clear lung fields noted bilaterally on auscultation. Cardiovascular examination, other than sinus tachycardia, did not reveal any abnormalities. The rest of the physical examination was otherwise unremarkable.

Initial laboratory studies revealed WBC 11.7 x 10³/mm³, Hgb 5.2 g/dL, MCV 87.4, RDW 15.1%, reticulocyte count 7.2%. The basic metabolic panel was unremarkable. However, the serum albumin level was 1.2 g/dL. Proteinuria and microscopic hematuria was found on urinalysis.
Chest x-ray showed hazy alveolar opacities bilaterally with the right side featuring more prominence compared to the left.

Figure 1. Posterior-anterior and lateral chest x-ray on initial presentation.
The patient was transfused two units of packed red blood cells and started on broad-spectrum antibiotics. She was admitted to the hospital for further evaluation. The morning following admission, the patient exhibited sudden onset of hemoptysis as well as an acute decrease in SpO$_2$ to 70%. A chest x-ray revealed diffuse bilateral opacities that have progressed significantly compared to previous imaging. CT chest also revealed similar findings as well as intrathoracic lymphadenopathy.

The patient was subsequently transferred to the MICU and intubated for hypoxic respiratory failure. Diagnostic bronchoscopy was performed and revealed gross blood in the trachea and bilateral bronchi down to the subsegmental levels. No endobronchial lesions were noted in either lung. A bronchoalveolar lavage (BAL) of the right middle lobe was performed. A total of 120 cc of normal saline was instilled with subsequent aliquots remaining bloody. Following her episode of hemoptysis, her hemoglobin dropped to 5.1 g/dL, which improved to 6.9 g/dL after she received two additional units of packed red blood cells. The patient's age, anemia, hemoptysis, and non-specific constitutional symptoms prompted an evaluation of rheumatologic etiology for her symptoms. Laboratory analysis revealed low complement levels and confirmed the presence of the following: antinuclear antibody (ANA) (1:160). Anti-Smith, anti-Ro, and anti-ribonucleoprotein antibodies. The analysis also found that Anti-double stranded DNA, lupus anticoagulant, anti-cardiolipin antibody, beta-2-glycoprotein, anti-neutrophil cytoplasmic antibodies, and anti-glomerular basement membrane studies were negative. The infectious workup was unrevealing. A renal biopsy was obtained and revealed class II and class V lupus nephritis. The diagnosis of systemic lupus erythematosus (SLE) was made and the patient was treated with intravenous (IV) methylprednisolone 1g daily for 5 days. Upon completion of the IV corticosteroid regimen, the patient was given prednisone 60mg daily and hydroxychloroquine 200mg daily. The patient was eventually extubated and
weaned down to nasal cannula oxygen supplementation. She did not have further hemoptysis episodes and her hemoglobin remained stable. She was discharged with home oxygen supplementation, steroid taper, mycophenolate mofetil 500mg twice daily, and hydroxychloroquine 200mg daily.

Discussion

SLE is a systemic autoimmune disease which can affect any organ system. DAH occurs in approximately 2-5% of patients with SLE.1 Although it is rare, DAH in SLE can be devastating. Historical reports of mortality are reported to be as high as 70-90%.3 Although more recent studies have shown an improvement in survival, in-hospital mortality rates remain high by most accounts.2 Most patients who develop DAH generally have a long-established diagnoses of SLE. However, several cases have described pulmonary hemorrhage as an early presenting feature within this disease.6 When present, pulmonary hemorrhage in patients with SLE tends to occur in those with severe, multiorgan disease involvement. The association between nephritis and DAH in SLE has been identified by multiple studies.4,13

The diagnosis of DAH typically requires the presence of: 1) signs of pulmonary hemorrhage such as hemoptysis 2) an acute decrease in hemoglobin, and 3) new evidence of diffuse alveolar opacification.2,5 Evidence of pulmonary hemorrhage may not always be obvious. For example, dyspnea is more often the presenting feature of DAH while hemoptysis is commonly absent.6 Nonspecific symptoms such as fever and cough are also frequently seen as presenting symptoms making the distinction between DAH and infection difficult.3,6 Radiographic evidence of alveolar hemorrhage is generally bilateral, although unilateral findings may occur on initial presentation and can be easily misinterpreted for pulmonary infection.6 Serial chest radiographs may be helpful as interstitial or unilateral radiographic findings may be representative of early abnormalities that can rapidly progress to severe DAH.8 Bronchoscopy with bronchoalveolar lavage is indicated and should be performed early for diagnostic confirmation of DAH given the high mortality rate as well as overlapping presentations with other conditions. Aspirated fluids may be persistently or increasingly bloody, and red blood cells as well as hemosiderin-laden macrophages are generally visualized under microscopy.3,6,14

Heavy immunosuppression with high dose corticosteroids and cytotoxic agents have been associated with improved clinical outcomes.6 Interestingly, multiple reports note that alveolar hemorrhage may occur or recur in patients already receiving immunosuppression.6 Because autoantibodies and immune complex deposition are thought to play a role in the disease process, plasmapheresis has been used in treatment regimens if patients did not show adequate clinical response to corticosteroid and cytotoxic therapy.6 Concomitant use of cytotoxic agents with plasmapheresis has been suggested to decrease the risk of increased autoantibody synthesis during plasmapheresis.6,9,10 Because of the higher mortality associated with concomitant DAH and infection, a systematic search for pulmonary infections along with broad-spectrum antibiotics may help improve clinical outcomes.3,6,14,15

Conclusion

DAH, although rare, can be a severe manifestation of SLE. Early recognition of DAH is difficult because of its abrupt onset and rapid progression. Presentation of DAH can be similar to
common conditions such as infection. Knowledge of the clinical features of DAH can help clinicians reach the diagnosis quicker and initiate treatment early in an attempt to improve outcomes. Clinicians should undergo a thorough evaluation for potential infections as its coexistence with pulmonary hemorrhage is associated with higher mortality. Therefore, the threshold for initiating empiric antibiotic therapy should be low. Corticosteroids and cytotoxic agents are the first line treatments for DAH secondary to SLE. Plasmapheresis remains an option in severe cases that are unresponsive to traditional therapies.

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Disseminated Cryptococcosis with False-negative Serum Antigen Testing

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Abstract

Introduction: *Cryptococcus neoformans* can cause widespread infection, involving the central nervous system, lungs, gastrointestinal tract and skin. The majority of the subclinical infections are asymptomatic and timely diagnosis can be challenging, often times leading to grave consequences.

Case Report: A 51-year old man with HIV infection presented with a productive cough, atypical chest pain and diffused papular skin lesions. His CD 4 count was 11 cells/µL. His initial cryptococcal antigen test result was negative. Further work-up revealed Cryptococcus in blood culture and skin biopsy, cryptococcal duodenitis, gastritis and meningitis.

Discussion: Clinicians frequently use cryptococcal antigen to screen immunocompromised patients for cryptococcal infections. A false-negative antigen test can delay initiation of treatment and increase morbidity and mortality.

Introduction

Disseminated cryptococcosis is a potentially severe infection with high morbidity and mortality. Cryptococcosis accounts for 20% to 25% of AIDS-related deaths globally each year. Early diagnosis is imperative to initiate therapy and improve prognosis.

Case Description

A 51-year-old man with known HIV infection, off antiretroviral therapy, presented with one week of worsening cough with clear sputum, subjective fevers, night sweats, and odynophagia accompanied by chest and abdominal pain. He also had new scattered umbilicated papules on his arms, neck and trunk (Figures 1A and B). He was tachycardic but breathing comfortably on room air. Physical examination revealed diminished basilar breath sounds bilaterally, and oral thrush.

Routine laboratory tests on admission revealed a hemoglobin level of 12.1 g/dL, white blood cell count of 13500/µL (58% neutrophils, 23% lymphocytes, 4% monocytes), aspartate aminotransferase 66 U/L, and alkaline phosphatase 197 U/L. Serum lactic acid was 2.23 mmol/L, LDH 273 U/L and Rapid Plasma Reagin test was negative. Chest radiography showed bilateral lower lung interstitial opacities. Empirical therapy with trimethoprim-sulfamethoxazole and prednisone was started. Additionally, he received fluconazole for oropharyngeal candidiasis and esophagitis. Computerized tomography demonstrated hepatosplenomegaly and miliary ground glass nodular opacities in both lung bases. Serum cryptococcal antigen and sputum samples for acid fast bacilli were negative.
The odynophagia persisted despite fluconazole. An esophagogastroduodenoscopy was performed, revealing diffuse esophagitis, gastritis, and duodenitis. Grocott methenamine silver staining was performed on the biopsy samples revealing cryptococcal duodenitis and gastritis. Skin biopsy demonstrated encapsulated yeasts (Figure 2), consistent with Cryptococcus. Blood cultures also grew *C. neoformans*. Lumbar puncture showed an opening pressure of 26 cm H$_2$O. Analysis of the cerebrospinal fluid showed 5 leukocytes/µL, positive Cryptococcus antigen titers of 1:2560, and cerebrospinal fluid culture positive for *C. neoformans*. Amphotericin B and flucytosine for two weeks led to adequate response. The patient was discharged on consolidative therapy with fluconazole, as well as antibiotic prophylaxis for *Mycobacterium avium* complex and *Pneumocystis jiroveci*.

Discussion

Serum and cerebrospinal fluid antigen testing for Cryptococcus is often used due to its high sensitivity and expediency in results. This case demonstrates the potential problems associated with false negative serum antigen testing. Latex agglutination testing for cryptococcal capsule may be falsely negative in infections with *C. gattii*, an unencapsulated Cryptococcus, or when the fungal load is low [1]. The lateral flow assay for the capsular glucuronoxylomannan is more sensitive than latex agglutination at lower antigen concentrations and is better at detecting infections from *C. gattii* [2]. In some cases, antigen testing has also been proposed as a screening tool for cryptococcal disease in asymptomatic untreated HIV-infected persons with CD4 counts < 100 cells/µL. Nevertheless, the result of the lateral flow assay used in this patient was falsely negative. Despite the high sensitivity and specificity, and rapid results of antigen testing, clinicians should keep in mind the limitations of these assays, and should resort to tissue diagnosis or direct staining when clinical suspicion is high.

References

Faster than a speeding bullet: an atypical case of Guillain-Barré Syndrome

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Summary

Guillain-Barré Syndrome (GBS) describes a disorder characterized by the acute onset of ascending paralysis with absent deep tendon reflexes. Presenting symptoms may be quite subtle but become more apparent as the disease progresses. Most cases of GBS take several weeks to months for complete resolution of symptoms. GBS is a disorder with a spectrum of possible manifestations and known variants. We present this case of GBS as a unique presentation based on the rapidity of onset, concurrent myopathy, and extremely quick rate of recovery.

Background

Dr. Landry first reported cases of patients with distal sensory disturbances and progressive ascending paralysis in 1859(1). French neurologists Guillain, Barré and Strohl further described this disorder years later as having a dissociation between protein concentration and cell count in cerebrospinal fluid (CSF) (1,2). Their observations stemmed from clinical evaluation of CSF from soldiers with similar presentations of ascending paralysis. This finding, labeled albuminocytologic dissociation, has become a central finding in the disorder now called Guillain-Barré Syndrome (GBS) (2). Since the original description of GBS, several variants have been recognized based on the pathophysiology and type of nerve fiber involved (3). The acute motor axonal neuropathy (AMAN) variant affects the axons of motor neurons and progresses rapidly (3). Patients usually don’t start to recover from classical GBS or variants until weeks after treatment with full recovery taking several months in most patients (2,3). We present this case of AMAN variant GBS that had an atypical course characterized by rapid onset, concurrent myopathy, and extremely speedy recovery with full resolution occurring in only 13 days.

Case Presentation
A 24-year-old man with no past medical history presented to our facility four days after noticing numbness and tingling in his toes bilaterally. He had no pertinent past medical history, recent infection, or travel. Soon after noticing the numbness, he experienced decreased strength with hand grip and plantar flexion along with dysphagia to solids and liquids. His weakness progressed to the point he was not able to raise himself from a supine position. At this stage, the patient was brought to our hospital for treatment. At presentation, physical examination revealed ankle and patellar deep tendon reflexes to be intact bilaterally. Initial laboratory evaluation showed an elevated creatine kinase (CK) of 1162 U/L. The CK peaked in our patient at 4099 U/L with gradual decrease to baseline normal values. No additional etiology for CK elevation was identified based on history, medication consumption, or exercise practices of the patient. However, there was no renal injury or physical symptoms of myalgia. Therefore, acute rhabdomyolysis was considered to be a less likely etiology for our patient's condition. Two days after presentation, the patient's patellar and ankle reflexes became absent bilaterally. The patient continued to deteriorate and became unable to lift any of his extremities against gravity. Concern for neuro-muscular etiologies prompted an electromyogram with nerve conduction study that revealed polyneuropathy and axonal demyelination. Magnetic resonance imaging of the lumbar spine was also obtained, which showed enhancement of the ventral nerve roots at the level of the cauda equina (See Image 1). The patient underwent a lumbar puncture that revealed elevated protein and a normal white blood cell count consistent with albuminocytologic dissociation. The summation of the clinical presentation, laboratory data, and imaging findings prompted the diagnosis of Guillain-Barré Syndrome and intravenous immunoglobulin (IVIg) therapy was started. After 5 days of treatment, he was discharged home with his baseline upper extremity strength and the ability to ambulate with a cane. Thirteen days after onset of symptoms, he was performing all activities of daily living, walking without an assist device, and had just returned from attending a professional soccer game. The patient's continued recovery was confirmed by telephone conversation.

Discussion

Guillain-Barré Syndrome (GBS) is one of the most common causes of neuromuscular paralysis in the world, with an annual incidence of 1.2-2.3 per 100,000 cases (1). Studies have shown that men are affected more frequently than women, and that incidence increases with age (4). Often times, GBS is preceded by an antecedent infection (1,4). However, most cases occur sporadically (1,2). The majority of cases in North America and Europe take on the classical form, while variants are more common in Asia and the rest of the Americas (3,4,5).

The typical form of GBS, also known as acute inflammatory demyelinated polyneuropathy (AIDP), is characterized by initial symptoms of sensory deficits in the extremities that precede weakness. Sensory abnormalities typically manifest as paresthesias and dysesthesias. Classically, sensory deficiencies begin as bilaterally symmetric distal lower extremity weakness and extend proximally to involve the upper extremities, bulbar musculature (facial weakness, dysphagia) and autonomic nerve fibers (cardiac arrhythmias, labile blood pressures). The progression of weakness beginning in the lower extremities and extending to involve more proximal muscles is termed ascending paralysis. Other common signs and symptoms reported in the literature include respiratory fatigue from diaphragmatic involvement, decreased or absent deep tendon reflexes, and pain (1,2).
The diagnosis of GBS is based on clinical suspicion. Progressive weakness and areflexia are required to diagnose typical GBS (1). Additional investigations that help confirm the diagnosis of GBS include cerebral spinal fluid analysis, nerve conduction studies, electromyography, antibody testing, and/or nerve biopsy. Albuminocytologic dissociation in the spinal fluid is a typical feature of GBS. A demyelinated pattern on nerve conduction studies and electromyography are also frequently seen (1). Antibodies directed against Schwann cells or myelin have occasionally been identified in the patients suffering from GBS (6). Nerve biopsies are rarely performed, but when obtained reveal lymphocytic infiltration (1,2). Additionally, non-specific findings of elevated creatine kinase (CK) or transaminases have been observed in the setting of GBS (7,8).

Many variants have been characterized since GBS was first described. Variants differ based on the type of nerve fiber involved (sensory, motor, cranial, or autonomic) and the nature of nerve fiber injury (axonal or demyelinating). Similar to classical GBS, the acute motor axonal neuropathy (AMAN) variant may be preceded by infection and presents with symmetric distal and proximal weakness. The AMAN variant tends to have less sensory abnormalities and is characterized by a very rapid onset of weakness and a prolonged course for recovery (1,3).

Our case has some atypical features that are notable. This patient had an elevated CK suggesting a component of myopathy. As noted previously, CK can be elevated in classical GBS, however our patient’s CK peaked at 4099 U/L. Although this level of CK is far less common, it has been associated with GBS. Satoh et al. described a patient who presented with cramping pain and a CK level of 1917 U/L (4). The patient eventually manifested areflexia and ascending paralysis before being diagnosed with GBS. Their group suggested that rapid denervation secondary to acute inflammation in GBS lead to hyperexcitability in muscles. This in turn caused cramping and elevated CK (4). Similarly, Scott et al. reported a case of AMAN variant of GBS that presented with concurrent acute rhabdomyolysis (9). This patient had CK levels peak at 10,150 U/L with no reported pain or muscle cramps. Several other reports of elevated CK in the setting of GBS have been reported (4,5,7,9,10). Although not fully understood, GBS can manifest with substantial CK elevations that can cause pain, bodily injury, and even death (5,7,10). Further investigation is necessary to help elucidate the mechanism of muscle injury (11).

Another interesting aspect of our case was the rapid recovery our patient experienced. Recovery in cases described by Satoh et al. and Scott et al. took several weeks before the patient could be discharged to an acute rehabilitation hospital (4,9). This is consistent with the natural disease course associated with GBS (1). Our patient was back to his baseline muscle strength 13 days from the onset of symptoms. Cases of rapid recovery from GBS and its variants have been reported before (11). However, we are not aware of a case describing this short of a recovery course. Ho et al. presented a case of AMAN where the patient returned to 4 out of 5 muscle strength at 15 days, but the patient did not display CK elevation. Our case showed rapid recovery in a patient with the AMAN variant and elevated creatine kinase that are associated with prolonged recovery times.

GBS is composed of a spectrum of disorders categorized into multiple variants. The disease course associated with GBS is expected to require weeks to months for full recovery (1,2). We present this atypical case to highlight that unexpected variations can be encountered in GBS.
By reporting atypical variants of this disorder, we may be able to establish a better understanding of the collection of symptoms that are associated with GBS.

References

Adaptability to Adverse Outcomes from Innovative Medicine

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Abstract

This case report describes a unique surgical procedure performed on a patient with humeral metastasis of leiomyosarcoma that was experimentally injected with Clostridium spores. This patient had a complicated treatment course due to a long history of progressive and recurrent leiomyosarcoma. She was injected with Clostridium spores due to inadequate outcomes using traditional treatment methods to eradicate the tumor. However, she subsequently developed a pathological fracture and her humerus became infected. Thus a creative surgical approach was performed to resolve the infection.

This report is an example of how innovative medicine may result in adverse consequences. Physicians who partake in experimental treatment approaches must be aware of all the possible outcomes and have the ability to adapt and improvise in each circumstance.

Introduction

Advanced solid tumors can be difficult to manage with conventional therapy for various reasons. A major impediment to management is the development of hypoxic regions within the tumor. Tumor hypoxia has been shown to reduce the efficacy of many standard cytotoxic drugs used in the treatment of cancer [1]. This is primarily due to poor vascularization of the tumor resulting in necrotic regions and poor penetration of drugs. Additionally, tumor hypoxia can promote tumor progression and has become a prognostic factor for patient survival and cancer control [1]. As technology and research expands, experimental approaches and treatment options are becoming more prevalent. Particularly in diseases, such as cancer, where the pathological process is not always fully understood and limited treatment options exist. When non-traditional techniques are applied, the obvious objective is remission and resolution of the disease. However, in many instances this positive outcome is not achieved. As a result, clinicians and physicians must be prepared to handle adverse outcomes, while maintaining the ability to adapt in order to find a cost effective solutions for suboptimal results. These characteristics are a key component of innovative medicine.

The genus Clostridium is a gram-positive, rod shaped, spore forming obligate anaerobe. Therefore, hypoxic regions within tumors provide the optimal environment for the bacterial endospores to selectively germinate. C. Novi-NT, in particular, is extremely sensitive to oxygen. Intratumoral injections of C. Novi-NT spores has numerous antitumor effects, it causes tumor necrosis, an intense
inflammatory response, and an adaptive immune response against tumor cells [2]. We describe the cost effective reconstruction of the proximal humerus in a patient that became infected following the experimental use of Clostridium Novi injections for metastatic disease.

Case Report

In 2006, a 53 year old woman initially noted a palpable mass in her lower right abdomen. A subsequent ultrasound evaluation and biopsy revealed a retroperitoneal leiomyosarcoma. She was started on chemotherapy (Taxotere and Gemcitabine followed by Adriamycin and Ifosfamide) but required intraoperative radiation therapy and right radical nephrectomy. However, one year later the patient developed metastatic disease in her liver and lungs. She ultimately underwent right and left thoracotomy along with left lower lobe resection. In 2013, the patient was noted to have significant progression of her liver and lung metastasis.

A large destructive lesion in her right proximal humerus with circumferential soft tissue involvement was noted on computed tomography (CT) scan [Figure 1]. The lesion caused significant discomfort and pain in her right shoulder resulting in a progressive limitation in range of motion. The patient agreed to experimental treatment with intra-tumoral injections of Clostridium novyi-NT spores. However, two days later she reported a significant increase in pain in her right deltoid area that radiated down to her scapula. She also developed a fever of 39.2°C for 24 hours. As workup for a possible infectious source, the patient underwent a CT scan which demonstrated interval development of air within the right humeral intramedullary cavity, soft tissue component of the metastasis, and right humeral joint space. These findings were consistent with an abscess [Figure 2]. The abscess was decompressed percutaneously by interventional radiology (IR) with a drain to temporally alleviate her pain and discomfort. The pain eventually subsided and she was able to retain function of the joint.

Two months later while pulling a shirt over her head the patient heard a loud crack. She was found to have a pathological fracture through the necrotic portion of the bone. A biopsy of the humerus confirmed tumor infiltration. The most definitive treatment for this complicated case at the time was amputation. However, the patient did not agree to this procedure and opted to pursue limb salvage therapy. After discussing the risks of infection, tumor recurrence, and pathological fracture, the patient was taken to the operating room for surgical intervention.

Utilizing a deltopectoral approach to the humerus, the diseased tissue was identified immediately and was sent for culture and pathology; the pathological fracture was also noted. A large amount of purulent fluid was found and aspirated and there was a large amount of disease with very hard nodules found in the tissues (Figure 3). These were excised as they were encountered. Ultimately, because the humerus was infected following the Clostridium injection the subsequent surgery became more complex and challenging.

Postoperatively, the patient was stable and placed in a shoulder immobilizer and instructed to remain non-weight-bearing. The patient was seen a month later during a follow up visit, she reported much improvement with only mild aches and pains. On physical exam, she was able to shrug her shoulder and had full range of motion of her elbow and wrist. The sling was continued for comfort. She missed her 3 month follow up visit but reported that function in her arm had been acceptable. Unfortunately, due to progression of the metastatic leiomyosarcoma the patient passed away 5 months following the operation.

Discussion
This patient had a complicated treatment course due to progression and recurrence of her leiomyosarcoma. As a result of inadequate outcomes using traditional therapies including chemotherapy, radiation, and surgical resection, experimental options were considered. Treatment with clostridium injection was chosen because it has been shown to produce an antitumor response experimentally in rat carcinomas and sarcomas (2). The patient was injected with *C. Novi-NT* spores in an attempt to eradicate the metastatic tumor in the right proximal humerus. However, the projected response was not appreciated because the humerus became infected following injection. Therefore, a creative surgical approach was performed to resolve her iatrogenic infection. This case provides an excellent example of how innovative medicine may sometimes result in adverse consequences. It is vital to portray all possible risk and benefits clearly to patients considering experimental treatments. This is especially true for patients with death defining illnesses who are often desperate and willing to undergo any possible solution to cure or mitigate the disease. Additionally, physicians who partake in experimental treatment approaches must be acutely aware of all possible outcomes, beneficial or negative, and have the ability to adapt and improvise as circumstances dictate.

Imaging

Figure 1: Right proximal humerus CT demonstrating soft tissue mass.

Figure 2: Right proximal humerus CT
Figure 3: Intraoperative specimens

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Barrett’s esophagus incidentally diagnosed on biopsy disruption of a Schatzki’s ring

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Abstract:

We present a case of Barrett’s esophagus (also called Barrett’s metaplasia) incidentally diagnosed after biopsy excision of a Schatzki’s ring in a patient with no endoscopic evidence of classic salmon-colored mucosa extending from the gastroesophageal junction (GEJ). Our report suggests that, however rare, Barrett’s metaplasia should be considered in patients with symptoms consistent with reflux with or without a Schatzki’s ring. Close follow up of these patients is warranted to avoid missing the diagnosis as this may lead to dysplasia and subsequent esophageal adenocarcinoma.

Case

A 45 years old Caucasian female with no significant past medical history presented with chronic dyspepsia. She was previously evaluated for intermittent epigastric pain with radiation to her chest and was diagnosed with GERD over five years ago. She was started on esomeprazole 40 mg daily with mild symptomatic relief. For seven months preceding endoscopy, her epigastric pain worsened in intensity and she developed new onset back pain. Her abdominal pain was improved after meals. She denied any nausea, vomiting, weight changes, dysphagia or cough. There was mild epigastric tenderness to palpation on an otherwise benign physical exam.

As her symptoms did not improve with medical management, upper gastrointestinal endoscopy was performed. A small (4-5 mm) hiatal hernia and an intermittent Schatzki’s ring were noted (Figure 1). Disruption biopsies of the ring were obtained (a total of 8 biopsies) and sent for histopathologic examination.

Histopathologic review of the biopsy samples from the gastroesophageal junction/Schatzki’s ring revealed Barrett’s metaplasia with chronic inflammation and squamous epithelium with changes consistent with reflux esophagitis (Figure 2).

Repeat upper endoscopy performed 6 weeks later revealed a partially disrupted Schatzki’s ring. Repeat biopsies again confirmed the presence of Barrett’s esophagus. The patient was continued on proton pump inhibitor with plan for repeat endoscopy in three years for surveillance.

Introduction/Background

Barrett’s esophagus is a complication of gastroesophageal reflux disease. It occurs with prolonged exposure of the esophagus to gastroduodenal reflux, which results in the development of metaplasia of the squamous epithelium into specialized columnar mucosa with goblet cells in some
patients. This phenomenon is known as intestinal metaplasia (1). It is estimated that 5.6% of United States population has Barrett’s esophagus. Between 0.5-1.0% of people with Barrett’s esophagus may develop dysplasia which could lead to esophageal adenocarcinoma, a tumor that carries a poor prognosis (1). The diagnosis requires endoscopic evaluation and biopsies. Barrett’s esophagus is typically identified endoscopically as salmon-colored mucosa extending from the gastroesophageal junction. The diagnosis is confirmed with histopathologic examination. Proton pump inhibitors are the mainstay of therapy for Barrett’s esophagus as it has been shown to reduce the risk of neoplastic progression while providing reflux control (2). Endoscopic interventions such as radiofrequency ablation can also be employed; however, its role in non-dysplastic Barrett’s esophagus has not been well established. Periodic endoscopic surveillance with mucosal biopsies is recommended every 3-5 year by American College of Gastroenterology (3).

Discussion

Our case highlights a rare incidental finding of Barrett’s esophagus on biopsies taken during endoscopic disruption of a Schatzki’s ring. Schatzki’s rings and Barrett’s esophagus rarely occur together. In fact, Schatzki’s rings were thought to be protective against the development of Barrett’s esophagus by providing mechanical inhibition of acid exposure in the distal esophagus (4). However, Winters et al. sheds doubt on this theory by demonstrating that there is no significant worsening of acid reflux after ring dilation (5). Furthermore, they suggest that the presence of Schatzki’s rings may lead to prolonged exposure to gastric acid by preventing esophageal acid clearance. This may explain the histopathologic diagnosis of Barrett’s esophagus in our patient whose upper endoscopy showed a Schatzki’s ring without the typical salmon-colored mucosa extending proximally from the GEJ. Conversely, this finding may be coincidental. Further clinical, cellular and even molecular studies are needed to determine whether a cause and effect exist between Schatzki’s ring and Barrett’s esophagus. Through our case, we intend to suggest that histologic evaluation is important in cases of biopsy disruption of Schatzki’s rings. The presence of histological Barrett’s esophagus without endoscopic evidence in patients with a Schatzki’s ring is likely rare; however, routine biopsies are generally not performed in these cases. The actual incidence of concomitant Barrett’s esophagus and Schatzki’s ring should be determined as this would be important for future surveillance biopsies, which could potentially help prevent the development of esophageal adenocarcinoma in this subset of patients.

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Nitrofurantoin-induced Acute Psychosis

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Abstract
Nitrofurantoin is one of the most commonly used antibiotics for the treatment of urinary tract infections due to its cost effectiveness as well as its potent activity against common urinary pathogens. Side effects in patients taking nitrofurantoin are infrequent and generally minor and reversible. Neurotoxicity secondary to nitrofurantoin is rare and primarily limited to peripheral neuropathy. We report a case in which an acute psychotic state developed after a patient was prescribed nitrofurantoin.

Case Presentation
A 33 year-old Caucasian female with a history of automobile-pedestrian collision accident 4 months prior to admission resulting in skull fracture and subarachnoid hemorrhages was brought by her husband to the emergency department for evaluation of a sudden change in behavior. She does not have any personal or family history of neuropsychiatric disorders and had been well following her accident. Approximately four days prior to admission, she was prescribed nitrofurantoin for empiric treatment of a presumed urinary tract infection. She otherwise does not take any medications. She had been watching Toy Story 3 with her children and mother when she developed bizarre behavior characterized by tangential thought and speech as well as speaking only in Japanese and German (languages in which she is fluent in addition to English). During transportation to the hospital, her husband attempted to gauge her mental status in hopes for improvement. However, she would suddenly disengage from conversations at times and stare into the sky. She also repeatedly stated, “We have to go and save Woody.”

In the emergency department, the patient exhibited vocal outbursts and lack of cooperation with medical evaluation requiring temporary pharmacologic sedation with benzodiazepines. Her urine drug screen for substances including amphetamines, barbiturates, cocaine, opiates, phencyclidine, and tetrahydrocannabinol was negative. No electrolyte abnormalities were found. All vital signs were within normal limits on initial presentation. On neuropsychiatric examination, the patient appeared distrustful. She generally avoided eye contact and refused to answer most questions. She was able to state her name but was not oriented to time or place. When asked to count the number of people in the room, she stated that her friend (who was not present) and Woody (the character from Toy Story) were standing behind her. Physical examination was otherwise unremarkable. When her husband arrived to the examination room, she said, “He is not my husband. He is a dragonslayer.”
Given the chronologic association between nitrofurantoin initiation and subsequent onset of symptoms, the medication was discontinued on admission. Urine culture performed at the primary care clinic did not show any bacterial growth. The patient’s mental status improved to baseline over the next 24 hours. She was subsequently discharged home in good condition.

Discussion

Nitrofurantoin is one of the most commonly used antibiotics for the treatment of urinary tract infections due to its cost effectiveness as well as its potent activity against common urinary pathogens. Bacterial nitroreductases convert nitrofurantoin to highly reactive electrophilic intermediates which attack ribosomal proteins, DNA, as well as other molecular structures in a nonspecific fashion. Other mechanisms of action have also been described. Despite its widespread use since the 1950s, nitrofurantoin resistance has generally been less problematic compared to that of other antimicrobials, likely because of the medication’s multiple mechanisms and sites of action.

Side effects in patients taking nitrofurantoin are generally infrequent, minor, and reversible. Furthermore, early onset of adverse effects associated with nitrofurantoin use is uncommon. Pulmonary fibrosis and hepatotoxicity, two of the most feared side effects of nitrofurantoin, have been primarily documented in patients receiving prolonged nitrofurantoin prophylaxis. Neurotoxicity secondary to nitrofurantoin is rare and usually limited to peripheral neuropathy. However, reports of other symptoms, including dizziness, vertigo, diplopia, cerebellar dysfunction, and benign intracranial hypertension have been reported. As toxicity associated with nitrofurantoin is generally seen in the geriatric population, the updated Beers criteria from the American Geriatric Society strongly recommends against its use in elderly patients. Other than one report of a 38 year-old female who developed sensory neuropathy over a 7-year period which was subsequently attributed to nitrofurantoin, adverse effects in younger patients appear to be rare. A single report detailed suspected nitrofurantoin-induced auditory hallucinations in an 83 year-old woman with Alzheimer’s disease. Otherwise, our literature review did not reveal any reports of nitrofurantoin causing acute psychotic symptoms.

The Naranjo criteria classify the probability that an adverse event is related to drug therapy using a weighted scoring system to examine factors such as the temporal association between drug administration and the event in question, alternative causes for the event, drug levels, dose-response relationships and previous patient experience with the medication. Based on the Naranjo algorithm, the patient’s presentation (Naranjo score = 7) falls under the “probable adverse drug reaction” category. A number of criteria examined by the Naranjo algorithm (i.e. reappearance of symptoms upon re-administration of the presumed inciting agent, reappearance of symptoms upon administration of a placebo medication, detection of serum drug levels, changes in symptom severity after increasing or decreasing the dosing of the presumed inciting agent) could not be evaluated in our patient due to ethical reasons or clinical irrelevance. The fact that the patient exhibited rapid improvement in symptoms after withdrawal of nitrofurantoin may reflect the quick half-life elimination rate of the medication.
Conclusion

Nitrofurantoin is commonly used for the treatment of urinary tract infections. Side effects are generally associated with the geriatric population, infrequent, mild, and reversible. Nitrofurantoin-associated neurotoxicity is rare and typically manifests as peripheral neuropathy. However, atypical adverse effects such as hallucinations and acute psychosis may be associated with nitrofurantoin, and clinicians should be mindful of such presentations. The Naranjo criteria is a useful tool for evaluating the relationship between a medication and potential adverse events.

References

Grumous within a Pancreatic Cyst: A Rare Case of Lymphoepithelial Cyst of the Pancreas Arising within an Accessory Spleen

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Abstract

Background

Cystic pancreatic lesions can be identified during radiologic work up of patients complaining of gastrointestinal symptoms. However, they can also be incidental findings in asymptomatic patients. Many of these cysts are as yet uncharacterized in terms of prognosis and imaging. Lymphoepithelial cysts, are rare cysts filled with keratinized material, lined by mature squamous epithelium which is surrounded by lymphoid tissue containing a few lymphoid follicles. Upon review of the literature there are approximately one hundred reported cases of lymphoepithelial pancreatic cysts.

Case Report

A 58-year-old Caucasian male with a past medical history of diabetes, hypertension, hyperlipidemia, and bilateral Warthin’s tumor removal presents with a 6.2x4.5x3.0 cm pancreatic cystic mass and an unintended weight loss of 24 pounds. The patient underwent endoscopic ultrasound and was found to have a 22 mm x 42 mm anechoic cystic mass with intra-cystic hypoechoic round nodules abutting the tail of the pancreas. Surgical pathology confirmed the presence of lymphoepithelial cells within the cystic mass suggesting a lymphoepithelial origin.

Discussion

As imaging studies reveal more pancreatic lesions, it is important to develop a broad differential diagnosis and better characterization of these lesions based on their appearance on these images in order to obtain an accurate diagnosis without the need for surgical intervention. Further study of the pathogenesis and progression of lymphoepithelial cysts is needed to create more accurate guidelines for their management.

Background

Cystic pancreatic lesions can be identified during radiologic work up of patients complaining of gastrointestinal symptoms. However, they can also be incidental findings in asymptomatic patients. Pseudocysts are the most common cystic lesion of the pancreas, often as a result of pancreatitis, but true pancreatic cysts are often neoplastic in origin which makes the classification of these cysts important for developing an accurate diagnosis, prognosis, and treatment plan.
Lymphoepithelial cysts are an uncommon, benign form of pancreatic lesions. They are filled with keratinized material, lined by mature keratinizing squamous epithelium which is surrounded by lymphoid tissue containing a few lymphoid follicles (3). They can arise from any portion of the pancreas, and sometimes within an accessory intrapancreatic spleen (3). These cystic lesions have distinctive radiological and pathological features, allowing their identification with a high degree of specificity important as will be shown by this case.

Case Report

A 58-year-old Caucasian male with a past medical history of diabetes, hypertension, hyperlipidemia, and bilateral Warthin's tumor removal was referred for evaluation of an incidental pancreatic mass found on computed tomography scan. His only symptom was an unintended weight loss of 24 pounds over the previous several weeks.

He did not smoke, had no history of alcohol abuse, and no family history of gastrointestinal malignancies. The patient subsequently underwent magnetic resonance imaging of the abdomen which demonstrated a 6.2 x 4.5 x 3.0 cm pancreatic cystic mass abutting the distal pancreatic body, proximal pancreatic tail, and inferior margin of the gastric body. (Figure 1) There was also a small 1.5 cm fluid filled cyst within the uncinate process, suspicious for either a congenital or acquired cyst.

The patient underwent endoscopic ultrasound and was found to have a 22 x 42 mm anechoic cystic mass with intra-cystic hypoechoic round nodules abutting the tail of the pancreas. (Figure 2) There were multiple intra-cystic nodules noted with the largest measuring 19 x 24 mm. The cystic lesion did not appear to be arising from the pancreas. There was a small 6.5 x 8 mm anechoic cyst on the uncinate process. Under Doppler guidance, fine needle aspirate biopsies were taken, which demonstrated atypical cells. The biopsy demonstrated cystic contents demonstrating highly degenerated squamous epithelium and numerous crystals suggestive of a cholesterol type in the background of degenerative changes with rare cells described as mucinous-like cells with features that were suggestive of lymphoepithelial cysts. The patient was referred for surgery and received a distal pancreatectomy. Pathological studies confirmed the presence of lymphoepithelial cells within the cystic mass (Figure 3A, 3B). The patient had an uneventful postoperative period and was subsequently discharged home.

Discussion

With improved imaging capabilities and greater awareness, cystic lesions of the pancreas are being identified more frequently with their histology ranging from benign to malignant (4). Increased detection of these lesions has led to a rise in the number of pancreatic surgical resections (5). However, many of these cystic lesions are known to be of benign etiology which indicates that many of these resections may be unjustified (5). With the high degree of surgical complications related to pancreatic resection, it is important to distinguish these cystic neoplasms of the pancreas from pseudocysts and to identify and characterize these lesions radiographically and histologically; which could lead to better understanding and the prevention of unnecessary surgical procedures.

Lymphoepithelial cysts of the pancreas are one of those exceptionally rare benign lesions of yet to be identified pathogenesis which are often misidentified as mucinous cysts (3). Upon review of the literature, there are approximately one hundred reported cases of lymphoepithelial cysts. With so few cases reported establishment of risk factors is difficult but these cysts have most often been
seen in middle aged patients with an average age of 56 years, and are found predominately but not exclusively in men (3). As previously stated, many cases are discovered incidentally upon computed tomography or other imaging modalities but when patients are symptomatic they most often present with abdominal pain; other complaints can include anorexia, weight loss, vomiting, fatigue, fever, chills, and back pain (3).

Lymphoepithelial cysts are often well defined, with equal distribution between the head, body, and tail of the pancreas, and can be multilocular or unilocular. They can often protrude through the pancreatic parenchyma, and in many cases can be mistakenly thought to be peripancreatic (6). The classical finding on endoscopic ultrasound of lymphoepithelial cysts is a hypoechoic uniloculated or multiloculated cystic lesion. They are frequently macrocystic in appearance which can make differentiation from other macrocystic lesions difficult.

The pattern in chemical analysis of lymphoepithelial cystic fluid including markers such as CEA, CA19-9, CA-125, CA72-4, ps2, mucin-like carcinoma associated antigen, and fluid viscosity are often negative but there have been cases reported that demonstrates elevated levels of CA19-9 levels within the cystic fluid, but so far has not been found serum. Histologically these cysts are characterized by stratified squamous epithelium surrounded by mature dense lymphatic tissue, primarily composed of T lymphocytes with well-formed germinal centers containing B cells. It has been hypothesized that lymphoepithelial cysts are epithelial remnants of lymph nodes without the characteristic features but more study is required to further delineate their origin.

Conclusion

As imaging studies produce more pancreatic lesions it is important to develop a broad differential diagnosis and to develop characterizations of these lesions through identification of various factors in order to obtain an accurate diagnosis without the need for surgical intervention. No recurrence or progression of lymphoepithelial cysts to lymphoma or carcinoma has been documented. Further study of the pathogenesis and progression of lymphoepithelial cysts is needed to create more accurate guidelines for their management.
Figure 1. Magnetic resonance image with contrast enhancement demonstrating a 6.2 x 4.5 x 3.0 cm mass abutting the superior margin of the distal pancreatic body/proximal pancreatic tail and the inferior margin of the gastric body. On T1-weighted imaging, the lesion is predominantly T1 hyperintense with rounded areas of hypointensity. On T2-weighted imaging the lesion is predominantly T2 intermediate intensity with a few rounded areas of hypointense signal.

Figure 2. Endoscopic ultrasound of the pancreas demonstrating a 22 mm x 42 mm anechoic cyst with intracystic hypoechoic round nodules abutting the tail of the pancreas. Multiple intracystic nodules, the largest measuring 19 mm x 24 mm are also demonstrated. The cyst was abutting the pancreas and gastric body and causing some displacement of distal body and tail of the pancreas.
Figure 3A. Surgical pathology of the lymphoepithelial cyst - cystic spaces are filled with keratinous material while the cyst wall contains mature lymphoid tissue with multiple lymphoid follicles, some with germinal centers, as well as small spacious glands. A small portion of the cystic lesion is surrounded by splenic parenchyma.

Figure 3b. Surgical pathology of the lymphoepithelial cyst – arrow demonstrating a small portion of splenic parenchyma.
References

Semin Diagn Pathol 2000;17:31-42.
Prostate Cancer Recurrence with Metastasis to Left Orbit

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Abstract

Introduction: Prostate cancer metastasis to the orbit is relatively rare and presentation of symptoms presents a wide differential.

Case presentation: A 58-year-old Caucasian man with a history of prostate cancer, in remission, was admitted to our hospital with a 3-week history of left eyelid edema and erythema. Magnetic resonance imaging revealed an extraconal mass in the superior medial aspect of the left orbit. An anterior orbitotomy was performed with incisional biopsy of the mass with frozen sections, showing adenocarcinoma found to be of prostatic origin.

Conclusions: Diagnosis of orbital mass require a multimodal approach that factors in clinical presentation, imaging, and utility of biopsy for final diagnosis.

Introduction

Prostate cancer represents the second most common cancer in men worldwide, with an estimated 181,000 cases and 26,100 deaths in 2016.¹ Metastatic spread most commonly involves bone, lung, liver, pleura, and the adrenal.² Very rarely, orbital metastasis can occur, with limited cases being reported in literature. Metastatic lesions typically occur in the anterior segment of the orbit and present with rapid onset diplopia, proptosis, decreased vision, pain, ptosis, and a palpable mass.³ ⁴ In this case report, we present a 58-year-old male with prostate cancer status post radiation therapy reportedly in remission who presented to our facility with metastasis to the orbit.

Case Presentation

Our patient is a 58-year-old Caucasian male with a past medical history of prostate cancer diagnosed in 2014. He underwent treatment with radiation in 2015 along with androgen deprivation and was reportedly in remission. The patient also had a pulmonary embolism status post thrombectomy in July 2016 and was started on warfarin. Additionally, he had past ocular history of blindness in the right eye. The patient presented with a 3-week history of left upper eyelid edema. He reported no orbital trauma, fever, weight changes, headache, nausea, vomiting, diplopia or pain.

On examination, his best corrected near visual acuity was no light perception in the right eye and 20/30 in the left eye. Pupils were round and reactive with a right relative afferent pupillary defect. Intraocular pressure was normal in both eyes. There was limitation of movement on the left eye, particularly supraduction and adduction. External examination showed proptosis, inferior displacement of the left globe and upper eyelid erythema, edema, and ptosis. There was a palpable
firm, non-mobile mass in the left superior sulcus without fluctuance. Anterior segment examination was unremarkable in each eye. Fundus examination in the right eye showed a pale optic nerve with significant cupping. The left eye was normal.

A maxillofacial computed tomography (CT) scan showed an extraconal mass in the superior left orbit, interpreted by radiology as a lobulated, abscess-like fluid collection. Intravenous Ampicillin/Sulbactam and Clindamycin were started due to suspicion of a subperiosteal abscess causing orbital cellulitis. To better characterize the mass, an orbital magnetic resonance imaging (MRI) was obtained. The MRI revealed a 2.5 x 3.5 x 1.5 cm left extraconal mass concerning for neoplasm indenting the globe with small enhancing lesion near the outlet of the left frontal sinus opacified by retained secretions. The patient's anticoagulation was reversed in preparation for surgery. On hospital day 2, a left anterior orbitotomy was performed with incisional biopsy of the mass with frozen section analysis that showed adenocarcinoma. Further histologic analysis revealed a high-grade malignant neoplasm positive for prostate specific antigen and prostatic acid phosphatase. At his one-week postoperative follow up visit, the patient was doing well with stable vision and improvement in motility. The patient has since followed up with Urology for evaluation of prostate cancer recurrence.

Discussion

Evaluation of an orbital mass presents a wide differential that includes vascular lesions, abscess, lacrimal gland tumors, and metastatic lesions. Metastasis to the orbit accounts for 1-13% of all orbital masses, with 48-53% caused by metastatic breast cancer. Other reported causes of orbital metastasis include prostate carcinoma, lung carcinoma, and melanoma. Review of the literature reports a range of prostate cancer metastasis to the orbit of 1.3-10%. About 20-30% of men failing therapy for locally advanced prostate cancer will progress to metastatic disease. In this case, the diagnosis was delayed primarily due the fact that the patient was monocular and therefore had no symptomatic diplopia from the growing mass. Differentiating infection from metastatic disease based on imaging alone can be difficult. Sinusitis, most commonly with frontoethmoidal involvement, may be complicated by subperiosteal abscess formation and intraorbital extraconal inflammatory collections that may present as an orbital mass. Imaging may reveal sinus mucosal opacification and air fluids levels with mass-like infiltration of the extraconal space. In contrast, metastatic lesions typically present as hyperdense contrast-enhancing lesions on imaging. CT scan is best for evaluating the bony orbit, while MRI offers better soft tissue detail and can provide additional information needed for differentiating lesions with overlapping clinical presentations. In our patient, MRI was obtained for better visualization of the orbital lesion due to clinical presentation of an afebrile state, lack of pain, lack of leukocytosis, and history of prostate cancer being inconsistent with initial diagnosis of orbital cellulitis. In the diagnostic work up of orbital lesions, it is imperative to factor in clinical presentation when evaluating imaging studies due to the wide differential present for orbital mass. Of note, the final diagnosis was made following incisional biopsy of the lesion.

Conclusion

Through this case, we intend to demonstrate metastasis to the orbit may present clinically similar to sinusitis. Diagnosis of an orbital mass requires a multimodal approach that factors in history and physical, imaging, and utility of biopsy for final diagnosis. Inasmuch, expertise of appropriate specialties should be recruited promptly for a definitive diagnosis and subsequent treatment plan for the patient.
Images and Figures

Figure 1. Pre-Operative External Photo. This image shows the patient's external presentation prior to surgery with significant left upper eyelid erythema, edema, and ptosis.
Figure 2. Orbital Magnetic Resonance Imaging. Coronal T2 MRI and Sagittal T1 MRI of the orbits with contrast showing extraconal mass in the superior left orbit indenting the globe.
Figure 3. Surgical pathology specimen. This image is magnified at x200 and shows the specimen immunostained with antibody to prostate specific antigen (positive cytoplasmic stain).

References

The Quilt of Peace

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One tiny, inconsequential nap. That was all I needed. I lay face down, exhausted as usual, on my bed. I did not even take the time to wrap my bulky comforter around me, which I usually tossed and turned in until I was snuggled in a cocoon of blankets. My droopy eyelids stayed up long enough for me to set an alarm for a thirty-minute snooze. I just needed a tiny nap before meeting with my preceptor for the first time that evening in the emergency room.

My alarm buzzed in its usual obnoxious way. Realizing where I was, who I was, and what I needed to do, I lurched out of my beloved bed and threw on scrubs. A million thoughts were running through my head. Where was my white coat? My keys? Stethoscope? Would I remember how to do a full physical? Would my preceptor think I was an incompetent pea brain? Gathering my things together after shuffling around, I finally drove out to the hospital much later than intended. On the way, I tried reciting my physical exam checklist out loud instead of blasting the radio. I had worked in an ER for two years during my time as an undergraduate. I was ready to get back to all the excitement. In college, I had been a scribe, never actually touching any patients or being in a room by myself. I had always hidden in someone else’s shadow. This would be a whole different story.

The ER bustled: monitors beeping, patients in the hallway, phones ringing, voices blending together in a unique, forte melody. And there I was, wandering around in my oversized, half-length white coat, all wide eyes and growing anxiety as I waited for my preceptor under the bright fluorescent lights. He found me by the triage desk. Without beating around the bush, he walked me right into a dimly lit room to see my very first patient.

The patient agreed to talk to me. Me, a silly, inexperienced, tremulous medical student. I was a second year. I was supposed to know how to do a full history and physical, smoothly, efficiently, neatly. I stood there frozen for a few seconds after my preceptor briskly left the room. The elderly woman in the bed probably was wondering what in the world this young spring chicken was doing just standing there, blinking rapidly, gripping a pen and paper close to her chest. This was my first patient. My first, real, live, human patient. My patient. I had seen several standardized patients at school to learn how to do the physical exam. But standing there, in the hospital, with a family member in the room and a sick patient in a bed hooked up to a monitor, I was dumbfounded at how different I felt in that very moment. I felt responsible for another human being. I felt completely insignificant.

After a pause long enough for several babies to be born, I mustered up the courage to introduce myself, wash my hands, and transition back into the semi-automatic robot mode of a naive medical student. The patient was a thin, older woman. She was propped up on some pillows and covered
almost completely with blankets. She looked tired. Not tired because she took a test that day. No, truly tired. Tired of being trapped in a failing body after living life in full for so many years. Her sister sat by the bed and helped answer some of my questions. I spluttered out the regular list, asking about her chief complaint, her symptoms, her medications, everything. Both women were very sweet and patient while I rattled off all my questions, probably the same ones the nurse asked, the resident asked, and the techs asked. I was so low on the medical totem pole and yet they both listened to me and waited patiently through my many awkward pauses during the interview. She had not had an appetite lately. She really did not complain of any other symptoms. No fever, no sore throat, no chest pain, no abdominal pain, no headaches – just a small appetite.

I have always been fascinated by mysteries. I love following along as a keen detective starts from a few observations and puts the puzzle pieces together to end up with a magnificent conclusion to explain everything. Nancy Drew, Hercule Poirot, Jessica Fletcher, you name it. I think I was drawn to the field of medicine because each patient story is a mystery. Of course, I am no Sherlock Holmes. Not yet. Hopefully someday I will be able to easily follow the clues to find my patient’s diagnosis. I had clues that night. She was being admitted. She was frail. She was covered in a large pile of blankets, one of them a handmade quilt from home. I asked question after question, sitting by the bed scribbling notes on a scrap of paper I dug out of my coat. She calmly gave me all the answers. Doctors are supposed to reassure patients, but she was reassuring me. I felt like a young child speaking to their gentle grandmother. My heart rate slowed as I inquired about her social history. I asked about her alcohol use. She went on to tell me a wonderful story about how her pappy used to sit her down with the whole family, all her sisters and brothers, and how he would let these young adults have some moonshine at the dinner table until they learned about their limits. He did not want them going out and being foolish with alcohol. Her sister confirmed what she was saying. The way she told her story made me feel like I was sitting right there at the big oak table with them, copper mug in hand. As medical students, we are supposed to learn how to redirect patients if they start to drift away from information relevant to the interview. I have a feeling I will always have trouble doing just that. I find those irrelevant stories quite interesting. The true essence of the human condition is not found in any list of lab values, medications, or diagnoses. I believe the incandescence of humanity is found in those stories. Why do physicians not have time to listen to them? Her father taught her to respect her limits as a young adult and she never drank like that the rest of her life. Just a little piece she gave me to put into her life puzzle I was trying to assemble.

I attempted to perform a physical exam. I had never examined a patient lying in a hospital bed before. I was so slow that the sister nodded off to sleep. But my patient had patience. I went down my checklist, checking her cranial nerves, percussing her lungs, listening to her heart. In the process of performing the exam, I had moved all of her blankets out of the way and squished them between her bed and the side rails. Nearing the end of my checklist, I quickly replaced her covers and was about to wash my hands again when she interrupted me. “Now, put down your pen and paper, and come over here and help an old lady feel at home by putting her blankets back in their proper order.” I immediately felt embarrassed I had overlooked such a simple request. That small detail meant more to my patient than anything else I had done during our encounter. It certainly was not on my checklist. Slowly, I laid out each blanket one by one as she instructed me. The beautiful quilt was last, on top of all the other covers. It was a colorful patchwork quilt that looked a little worn...
down by years of faithful use. It made her feel at peace despite being in a cold, impersonal hospital room. Her blankets enveloped her in a cocoon of resilience. An embrace of hope. Her home.

I hope to carry that personal moment we shared with me throughout my career. In that moment I was truly caring for another person. Not just caring about her health, her medications, or her list of active diagnoses. She helped me to meet her on a spiritual level. This is so often uncharted territory in the medical field. Providers get swept away with the technicalities. Protocols are in place. Charts must be in order. Time is money. Should physicians take the precious time to address each patient’s humanity, but in doing so lessen the total number of patients that could be seen? I can understand how so many doctors lose touch with their spiritual side just trying to cope with all the demands. But it is a spectacular moment when a patient reaches out to your humanity and spirit. I hope I will always reach back.

I turned out the lights and left the two sisters resting peacefully in the room. I was back in the bright artificial light of the hallway, feeling once again like a freshman on her first day in high school. I wandered back and discussed the case with my preceptor. I had asked about many details that were jotted down on my wrinkled papers. I had followed my checklist. I had done a full H&P. I had totally missed the big picture. My preceptor told me she would probably go into hospice care soon. His words caught in my chest. She was a cancer patient and was no longer eating. I had heard her answers to my questions, but I had not put the puzzle together. I had certainly not solved the mystery with my clue about her appetite. Her stories were so full of life I did not even consider how close she was to death. Maybe if every doctor was told each one of their patients was very near death, they would really cherish the time spent with them. Maybe there would not be as much pressure to hurry back to their computer and move on to the next patient. Maybe more connections would be made on a spiritual level. But then, would the grief be too much for physicians to bear each time a patient died? I thought about how lucky I was to have been able to hear some of her amazing tales before she passed. Who was I? A complete nobody. A stranger. But she had unhesitatingly opened the window to let me feel the warmth from her personal sunshine, her life story.

Before I left the hospital, my preceptor mentioned this had just been to “get my feet wet.” He could not have picked a better first patient for me to see. She had really helped me understand the therapeutic power of a patient encounter for both sides of the relationship. I would be less nervous with my future patients. I would consider them more as friends than as strangers. I would always try to remember how vital whole person care is for the physician and the patient. I would treat humans, not diseases. Most importantly, she taught me that humanity is found in the small details that are not on any checklist.

As I drove home that evening under an indigo starry sky, the adrenaline started to wear off from the encounter. I laughed thinking about how funny I must have looked to the older woman. I had been anxious for absolutely no reason. I had so much to learn. By the time I changed out of my scrubs into my rumpled pajamas, I was once again feeling exhausted and ready to drift off into a deep sleep for the night. I wrapped my comforter and covers tightly around me in a snug embrace. My blankets bundled me up with hope for the days to come and my future patients. My own cocoon of resilience. My quilt of peace.
Appendix A

Quality Improvement Abstracts
Developing an Outpatient High Level Disinfection Competency Program

Paola Hasbun, Karen J. Vigil, Kristofer Harris, Luis Ostrosky-Zeichner MD, Fozia Steinkuller.

Background: Breaches in reprocessing reusable instrument through high level disinfection can result in transmission of hepatitis, Salmonella, Pseudomonas, and Mycobacterium species. Qualification of medical staff to reprocess the instruments includes education on the transport, cleaning, disinfection, and storage of the semi-critical instrument according to manufactures instructions.

Methods: We created a competency program that included a didactic component and hands on training to evaluate knowledge on high-level disinfection. Participants completed a pre and posttest to evaluate efficacy of the competency program.

Results: The outlying lowest scored questions in the pre-test were about quality control and expiration. Test strip solution preparation (32%), expiration (32%), frequency of testing the test strip bottle (44%), and the time required before test strips can be read (12%) were frequently missed questions. Knowledge gaps associated with the disinfectant were disinfectant expiration once opened (32%) and how often the solution needs to checked (44%). The lowest two questions in the post- test were disinfectant temperature (82.4%) and frequency of testing the test strip bottle (82.4%). After the training the overall mean score improved from 61% on the pretest to 95% on the post test.

Conclusion: Our evaluation indicates pre-competency training participants were not proficient and had knowledge gaps as evidenced by the pretest mean score of 61%. After completing the training program mean scores improved to 95%. Our training program was effective in closing high level disinfection knowledge gaps. The question level analysis may be utilized to guide other programs or trainers on specific areas to dedicate more effort.
Establishing Leadership for In-Hospital Cardiopulmonary Resuscitation in an internal medicine residency program – beyond Advanced Cardiac Life Support Certification


Literatures support the importance of leadership during in-hospital cardiopulmonary resuscitation (CPR)\(^1\). However, without an established policy to pre-designate the leader or sufficient education, it is hard to obtain a strong leadership during CPR. The purpose of this quality improvement project is to assess current understanding about leadership during in-hospital CPR, establish a policy to designate a leader and educate the residents in a teaching hospital.

We conducted a survey among the residents to assess their current understanding about the leadership. Survey questions included training level, confidence level to be a CPR member, confidence level to be a CPR leader, who they think the leader should be, and what they think the leader should do. Then, we constructed a flow chart showing the suggested leader delegation, and share it during orientation and through e-mail.

Total 87 residents responded the survey. Half of them were post-graduate year 1 (n=42). The average confidence level to be a member of code team was 3.2/5, but confidence level to be a leader was 2.03/5. Unfortunately, half of them misunderstood the question “Who do you think the leader is?” and answered with the role of the leaders (ex. “The one who tells others what to do”). However, among those who understood the question correctly, the answers showed no consensus. But, most of them understood what the leader should do. This project will be continued to evaluate if the intervention is effective to improve the resident’s understanding about leadership and their confidence, through follow-up survey.

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<td>2017</td>
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<td>How confident do you feel to be a member of a code team during resuscitation?</td>
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<td>Average 3.22</td>
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<td>How confident do you feel to be a leader of a code team during resuscitation?</td>
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<td>Average 2.13</td>
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<td>Placing orders into EMR</td>
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<td>How many participants do you think are needed including non-physician staff?</td>
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|                                                                       | Average 6.34
Increasing the Use of Atherosclerotic Cardiovascular Disease Risk Calculators in Internal Medicine Clinics


**Background:** Eighty-six million Americans live with some form of cardiovascular disease (CVD) or some form of stroke. These statistics make a compelling argument for the primary prevention of cardiovascular disease in our clinical practice.

**Methodology:** The patient population included those between 40-79 years old, excluding those with known CAD, CVA or PVD. Patient charts were randomly selected before and after the intervention to assess the use of the ASCVD risk calculator in LBJ and UTPB continuity clinics. The following interventions were piloted- 1. ASCVD risk calculators were installed on the computer desktops. 2. Stickers of “ASCVD Risk” labeled red hearts were placed on the computers to remind physicians to use the calculator.

**Results:** Prior to our intervention, only 13% (n=12) of patients had a documented ASCVD risk score. In addition, some patients were wrongly placed on statins, when there was no medical need, and others were prescribed the wrong intensity of statins as per ASCVD guidelines. After the pilot, more than 50% (n=60) of the targeted patient population had a documented ASCVD risk score.

**Conclusion:** Early findings suggest the presence of an accessible ASCVD risk calculator or the use of external visual reminders (Red Hearts) are helpful in reminding physicians to perform and document the ASCVD risk assessment. This leads to the appropriate prescription, discontinuation or dose of statins. We plan to roll out this approach to more clinics and measure our improvement at each cycle.
Nocardiosis in the Heart transplant Center: Outbreak or prophylaxis gap?


Background: *Nocardia* species are ubiquitous environmental saprophytes. They can cause uncommon but serious infections in immunocompromised patients. An increased incidence was noted in the heart transplant program.

Methods: We identified 3 cases from September to December 2016. Date of transplant, bed tracking during hospitalization, prophylaxis, date of culture, and susceptibilities were collected and analyzed.

Results: The incidence of nocardiosis was 3/163 transplants (1.8%). Case one was diagnosed in September 2016 presenting with pneumonia 4 months post-transplant, case two was diagnosed in October 2016 presenting with pneumonia and brain abscess 4 months post-transplant, case three was diagnosed in December 2016 presenting with pneumonia and right gluteal abscess 10 months post-transplant. The patients did not have rooms in common in the hospital prior to or during their diagnosis. Additionally, no procedures in common were found prior to diagnosis. All three cases were on atovaquone prophylaxis post-transplant due to trimethoprim/sulfamethoxazole (TMP/SMX) contraindications. All isolates were susceptible to TMP/SMX and Linezolid, but susceptibilities to other agents varied.

Conclusion: While the incidence of nocardiosis was within what has been reported for transplant programs, the temporal clustering was concerning. However, our findings suggest that environmental sources may be playing less of a role than gaps in prophylaxis. Atovaquone prophylaxis against pneumocystosis is appropriate in the setting of TMP/SMX contraindications but a gap against *Nocardia* became apparent. Our findings suggest that immunocompromised patients who are prophylaxed with atovaquone may need a second agent for *Nocardia* prophylaxis or should be placed on TMP/SMX if the contraindication resolves.
Code Sepsis for Surviving Sepsis


Background: Sepsis is a complex syndrome and patients with no sign of organ failure have about 15-30% mortality rate, while patients with severe sepsis or septic shock have a rate of 40-60%. Importance of timely identification and treatment cannot be emphasized enough and has been the focus behind rolling out “Code Sepsis for Surviving Sepsis”.

Goal: Primary: Increase % of time 1st antibiotic is administered with 3 hours from ED arrival to 80% during the Code Sepsis phase. Secondary: Ensure Sepsis Reassessment documentation completion within 3 hours of ED arrival.

Approach: Code Sepsis: A Code Sepsis alert, which serves an additional safety net to ascertain sepsis bundle compliance, is initiated for severe sepsis cases in ED. On receiving alert, a Code Sepsis team member calls the ED physician to ensure protocol completion per CMS sepsis bundle guidelines.

Weekly Summary, Individual Report Cards and Sepsis Core meetings: Dissemination of weekly patient-specific dashboards and individual report cards increases transparency while the monthly meetings serve as a platform for unit staff, pharmacist and providers to collaborate and assess progress, identify roadblocks and implement solutions

Results: 1st phase the time to antibiotic within 3 hours of ED arrival increased from 53% to 73%. Introduction of the Code Sepsis phase resulted in an additional improvement to 85%.

Monitoring of Sepsis Reassessment documentation in ED started in July of 2016 and documentation completed within 6 hours from arrival increased from 45% to 70%

Conclusion: Open dialog with patient care providers, innovative dashboards, data driven intervention and targeted education are all instrumental in achieving desired results.

I-Chart (by Phases) Shows Marked Improvement in Time to Antibiotic from ED Arrival
Increasing Lipid Monitoring in Rheumatology Clinic

Anju Mohan, Kara Calhoun, Astrid Grouls, Sheba Jon, Karla Lopez, Kanika Monga, Joanna Scoon, Melissa Yan, Beth Scholz

Introduction: Patients with autoimmune conditions are at increased risk for cardiovascular disease (CVD) compared to the general population. It is not routine practice at UT Rheumatology to manage lipids, but this important to modulate CVD risk.

Objectives: 1. Increase percentage of patients with an annual lipid panel checked by Dr. Scholz to 50%. 2. Prescribe statin therapy for LDL ≥ 190 OR ASCVD ≥ 7.5%.

Methods: Patients > 18 years with RA, SLE, Psoriatic arthritis, Polymyositis and Dermatomyositis seen by Dr. Scholz. Baseline data was collected from July 2016 to August 2016. Post-intervention data was collected December 2016 and February 2017. Intervention 1: A reminder card was attached to work stations, and ASCVD risk calculator was downloaded to the provider’s cell phone. For appropriate patients, lipid profiles were ordered and ASCVD risk calculated (fig.1). If indicated, atorvastatin was prescribed. Intervention 2: The provider reviewed the daily schedule and printed appropriate lab orders for each patient the day prior to the visit.

Results: At baseline, lipid profiles were ordered on 20% of appropriate patients (5/30) with 13% (4/30) on statins. After the first intervention, lipids were checked in 33% (12/36) with 13.8% (5/36) on statins. After the second intervention, lipids were checked in 77% (10/13) with 23% (3/13) on statins.

Conclusion: Checking lipids can be incorporated to the existing rheumatology clinic workflow. Next steps will involve spread to other rheumatology providers in the clinic.

Figure 1. Workstation reminder card
Resource Utilization and Outcomes in Patients with Infective Endocarditis (IE) at Memorial Hermann TMC (MHTMC)


Background: The purpose of this study was to understand the current state of resource utilization and outcomes in patients with IE at MHTMC.

Methods: Medical records of patients with ICD 9 diagnosis of IE within the last 2 years at MHTMC were reviewed collecting the use of transthoracic echocardiogram (TTE), transesophageal echocardiogram (TEE), blood cultures, antibiotics, readmissions, mortality, and ICU admissions.

Results: 23 patients were identified. All met Duke's criteria for IE. Mean time to diagnosis was 4.7 days. Mean length of stay was 20.9 days. 21 patients received TTE with an average number of TTE/patient of 1.34. Average time to TTE was 4 days. 21 patients received TEE and average time to TEE was 7 days. The average number of blood cultures drawn for each patient was 5.7. 22 patients received an infectious disease (ID) consult with average time to consultation of 5 days. Cardiology (CARD) was consulted for 19 patients and the average time consultation was 3 days. 8 patients had a surgical indication. 12 patients received cardiovascular surgery consult. Surgery was not performed due to high risk in 7/12 patients or was determined to be non-critical in 4/12 patients. 13 patients required ICU admission. The total number of readmissions and deaths were 11 and 5, respectively.

Conclusions: Higher than necessary number of TTEs, TEEs and blood cultures were found. Antibiotics and consultation of ID and CARD were appropriate. Higher than expected readmission and mortality rates were noted and need to be further explored, along with surgery utilization.
Diuresing Renal Clinic: Reducing the load on a taxed clinic


The nephrology clinic at Lyndon B. Johnson Hospital provides care to a high volume of patients with issues ranging from acute kidney injury to end stage renal disease. Delivering effective and efficient care requires the monitoring of kidney laboratory data. Unfortunately, patients seen in this clinic frequently do not have appropriately timed pre-clinic labs—those drawn between one and seven days before the appointment. This results in wasted clinic appointments, delayed care, misuse of resources, and oversaturation of the clinic. This quality improvement project seeks to decrease the number of patients seen without appropriately timed pre-clinic labs.

We reviewed charts of the established patients seen in LBJ Tuesday and Friday nephrology clinics for August 2016 (n=159). Of these patients, 108 (67.9%) did not have appropriately timed pre-clinic labs.

The primary cause: failure to reschedule a lab appointment when rescheduling a clinic appointment, either because of an actual rescheduling patient or a patient “no show” (34.3%).

We developed an intervention to increase the number of lab appointments rescheduled among our “no show” patients. The nephrology fellow in clinic reviews these patients’ charts. When patients need rescheduling, the fellow orders the appropriate labs and ensures that both clinic and lab appointments are scheduled. We educated the fellows regarding this change in their clinical responsibilities, and the intervention began in February 2017. We will collect new data six months from the initiation of this intervention (August 2017).
Parent-reported Barriers to Being Present with their Infant in the NICU

Emily Sedlock, Madelene Ottosen, Nikhil Jaiswal, Eric Thomas, Jason Etchegaray.

Background: In the Neonatal ICU, increasing parent engagement and presence are important components of creating a culture of patient-centeredness. Parents are integral partners who offer unique perspectives which can be used to improve quality and safety. Parent presence in the NICU also improves health outcomes for their baby.

Objective: To identify barriers which prevent parents from being present with their baby and to determine the average frequency in days that parents visit their baby in the NICU.

Methods: We conducted a descriptive, mixed methods survey study to understand parent perceptions of patient safety in the NICU at two large academic hospitals. 252 parents were surveyed at Hospital A and 106 parents were surveyed at Hospital B. An open-ended question asked parents to list barriers that prevent them from visiting their baby in the NICU. Content analysis was conducted by a multidisciplinary research team.

Results: Parents face 7 main barriers to being present with their child in the NICU: The most common are work, difficulties traveling to the NICU, and other children. The types and frequencies of barriers listed by parents were the same in both institutions. 76% of parents listed between 1 and 4 barriers. 76% of parents reported visiting their baby at least 5 days per week.

Conclusion: A majority of parents face barriers which prevent them from visiting their baby. It is important that hospitals consider ways to remove these barriers so that parents can be present more often and be engaged as partners in their baby’s care.

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Identifying “Waste” in the Hospital: A Novel Approach

Shivtej Kaushal, Bela Patel, Elizabeth Huynh.

**Background:** Waste in the US healthcare system is a major driver of increased healthcare costs and contributes to inefficient and even harmful patient care. It is defined as any activity or resource that does not add value to the patient. Common examples include healthcare-associated infections, adverse drug events, and unwanted end-of-life care. Multiple estimates have put the economic strain of waste to be up to 37% of the total annual healthcare budget. We sought to investigate areas of waste in our hospital through the use of a validated tool: IHI waste tool

**Methods:** Data collection was done with a total of 8 medicine teams. Each team was given a modified IHI waste tool worksheet and instructed to indicate reasons that contributed to an extra patient day in the hospital (Figure). The teams filled out these cards from 8/1-9/20 on a daily basis. These cards were then collected weekly by the patient safety fellow. Frontline staff that were directly involved with data collection included residents and attendings.

**Results:** In total, 230 completed cards were collected over the 7 week period. The top three categories that contributed to increased length of stay in the hospital were delay in discharge related to case management and social work, awaiting consultations, and awaiting procedures. Combined, these categories accounted for 173 unnecessary hospital days for the patients.

**Conclusions:** The IHI waste tool is an effective and free tool that can be employed by frontline staff to identify common areas of waste in the hospital setting.

**Figure**
Preventable vs non-preventable venous thromboembolism (VTE) in Hospitalized Patients

Shekhar Patil, Shivtej Kausha, Mary Ayad, Kavitha Gopal, Alexandris Aman, Kristy Gomez, Denise Jackson, Michelle Narat, Todd Johnson, Bela Patel MD.

Introduction: Venous thromboembolism (VTE) is still considered a common preventable condition in hospitalized patients. However, a significant proportion of VTE occur in patients who received appropriate prophylaxis based on current guidelines. Financial implications for healthcare-institutions for quality performance and costs incurred from the event can be substantial. We propose a classification system for preventable VTE versus non-preventable VTE cases based on current evidence-based guidelines.

Methods: An algorithm was developed using compliance measures based on American College of Chest Physicians 9th-edition (ACCP) guidelines. The algorithm helped to determine whether the patient care rendered was 'optimal' or 'sub-optimal' based on VTE screening-compliance rate, prophylaxis order-compliance rate and prophylaxis adherence rate. If any hospitalized patients develop VTE despite optimal care, it was classified as potentially non-preventable VTE. The VTE cases resulting from sub-optimal care were classified as potentially preventable VTE.

Results: Total of 219 consecutive cases of hospital-acquired VTE from July-2014 to February-2016 were evaluated. VTE screening-compliance rate, prophylaxis order-compliance rate and prophylaxis adherence rate were 95.89%, 93.8% and 74.11% respectively. Using our algorithm, 73(33.33%) cases were classified as potentially preventable VTE and 146(66.67%) cases were classified as non-preventable VTE.

Conclusion: Majority of hospital acquired VTEs in our institute are non-preventable. Classifying the VTE cases may reflect the quality of the healthcare more accurately. Quality performance measures should target compliance measures and preventable VTE events rather than all VTE episodes in hospital. Reducing the rates of potentially preventable VTEs is more achievable target and can lead to substantial reduction in VTE rates.
A Visualization Approach for Reducing Ventilator Induced Lung Injury

Alexandris Aman, Denise Jackson, Shekhar Patil, Shivtej Kaushal, Mary Ayad, Kavitha Gopal, Kristy Gomez, Michelle Narat, Todd Johnson, Bela Patel.

**Background:** Prolonged mechanical ventilation is associated with an increased risk of ventilator related complications and mortality. Use of tidal volume (VT) less than or equal to 6 mL/kg predicted body weight with corresponding plateau airway pressures (PPlat) less than or equal to 30 cm H2O has been advocated for acute lung injury. However, compliance with these recommendations is not always observed in the Memorial Hermann ICUs.

**Goal:** Primary: Develop an effective visualization technique showing the compliance rate of the ICUs for Tidal Volume, Plateau Pressure, and PEEP. Secondary: Ensure all obstacles preventing the compliance rate less than 100% for the mentioned categories have been identified using Six Sigma Strategy.

**Approach:** Visualization Meetings were held with Respiratory Therapists to decide how this visualization should be developed and how corrective actions should be addressed for non-compliance. Root Cause Analysis: 5 WHY approach was selected as a root cause analysis tool to investigate why certain patient population had higher than 6 Ml/kg predicted body weight value after 24 hours of admission to ICUs.

**The Results:** The visualization has served as an effective tool to raise awareness among RTs and nurses in addressing causes the non-compliance. Incorrect measurement of patient’s height, and important element in the calculation of initial Tidal volume, is one of the issues discovered during this quality initiative process.

**Conclusion:** Effective visualization technique along with continuous communication with RTs and nurses can be an effective strategy for reducing ventilator induced lung injury.

**Sample: MICU (Data is retrieved form the back end of Care 4 by developing structured equerries)**
Comparison between Baseline and Phase One Infection Prevention Surveys for Twenty Ambulatory Care Clinics

Fozia Steinkuller, Luis Ostrosky-Zeichner, Kristofer Harris, Karen J. Vigil.

**Background:** The Infection Prevention Program at UT Physicians (UTP) was established in 2014. Baseline infection prevention surveys were completed over the course of two and a half years, and in 2016, baseline data analysis was completed. Phase one surveys were started in 2016, and are currently ongoing.

**Methods:** The CDC Infection Prevention for Outpatient Setting Checklist was used in conjunction with UTP specific questions to collect baseline and phase one data. For this study, only clinics that had been surveyed for phase one were included in the baseline and phase one data analysis for comparison. The average and standard deviations were computed for the overall, CDC, UTP, HLD, and sterilization scores for both baseline and phase one data.

**Results:** There was a sample size of twenty clinics. The average of the baseline survey scores were as follows: overall scores: 80% (s: 13.8), CDC questions: 87% (s: 13.1), UTP questions: 67% (s: 22.4), HLD score: 70%, and sterilization scores: 77% (s: 9.8). The average of the phase one survey scores were as follows: overall scores: 87% (s: 9), CDC questions: 95% (s: 6), UTP questions: 77% (s: 16.7), HLD score: 100%, and sterilization scores: 88% (s: 10).

**Conclusion:** In almost all of the different aspects of the Infection Prevention survey, there was an increase in the mean and a decrease in the standard deviation of the survey scores. This illustrates that with an Infection Prevention program to provide guidance and expertise, ambulatory care clinics improve and have less variability in the observed infection prevention practices.
AUTOMATED LEXICON BASED CLASSIFICATION OF COLORECTAL BIOPSY PATHOLOGY REPORTS: A QUALITY IMPROVEMENT INITIATIVE

Bijun S Kannadath, Matthew P Meriwether, Andrew F Herman, Harsh D Patel, James R Stone, Danielle M Stone, Nirav C Thosani, Sushova n Guha.

Background: Screening for colorectal cancer is a cornerstone of gastroenterology practice. A key performance metric is one-year follow-up colonoscopy rate after resection of colorectal cancer in these high-risk patients. This metric is calculated annually by manual review of pathology reports of all patients who underwent colonoscopy with biopsy to identify high-risk patients (defined as malignancy and/or high grade dysplasia).

Aim: Our study evaluated whether an automated lexicon based classifier could be used for the detection and categorization of high-risk patients.

Methods: Pathology reports (n=1823) were manually abstracted and annotated by internal medicine residents into 3 categories: malignancy, high-grade dysplasia, and low-grade dysplasia. All data was then de-identified. 300 reports were used as a training set to develop the Lexicon-based Classifier. Text-matching rules were developed to detect the presence of terms indicating the pathological diagnosis. The algorithm was implemented in Python and evaluated for sensitivity, specificity, positive predictive value, and recall on the remaining data (n=1523). Instances where the algorithm and resident annotations disagreed were referred to a senior Gastroenterologist for review.

Results: The classifier was able to detect malignancies with sensitivity of 88.24% and specificity of 99.13%, and high grade dysplasia with sensitivity of 86.49% and specificity of 99% (Table 1).

Limitations: Mistyped reports were wrongly categorized by the algorithm.

Conclusion: Our automated lexicon based classifier is an accurate, time and resource efficient method for categorization of colorectal biopsy pathology reports. This can be implemented to improve the follow up of high-risk patients who have advanced adenoma or colorectal cancer.

Table 1. Summary of Results
A Quality Improvement Project to Evaluate Ordering Practices of Inpatient Transthoracic Echocardiograms.

C Paruthi, M Lim, A Velasquez, F Fuentes

**Background:** Transthoracic echocardiograms are best used as a tool to help confirm a suspected clinical diagnosis or evaluate the effects of a specific treatment. Appropriate Use Criteria in echocardiography were developed by eight leading cardiology organizations to guide the practitioner in appropriate utilization of echocardiograms.

**Objective:** We sought to assess how frequently orders for echocardiograms include appropriate indications, supportive chart documentation, and identify areas of improvement.

**Methods:** A retrospective observational review was conducted to identify echocardiograms ordered in a 28 day period. Descriptive analysis was performed.

**Results:** Of the 328 transthoracic echocardiograms ordered, 85% (281/328) were ordered as complete studies. In accordance with the Appropriate Use Criteria guidelines from 2011, 71% were appropriate, 18% were inappropriate, and 10% were uncertain. Documentation in the chart supported the indication in 73% of ordered echocardiograms. Sixty-four percent of studies were ordered by non-cardiac providers. There were 131 (41%) repeat studies in a one-year time frame, which included 60% performed for a change in symptoms. There was a change in findings in 23% of the repeat studies performed.

**Conclusion:** This project identified that 73% of charts had sufficient documentation to support an echocardiogram order. Based on the results obtained, ordering providers will benefit from education on appropriate use criteria and supportive documentation, with subsequent reduction of wait times for patients, and improved utilization of healthcare resources.
Smooth Transitions: An Effort to Increase Satisfaction and Value of MICU Transfer Summaries

Peerbhai, S; Makkani, S; Parvez, S; Khawaja, F; Mehrvarz, A; Mohan, V; Escobar, A; Krug, K; Cherian, E; Amin, A.

Transfer summaries written by the Medical Intensive Care Unit (MICU) Team serve as a synopsis of critical events that took place during the MICU hospitalization. Summaries should include vital information such as a concise MICU course, an active problem list, consultants participating in the patient’s care, procedures performed, code status and items needing follow up. Although important and fundamental to the care of these patients, this information is often not relayed to the next team taking over care. Furthermore, physician satisfaction with these transfer summaries is affected by the lack of these items. We sought to understand and intervene in this process by reviewing transfer summaries of patients leaving the MICU to go to an acute medical floor for one month at TMC Memorial Hermann Hospital. We also polled physicians taking over care of these patients regarding their satisfaction and inclusion of the aforementioned items. After gathering these data, we intervened by educating the MICU team via a presentation on the importance of these items, as well as created a structured template that was included in the electronic medical record for their use. Preliminary analysis revealed a positive trend in physician satisfaction. On average, there was over a two-fold increase (33% to 84%) in the inclusion of these items in the MICU transfer summaries post-intervention. In sum, our data suggests comprehensive transfer summaries improve physician satisfaction and transitions of care, which could likely translate to better patient outcome.
Line placement In New trainee’s Education – Ultrasound (LINE-US)

Suchitra Pilli, Shivtej Kaushal, Justin Wong, Joyce Williams, Shekhar Patil, Alisha Young, Kamran Boka.

Background: Physicians place approximately five million central venous catheters (CVCs) in US hospitals every year. Of the unknown percentage placed by residents, it is unclear who receives formal ultrasound education.

Aim & Methods: The purpose of our study is to assess procedural competency among residents in point of care ultrasound (POCUS) guided CVC-placement and to improve their self-assessed level of competency via four interventions: 1) teaching via simulation model by an ultrasound-credentialed academic clinician, 2) teaching via bedside POCUS by a critical care fellow, 3) self-directed learning via online curriculum, and 4) monitoring a pass/fail checklist during real-time ultrasound-guided CVC placement.

Residents on 4-week rotation in the medical intensive care unit will be given a pre-intervention questionnaire to assess self-described competency on POCUS. A proctored assessment using a POCUS checklist on a simulation model will be compared against a post-intervention questionnaire as well as a pass/fail POCUS checklist during real-time CVC placement. (Emergent CVC placements are excluded.) Outcome measures include comparison of pre- and post-intervention questionnaires, adherence to 100% of “critical” and 80% of “non-critical” POCUS checklist items, and metric-analysis of the number of successful procedures averaged over six months. Data will be analyzed using paired sample t-test with statistical significance of p<0.05.

Clinical Significance: Our study uses a multi-modality approach toward learning and provides framework data to improve procedural competency with a goal of decreasing adverse events, enhancing resident confidence and boosting POCUS skill. Further randomized controlled studies or matched comparison group studies are needed to assess our interventions.
"A Bone to Pick with Steroids:" Implementing the American College of Rheumatology's recommendations for prevention and treatment of Glucocorticoid-Induced Osteoporosis (GIOP)


**Introduction:** Steroids are necessary for treatment of many rheumatologic diseases despite their known adverse effects on bone density. Bone loss can occur after three months of use with progressive worsening after continued use. The American College of Rheumatology published guidelines for prevention and management of bone loss in 2010, utilizing DEXA scanning and risk stratification. More consistent implementation of these guidelines would improve patient care by preventing and treating steroid-induced bone loss. We aimed to increase the number of LBJ Rheumatology patients on ≥ 5 mg prednisone for ≥ 3 months who are appropriately risk stratified by DEXA and FRAX score by 25%.

**Methods/results:** Baseline data was obtained from 49 consecutive clinic patients who met the above criteria. Of these patients, 71% had a DEXA completed within 2 years, 8% had FRAX calculated, and 92% with osteoporosis were on treatment.

The first intervention provided residents and fellows with a risk stratification flow chart prior to clinic. Subsequently, 75% of patients had DEXA completed within 2 years, 7% had FRAX calculated, and 60% with osteoporosis were on treatment.

The second intervention modified the note template with a prompt to order DEXA and calculate FRAX. Consequently, 64% of patients had DEXA done within 2 years, 19% had FRAX calculated, and 78% with osteoporosis were on treatment.

**Conclusion:** We are currently implementing the third intervention, a questionnaire given to all clinic patients containing FRAX questions that will prompt residents/fellows to calculate FRAX and order DEXA on appropriate patients, as indicated by the 2010 guidelines.
Improvement of Foley Documentation to Decrease Undue Use

Jessica Dominguez, Jennifer Duke, Deepa Koshti, Min Ji Kwak, Laila Lakhani, Abin Puravath, Brandy McKelvy

Catheter-associated urinary tract infections (CAUTIs) have received growing attention in the realm of healthcare quality and safety due to the escalating use of urinary catheters and increasing evidence of preventability of infections. Progress has been much slower reducing CAUTIs than other device-associated infections including central line associated bloodstream infections (CLABSIs).

In order to prevent CAUTIs, a multidisciplinary approach focused on standardizing documentation relating to the insertion indication for indwelling catheter, daily monitoring the continued need of the device, and maintaining the catheter while in place should be implemented.

Prior to intervention, we retrospectively studied 100 data-points of MICU patients. The intervention is focused on creating awareness among residents about the evidence based indications for urinary catheters, daily re-assessment for the need of catheterization and adequate documentation in the electronic medical record (EMR). This will be followed by the post intervention survey with the chart review of another 100 data-points.

By creating a standardized documentation tool that is incorporated into the daily physician’s progress note for adult intensive care patients, we hope to increase appropriate urinary catheter usage and decrease the average length of catheter days by at least 10%. We hope to promote awareness of need for correct documentation to improve patient safety, promote appropriate usage and removal of the catheters when indicated.
Correlation and Halo Effect Analysis to Improve Outpatient Wait time in Internal Medicine Department

Alexandris Aman, Denise Jackson, Shekhar Patil, Shivtej Kaushal, Mary Ayad, Kavitha Gopal, Kristy Gomez, Michelle Narat, Todd Johnson, Bela Patel.

UT has been using Press-Ganey patient survey scores to assess patients' moving experience through clinic for so many years. It is noteworthy to mention that several categories are responsible for improvement or reduction of the overall moving through clinic score expressed in the survey by each individual patient. These categories include: Wait Time Before Seeing The Care Provider, Wait Time in Exam Room, Patient and The Care Provide Interaction and Timely Notification of Service Delays.

The presence of “Halo Effect” - a cognitive bias in which an observer's overall impression of a service influences the observer's feelings about that entity's character - make the wait time analysis more completed. A pairwise correlation analysis among the above-cited categories was conducted to see the impact of each individual category on the overall moving through clinic score.

**Goals:** *Primary*: To find those patient wait time categories causing the most impact on the overall clinic wait time experience of our patients. *Secondary*: To educate clinical staffs to develop simple strategies to improve the overall patient wait time.

**Approach:** *Visualization and Monthly Dashboard*: An effective dashboard was developed highlighting areas of concern in regards to patient survey scores.

**The Results:** The visualization has been instrumental to show correlation between different categories of patient dissatisfaction with their clinical wait time.

**Conclusion:** Effective visualization technique along with continuous communication with clinical staff, nurses, and physicians can be an effective strategy for patient satisfaction and improvement of our overall Press-Ganey score.

Pearson correlation: 0.72

Pearson correlation= 0.68
Increasing Chronic Kidney Disease and Dialysis Modality Education in the Outpatient Setting

Michelle Kelley, Farhan Abdullah, Nita Kumar, Sean Hebert, Monica Guzman, Ugochi Osborn, Ali Ziaolhagh, Aleksandra DeGolovine, Dia Waguespack.

There is significant morbidity and mortality associated with initiating dialysis with a central venous catheter. One step to avoid dialysis initiation with a catheter is patient education on both chronic kidney disease (CKD) and dialysis modalities in the outpatient setting. Our aim was to first identify if CKD education was being provided in the University of Texas Physicians Nephrology Clinics.

We included patients with CKD stage 3b or greater (glomerular filtration rate less than or equal to 45 ml/min) who were not already on dialysis. Data was collected via chart review from all patient visits to nephrology clinic in August 2016. Patients were determined to have received education based on documentation in the electronic medical record, specifically the nephrology progress note. Initial data collect demonstrated 10.34% of patients meeting our defined criteria had documented CKD and dialysis modality education.

We developed an intervention to increase the number of patients receiving CKD and modality education. As no dedicated educator exists within our institution we relied on referrals to a no cost community available option, Kidney Smart®. To increase awareness to our providers, we displayed signage in clinic containing program reminders, emailed nephrology stakeholders similar reminders, and met in-person to discuss referrals as well as documentation. To assist with documentation EMR was modified to allow documentation in the clinic flow sheet. Our goal is to increase referrals from 10% to 50% at six months. After implementation data was collected for the month of February 2017. Referrals and education of eligible patients had increased to 18.52%. This project is ongoing and we expect continued increase in the number of eligible patients receiving CKD and modalities education.
Make Evaluations Great Again

Robby Wesley, Syed Humayun Naqvi, Sahar Safavi, Sapna Naik, Matthew Meriwether, Rana Taherian, Gonzalo Matzumura, Fiorella Llanos Chea, Karla Bermudez Saint Andre, Patrick Yu.

Overview: Residents need effective and timely evaluations throughout their blocks of training in order to meet residency growth milestones, assess areas of strength toward competencies and identify opportunities for improvement early and often throughout residency training. Ineffective and untimely evaluations fail to promote residents toward unsupervised practice.

Aim Statement: Improve final block evaluations by enhancing the quality of feedback, addressing key core competencies and changing the culture to elicit constructive comments. Improve the timely submission of final block evaluations through the New Innovations online reporting tool.

Methods: Pre-Intervention surveys were collected from residents and faculty regarding their views on the current evaluation system and the quality of the evaluations received. Our intervention empowered residents with a four-point discussion instrument to guide faculty to address key competencies at the in-person evaluation. Post-Intervention surveys were then collected from residents and faculty to assess for change in the evaluation process.

Results: Study is on-going.

Conclusions and Next Steps: We hope with effective and timely final block feedback, residents and faculty can identify areas of strength and opportunities for improvement to allow residents to grow, in turn, improving patient care. We also hope to allow our training program to identify residents in need of specific/targeted interventions through more effective faculty evaluations. As we improve the culture of feedback within the Department of Internal Medicine, we hope to collaborate with our Graduate Medical Education office to expand this project to other residency programs at McGovern Medical School at UTHouston.
Implementing The Kamishibai Board to Improve Quality Patient Care in the MICU


**Objective:** Kamishibai Board is an interactive visual board that helps to monitor standards of quality care by involving the staff in simple daily audit tasks; in order to foster a culture focused on patient safety through collaboration.

**Method:** A number of questions will be pre-determined & baseline data will be collected for a 2 week period for each question. First, an auditor, either a physician, nurse or respiratory therapist will pick up an audit card randomly from the active question bank. Evaluations will be performed by the auditor in order to determine whether it’s a pass or fail. The card will be placed in an open slot with the appropriate color showing on top (Green for Pass, Red for Fail). The charge nurse will enter the count for “Pass” and “Fail” at the end of the day in a spreadsheet that is provided; the spreadsheet will be managed by the charge nurse. At the end of the month the final counts will populate.

The Kamishibai team members will meet monthly in order review audit topic results. If a card failed more than three times interventions are determined in order to address the failure and improve outcomes. In addition if a card passed 5 times it will become inactive and replaced by a new card.

**Results:** We are in the process of collecting baseline data.

**Conclusion:** Self audit with Kamishibai Boards can prove valuable addition to ongoing efforts to improve quality and patient safety through collaboration.
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Implementation of Oncology Survivorship Care Plans at MH TMC


The Commission on Cancer requires implementation of a Survivorship Care Plan (SCP) for patients with Stage I, II, or III cancers who have completed curative therapy. The goals for instituting the SCP are: End of 2016: SCPs to ≥ 25% of eligible patients. 2017: SCPs to ≥ 50%. 2018: SCPs to ≥ 75%. To comply with these goals a process is needed to identify patients, as each year the requirements increase. Initial identification was done by the nurse navigator (ONN) and registrar through daily searches of each patient’s medical record. Only 40 patients out of the goal of 90 for MH-TMC had been identified in October 2016.

Methods: Aim 1: Identify eligible patients for SCP in 2016 to comply with the 25% target through chart review Aim 2: Develop interventions (based on this experience, fishbone chart and discussions regarding limiting factors) to improve the process in 2017.

Results: Aim 1: In October 2016 IM residents reviewed oncology clinic schedules of Breast and GI clinics and identified 62 patients of which 53 were eligible for SCP. We developed the following interventions for 2017: 1) Review Tumor Board lists to identify potential patients 2) Physician email to ONN when radiation is completed 3) ONN meeting with Oncologist monthly to identify patients. 4) Development of BARI360 secure database (in progress). 5) Electronic Medical Record SCP (in progress)

Below is chart of patients identified in 2017 with these interventions.

<table>
<thead>
<tr>
<th>ICD-O-3 Site Group</th>
<th>Count</th>
</tr>
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<tbody>
<tr>
<td>BREAST</td>
<td>35</td>
</tr>
<tr>
<td>PROSTATE GLAND</td>
<td>10</td>
</tr>
<tr>
<td>CORPUS UTERI</td>
<td>8</td>
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<tr>
<td>RECTUM</td>
<td>5</td>
</tr>
<tr>
<td>KIDNEY</td>
<td>5</td>
</tr>
<tr>
<td>THYROID GLAND</td>
<td>4</td>
</tr>
<tr>
<td>PANCREAS</td>
<td>2</td>
</tr>
<tr>
<td>COLON</td>
<td>2</td>
</tr>
<tr>
<td>GALLBLADDER</td>
<td>2</td>
</tr>
<tr>
<td>LARYNX</td>
<td>1</td>
</tr>
<tr>
<td>ESOPHAGUS</td>
<td>1</td>
</tr>
<tr>
<td>BRONCHUS &amp; LUNG</td>
<td>1</td>
</tr>
<tr>
<td>OTHER PARTS OF BILIARY</td>
<td>1</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>77</strong></td>
</tr>
</tbody>
</table>
Appropriate use and de-escalation of oxygen

Joanna Scoon, Yameena Jawed, Gretchen Arnason, Amin Ameen.

Introduction: Patients are often initiated on oxygen when oxygen therapy is not indicated. Furthermore, oxygen therapy is often not weaned in a timely manner. Our aim is to improve the lack of knowledge of oxygen therapy and inconsistent practices of weaning supplemental oxygen by implementing a nursing oxygen de-escalation pathway and education session. We hypothesize that the implementation of this pathway will decrease use of oxygen and may lead to shorter hospital courses, lower costs and improved clinical outcomes.

Method: A pre-intervention questionnaire was provided to nurses, respiratory therapist, residents and attendings to evaluate knowledge and practices of oxygen therapy. Our initial intervention is a nursing education session and nursing de-escalation pathway. We plan to collect pre- and post-intervention data (including days on nasal cannula, number of oxygen escalation and de-escalation events, length of stay) from patients on supplemental oxygen.

Results: The pre-intervention questionnaire was completed by 78 medical personnel. Results showed that only 32.9% of medical personnel selected the accurate maximum rate for oxygen via nasal cannula as 6L/min. The majority of respondents (85.5%) correctly selected the goal oxygen saturation (SpO2) for patients admitted with COPD exacerbation. However, for patients admitted with heart failure, 19.2% of respondents selected goal SpO2 >90%, 35.9% selected goal SpO2 >92% and 30.8% selected goal SpO2 >94%. Table 1 shows the varying opinions of indications for oxygen.

Conclusion: These results suggest discrepancies of oxygen practices and knowledge and the need for further education and a nursing de-escalation pathway.

Table 1: Responses for indications of oxygen therapy

<table>
<thead>
<tr>
<th>Condition</th>
<th>% of respondents who selected the condition as an indication for oxygen</th>
</tr>
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<tbody>
<tr>
<td>Obstructive sleep apnea</td>
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<tr>
<td>Obesity hypventilation syndrome</td>
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<tr>
<td>Pulmonary amblyosa</td>
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<tr>
<td>COPD</td>
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<tr>
<td>Anemia</td>
<td></td>
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<tr>
<td>Post-surgical intervention</td>
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<tr>
<td>Congestive heart failure</td>
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<tr>
<td>Acute coronary syndrome</td>
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<tr>
<td>Severe trauma</td>
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<tr>
<td>Patient comfort</td>
<td></td>
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<tr>
<td>Dyspnea</td>
<td></td>
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<tr>
<td>Documented hypoxemia</td>
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</table>
Summarizing admissions and smoothing transitions


**Objective:** After four months, over sixty percent of Internal Medicine (IM) resident discharge summaries will include three key metrics (KM) identified by our team: accurate medication reconciliation, pending tests, and follow up appointments.

**Background:** Ineffective care transitions reduce patient safety and satisfaction. Despite guidelines from The Joint Commission on Accreditation of Healthcare Organizations (JCAHO), discharge summaries in the United States frequently omit medications (2-40%), follow up plans (2-43%), and pending tests (65%). Among IM resident discharge summaries at our institution, 50% included medication reconciliation, 30% listed pending tests, and less than 80% included follow up appointments.

**Methods:** Thirty-five discharge summaries from LBJ Hospital were evaluated to determine the proportion including the KMs. Our first intervention distributed a new discharge summary template to all IM ward residents. Our second intervention included repeat email reminders, posted signs in resident workrooms, and pages reminding residents to use the new template.

**Results:** After the first intervention, the percentage of discharge summaries containing KMs increased substantially (Figure). The second intervention further improved inclusion of pending tests.

**Conclusions:** Implementing a new discharge summary template and enforcing its use with reminders substantially increased the inclusion of key quality metrics. Ensuring discharge summaries include critical follow up elements should improve care as patients transition between the inpatient and outpatient settings.
Decreasing Bleeding and Blood Transfusion Events Post-PCI

James Stone, Danielle Stone, H. Vernon Anderson.

**Background:** Periprocedural bleeding and transfusion of blood products in patients undergoing Percutaneous Coronary Intervention (PCI) are both associated with increased morbidity and mortality, extended hospital stays, and increased costs.

**Methodology:** Retrospective chart review of 102 randomly selected patients who received blood transfusions post-PCI at Memorial Hermann–Texas Medical Center (MH-TMC) during 2015. Periprocedural hemoglobin levels, documentation of transfusion, and identification of the primary service placing transfusion orders were analyzed. Results were presented to involved physicians and nurses, and several administrative departments, within MH-TMC. The objective was to raise awareness and identify possible modifiable deficiencies in knowledge of bleeding and transfusion practices at MH-TMC compared to national guidelines. Bleeding and transfusion event rates at MH-TMC are tabulated monthly; these were evaluated before and after the feedback intervention. Rates were compared to the National Cardiovascular Data Registries (NCDR) 50th percentile benchmark.

**Results:** Bleeding and transfusion event rates prior to feedback intervention were significantly higher than the NCDR benchmark. Our analysis revealed that 46.2% of transfusions post-PCI had proper documentation. Moreover, only 47.3% of transfusion orders were placed by the primary Cardiology service, 41.8% were placed by consultants, and 10.9% of orders placed were indeterminant in origin. As the feedback intervention proceeded, and the awareness level increased, a substantial decrease in bleeding and transfusion event rates occurred.

**Conclusion:** Enhanced communication of practice variations raises awareness of potentially modifiable deficiencies in managing bleeding events and the need for blood transfusions post-PCI. We will continue interdisciplinary meetings annually and measure our improvement at each cycle.
Increasing Kidney Transplant Referrals in the Outpatient Setting


Kidney transplantation is considered the best renal replacement therapy for most patients with ESRD. Preemptive kidney transplantation is associated with the best survival and is an ideal transition for chronic kidney disease patients who need renal replacement therapy. Chronic kidney disease patients are eligible for preemptive kidney transplantation when their GFR is less than or equal to 20ml/min. These patients should be referred to a transplant center for kidney transplant evaluation.

We collected data for the month of August 2016 at the UTPB Renal Clinics. A total of 97 charts were reviewed, 17 of these were from patients who had a GFR of less than or equal to 20ml/min. 9 (53%) of these had documentation for kidney transplant referral.

In order to increase kidney transplant referral rates in this population, we displayed signage in clinic containing program reminders and had up to date paper applications for kidney transplant evaluation available, emailed nephrology stakeholders similar reminders, and met in-person to discuss referrals as well as documentation. To assist with documentation, the EMR was modified to allow documentation in the clinic flow sheet. Our goal is to increase referrals from 53% to 80% at six months.

After implementation, data was collected for the month of February 2017. 118 charts were reviewed. 16 of these were from patients who had a GFR of less than or equal to 20ml/min. 8 (50%) had documentation of referral for kidney transplant.

This was only 1 month after implementing the changes. We hope that by 6 months, we can achieve our goal.
EVALUATION OF CHRONIC CARE MODEL IN PRIMARY CARE CLINICS: THE ECONOMIC OUTCOMES OF UTILIZATION OF MEDICATION THERAPY MANAGEMENT FOR CHRONIC DISEASES

Ricardo Hernandez, Tong Han Chung, Pei Hua Quan, Edward Wei, Anaelle Libaud-Moal, Muttaya Bollich, Yen-Chi Le, Linh K. Nguyen, Lincy Lal, J. Michael Swint, Charles Begley

BACKGROUND: The Institute of Medicine reported that more than 1.5 million of the adverse drug events that occur annually in the United States are preventable. UT Physicians implemented a Medication Therapy Management (MTM) program in several community-based clinics through funding received from the Delivery System Reform Incentive Payments Program. We evaluated the effectiveness of MTM to reduce drug therapy problems and related medical cost savings.

METHODS: This is a retrospective, observational study on MTM participants from October 2015 through September 2016. Program participants include patients aged 18 years or older who take more than 4 prescribed medications and are diagnosed with at least one of the following chronic diseases: hypertension, congestive heart failure, chronic obstructive pulmonary disease, asthma or diabetes. The clinical pharmacist reviewed each patient’s electronic health record to create action plans to resolve identified drug problems. The number of avoidance of medical services was linked to the average cost of avoided medical services (i.e., potentially avoidable ED visits and hospital admissions) to calculate the total cost savings by MTM. Cost savings were collected from payer’s perspective and estimated in 2015 dollars.

RESULTS: The pharmacist identified 301 drug therapy problems and resolved 90% of identified problems. The most commonly identified drug problems were related to potentially adverse drug reactions or inappropriate drug dosage. The MTM program resulted in potential cost savings totaling $1,143,015.

CONCLUSIONS: The MTM program reduces medication therapy problems among program participants and achieves the significant health care cost savings.
In-patient falls in the older patients hospitalized in the ACE unit

Flores R, Lee J, Holmes H, Sultzzer A, Harrison N, Burnett J, Rianon N

Fall during in-patient hospitalization pose a challenge in health care for the elderly, which often lead to fractures, intra-cranial hemorrhage associated with high morbidity and mortality. Polypharmacy, delirium, low body mass index are known risk factors for in-patient falls in this patient population. A total of 6 falls were reported among the older group of patients (age 70 years or older) admitted to the acute care for the elderly (ACE) unit of the Memorial Hermann Hospital in the Texas Medical Center between January and December, 2016, who were treated by the UTHealth Geriatrics team. While some of the factors described as risk factors may not be avoidable in these patients, medication reconciliation, use of appropriate medications have been associated with improved rates of fall. Having a bed-side sitter is often a common intervention ordered by the health care team to prevent an in-patient fall in these patients. However, some of the falls were among patients who had a bedside sitter at the time of the fall. We aim to describe patient related risk factors to help identify appropriate intervention to prevent future falls in similar types of patients. Five of the 6 patients who fell while hospitalized in the ACE unit were men. Delirium was very common (N=5, 83%) among these patients. About 67% (N=4) had congestive heart failure and all of them had urinary incontinence. Only 2 of the 6 patients had a bed-side sitter present at the time of fall. Interventions focused on delirium may be warranted.
The Influence of Caffeine on Internal Medicine Conference Participation and Attendance

Bobak Akhavan, Frances Cervoni, David Boone, Bader Aldeen Alhafez, Gabriela Corsi, Aritra Sen, Travis Cox, Uday Sandhu, Keshav Kukreja, Hani Zamil.

In residency programs around the nation, morning report is an integral part of resident education and preparation as a future physician. Participation and engagement in these conferences enhances the experience as a whole. Many residents often consume caffeinated beverages such as coffee and tea on a daily basis. Evidence has supported that coffee can improve alertness and performance. Through some observation and theory we sought to determine if providing morning beverages (i.e. coffee and tea) at the beginning of conference would improve resident participation and punctuality. With this in mind, we envisioned a quality improvement project which we implemented an organized system which would allow these morning caffeinated beverages to be available to our residents at the start of morning conference. In this project, we observed and recorded the amount of responses, as well as the number of attendees with appropriate punctuality, during one week period of morning conference without providing coffee. We then repeated these same measurements with the aforementioned intervention. Our goal was to compare the data of three cycles to see if the addition of morning caffeinated beverages would influence the participation and attendance of our residency programs current residents. The results of our findings are currently pending the last week of data collection. However, the current data shows a trend towards improvement of participation during weeks in which caffeinated beverages were provided at morning conferences. There was no difference in punctuality when providing caffeinated beverages.