A Novel Solution to Decrease Open Defecation in an Urban Slum in Belén, Peru

Resident: Abraham Kanal, MD

OBJECTIVE: One of the Millennium Development Goals of the WHO is reduction of open defecation in poor communities, to reduce the physical hazards and prevalence of contaminated of drinking water. To decrease open defecation in an urban slum setting in Belén, Peru, we examined the uptake and sustainability of a novel waste management system.

METHODS: We enrolled three households into a longitudinal study over a four-month period to examine the use of a composting toilet. Participating households were required to build a platform adjacent to their home to receive the bathroom. We installed a personal bathroom kit for each, including a composting toilet, which relies on dry composition to decrease waste bulk and pathogen load. A mechanical counter recorded use for each toilet. Each household participated in both group- and individual-level education on the use and maintenance of the composting toilet. The outcomes included quantitative toilet use, surveys and compost inspections for both quantitative and qualitative measures regarding uptake and sustainability.

RESULTS: A total of five households were identified to receive composting toilets; three out of five built platforms and paid the subsidized cost, and we installed bathroom kits in three households in November, 2014. All households reported consistent and exclusive use over the four-month span, and declined the buy-back option at the end of the study. 2 of 3 households continued to use and maintain the toilet according to original instruction over the four-month period. Quantitative data reflected 0.5 – 2 uses per day per adult for >80% of the time, with approximately 15% of time showing inconsistent or sporadic use, likely due to counter failure during these periods.

CONCLUSION: Our study found that uptake of the composting toilet was 100% and satisfaction was high amongst participating households after four months. Education retention was 100% in 2/3 of households, and quantitative data suggested >80% uptake. We plan to expand our study to examine the uptake and sustainability of 20 toilets for a flood-prone jungle community of 14 households and 1 school.

The pressure is on: A case of a young woman presenting with PRES diagnosed with Acute Intermittent Porphyria

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Mentor: Stephen Holt M.D., M.S.; Yale Primary Care IM Residency Program, New Haven, CT.

Learning Objectives:

1. Identifying Posterior Reversible Encephalopathy Syndrome (PRES) as a rare manifestation of AIP
2. Recognize the signs and symptoms of an acute attack of AIP
3. Describe appropriate testing and interpretation of test results when suspecting AIP

Case:

A 28 year-old woman with a history of opiate dependence in remission, Hepatitis C and depression presented with one week of diffuse abdominal pain associated with nausea, vomiting and diarrhea. Review of systems was also positive for progressive lethargy, urinary incontinence, visual hallucinations, insomnia and generalized weakness. On physical examination, her heart rate and blood pressure were 134 bpm and 167/117 mm Hg, respectively. Exam was significant for delayed but fluent speech, tachycardia without an S4, normal fundoscopic exam and a diffusely tender abdomen without rebound. No LVH on EKG. Urine had ketones and was amber colored. CT scan of the head showed a subtle area of asymmetric low attenuation in the left occipital lobe. A CT scan of the abdomen and pelvis showed no evidence of pathology.
Her initial course was complicated by four tonic-clonic seizures. MRI brain was consistent with PRES so she was treated for hypertensive emergency. A work-up for secondary causes of hypertension was negative. She was started on phenytoin and remained seizure free. Over the next day she improved dramatically and requested discharge.
Gradually worsening lethargy with colicky abdominal pain and a witnessed seizure brought her back to the hospital 5 days later. She was again hypertensive but now reported diffuse motor weakness and sensory deficits in the lower extremities. Her labs were remarkable for a serum sodium of 114 mmol/L. Lumbar puncture was performed and the results were within normal limits. Hyponatremia corrected with fluid restriction but her weakness persisted. Qualitative urine porphobilinogen screening was positive (> 6mg/L). She was glucose loaded and started on Hemin. Fractionated porphyrin testing came back confirming the diagnosis of AIP. She improved over the next 3 weeks and was discharged to short term rehabilitation.

Discussion:

AIP is a difficult to make and often missed diagnosis due to non-specific signs and symptoms. The salient features of this case were PRES, hyponatremia, dark urine, weakness and hallucinations. Reaching the correct diagnosis requires creating a detailed problem list, generating a thorough differential diagnosis, and honing in on the diagnoses that can best explain the most notable features of the presentation. Screening for an acute attack with a spot urine porphobilinogen test is a highly sensitive and specific approach that prevents a delay of treatment.

Is HIV always on our radar?

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Case 1 is a 60 year old Caucasian male with a history of coronary artery disease who had been evaluated over a two year period for pancytopenia and fatigue, during which time he was also noted to have recurrent esophageal candidiasis and chronic diarrhea. In the most recent eight months he had a 40 pound weight loss and complained of worsening, disabling fatigue. He had no risky sexual contacts and no history of illicit drug use. Case 2 is a 55 year-old African American male with a four year history of severe psoriasis, two year history of pancytopenia, recurrent oral candidiasis, and recurrent herpes zoster who presented with 25 pound weight loss over a four month period, fatigue, and non-productive cough of one month duration. He denied any illicit drugs and was married to his wife in a monogamous relationship.

Both patients had been followed closely by multiple subspecialists for several years and had undergone, extensive work-ups targeting their individual problems. However, HIV testing was not offered until their disease was advanced. Unfortunately, both patients tested positive and were found to have very low CD4 counts of 18 and 1 cell(s)/microliter, respectively, indicating AIDS. These two cases highlight the need for providers to be properly trained on the signs and symptoms of chronic HIV, as well as the current screening guideline for universal HIV screening.

Currently, in the United States it is estimated that more than 1.2 million people are living with HIV/AIDS and approximately 20% are undiagnosed. The most recent CDC guidelines advise universal opt-out HIV screening for all adolescents and adults (ages 13-64) at least once and more frequently in the setting of certain risk factors. However, as illustrated in the described cases, some patients, particularly those over the age of 50 and without obvious high risk behaviors, may fail to be tested. In a recent survey of 330 primary care providers on their practices, beliefs, and knowledge, 69.7% of physicians reported that patients older than 50 years rarely or never asked questions concerning HIV/AIDS. Most physicians (60.8%) rarely or never discussed HIV or AIDS with patients older than 50 years. Physicians incorrectly ranked the most prevalent HIV risk factors in patients older than 50 years. It is crucial that residents in training and internists are appropriately trained in caring for the HIV population with emphasis on early diagnosis and linkage to care in order to prevent adverse outcomes related to AIDS and the risk of HIV transmission to others.

An Acid-Base Mystery

Resident: Mukta Dhond, MD

Resident: Ross Kristal, MD

Mentor: Christopher Remakus, MD

Learning Objective:

To evaluate a mixed acid-base disorder and examine the differential diagnosis for a respiratory alkalosis, metabolic alkalosis and metabolic acidosis.

Case Description:

A 56 year old man with h/o CAD, DM2 and heavy alcohol use presented with five days of vomiting, two days of diarrhea, and abdominal pain. During this time he had decreased PO intake including alcohol intake with last consumption of alcohol 24 hours prior to presentation. On presentation, he was afebrile, tachypneic to RR 22 and hemodynamically stable. Exam was significant for normal cardiopulmonary presentation and slight distention of his abdomen with hyperactive bowel sounds and RUQ tenderness. Labs were significant for severe electrolyte derangements including K 2.1, HCO3 17, Mg 1.4, Phos 0.7. Serum creatinine was 0.6. He had an AG of 38 and lactate of 19.3. CBC was significant for WBC 12 and plts 145. VBG showed pH 7.73 and pCO2 18. Serum and urine tox screen were negative except for cannabinoids. Osmolar gap was normal. U/A was significant for ketones. Cardiac enzymes were normal. EKG showed normal sinus rhythm with u waves. CXR initially demonstrated right sided atelectasis. CT Abd/Pelvis revealed a cirrhotic appearing liver and ascending colon thickening suggestive of colitis. Patient was diagnosed with mixed respiratory alkalosis, metabolic alkalosis and metabolic acidosis likely due to gastroenteritis/colitis and underlying cirrhosis. Patient was admitted to MICU and received 2L IVF, maintenance D5NS, aggressive repletion of electrolytes and antibiotics to cover intra-abdominal flora with rapid improvement in metabolic derangements over the next 24 hours.

Discussion:

This patient was alkalemic despite having profound lactic acidosis with a large anion gap. Looking at the blood gas, the patient had respiratory alkalosis which we believed was likely due to pain/splinting as evidenced by RUQ pain/tenderness and right sided atelectasis on CXR. Baseline increased minute ventilation from cirrhosis also played a role. Other causes for hyperventilation including primary respiratory causes, such as COPD, asthma, PNA and pulmonary edema, were ruled out by exam and CXR. Cardiac cause was unlikely given no evidence of ischemia by cardiac enzymes or EKG. PE was low on differential given no tachycardia or hypoxia on presentation. In addition to respiratory alkalosis, the patient also had metabolic alkalosis given that pH was much higher than expected for pCO2. In this patient, the metabolic alkalosis was likely due to vomiting as well as volume contraction. Lastly, despite pH indicating alkalemia, he had a large AG and lactate as well as ketones in the urine meaning he also had metabolic acidosis. We believe this was multifactorial in nature including AG acidosis due to poor lactate clearance secondary to cirrhosis and starvation/alcoholic ketoacidosis, and non-AG acidosis due to diarrhea. He showed no evidence of shock/hypoperfusion even at presentation, although hypovolemia may have been present at some point due to poor PO intake and GI losses. It is also possible that he had an unwitnessed seizure prior to presentation that led to his elevated lactate that quickly resolved.

Abdominal pain, stroke and hypoxemic respiratory failure in a 50-year-old gentleman with sarcoidosis and a reported history of sickle cell trait

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Mentor: Robert Nardino[1, 2], MD

Learning objectives

1. To describe the most common complications of Hemoglobin SC disease
2. To describe the methods for diagnosing Hemoglobin SC disease

Introduction: Hemoglobin SC (HbSC) disease is a hemoglobinopthy related to sickle cell anemia (HbSS) that is associated with significant morbidity and reduced life expectancy

Case Presentation: Mr. S was a 50-year-old gentleman who presented to the hospital from home with a two-day history of abdominal pain and subjective dyspnea. Past medical history was significant for sarcoidosis and sickle cell trait. Admission labs showed stable anemia with a hemoglobin and hematocrit of 11.3g/dl and 33.6%. Abdominal CT did not show obstruction or wall thickening. He was admitted for pain control with intravenous morphine. Overnight, he developed acute chest pain, worsening hypoxemia and altered mental status. Chest x-ray showed a new infiltrate. He was intubated and transferred to the intensive care unit. On neurological exam he was withdrawing to pain on the right side only. CT and CT angiogram of the head and neck were normal. Repeat head CT 24 hours later showed acute infarction involving the right frontal lobe. Unfortunately, shortly afterwards he developed asystole and was not able to be resuscitated. Autopsy revealed multifocal fibrosis in the heart and lungs. Because autosplenectomy was seen on the prior CT, high performance liquid chromatography (HPLC) was sent at the time of the ICU transfer. A result of hemoglobin SC disease returned post-mortem, suggesting a presentation consistent with vasoocclusive pain crisis, acute chest syndrome and ischemic stroke.

Discussion: Hemoglobin SC disease is a hemoglobinopthy related to sickle cell anemia (HbSS). Unlike homozygous HbSS, the HbSC genotype results when an individual inherits the hemoglobin S (HbS) gene from one parent and the hemoglobin C (HbC) gene from the other. HbSC occurs in 1/833 African American live births. In one Los Angeles study, the most common causes of morbidity for patients with HbSc disease were, in order: retinopathy, osteonecrosis, gallbladder disease, stroke, osteomyelitis and HbSS lung disease, and the main causes of death were chronic sickle renal failure, stroke, heart failure or overdose in the setting of pain crisis. Median survival was 60 years for men and 68 years for women, as compared to 38 and 42 years, respectively, for HbSS. Our patient demonstrates the challenges associated with HbSC diagnosis and management. Many patients are not diagnosed until after age 18, a time during which many of the serious chronic complications of HbSC begin to take hold. Thus, in African American patients with symptoms suspicious for pain crisis or with the stigmata of HbSS disease, suspicion should be high for HbSC disease and appropriate testing with electrophoresis or HPLC should be performed.

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The Case for Home Visits

Resident: Sandra Valenciano MPH, MD
Mentors: Sanjeet Baidwan MD, Julie R. Rosenbaum MD, PhD, Tracy Rabin MD

Learning objectives:
- Recognize the importance of medication reconciliation
- Appreciate the value of home-based care team visits in improving patient care

Case Information:
A 79 year-old woman with coronary artery disease, atrial fibrillation, type 2 diabetes, hypertension, and hyperlipidemia presents to clinic for follow up after being discharged from rehab. Two months prior, she had a complicated hospitalization during which she required coronary bypass surgery that left her de-conditioned. She brought in her medications and, in contrast to our medical record, she was taking amlodipine, imdur, and clopidogrel, which were discontinued upon her discharge. She was also taking a higher dose of amiodarone that was meant to be taken for only 2 weeks, which led to amiodarone-induced hypothyroidism. Her medication list was reconciled, an updated list was sent to the pharmacy, and the changes were also discussed with her cardiologist and her daughter (who, along with a VNA, assists the patient with her medications). A month later, the patient was seen in follow up and she again brought newly dispensed bottles of amlodipine, imdur, and clopidogrel**.** Her medication list was again reconciled, an updated list was sent to the pharmacy and to her VNA, and calls were made to the patient's VNA and daughter. A home visit team (comprised of an attending, chief resident, junior resident, and 2 intern residents) saw the patient a month later as part of an initiative to provide opportunities for residents to conduct home visits on their patients. Twenty bottles were discovered at her home, which included 7 medications that had been discontinued (amiodarone, amlodipine, imdur, clopidogrel, rosuvastatin, lisinopril 40 mg, ferrous sulfate) and 2 bottles with duplicate medications at different doses (lisinopril 5 mg and lisinopril 40 mg). The discontinued medications were removed from the home and detailed instructions were given to the patient, daughter, and VNA. Additionally, verbal medication reconciliation was performed with the patient's pharmacist. At a follow up visit, the patient arrived with a picture on her cell phone of her medication bottles lined up, was taking the correct medications and doses, and her blood pressure was at goal.

Discussion:
In the literature, the impact of house calls varies widely; importantly, several studies have demonstrated decreased hospital admissions and readmissions, shorter hospital stays, and decreased stays in long-term term care. Polypharmacy is common in the elderly population and about 14-50% of the elderly experience medication errors, which are associated with increased rates of readmissions, increased healthcare costs, and adverse outcomes. This vignette presents an example of the challenges of managing polypharmacy from within the clinic, and highlights the importance of understanding how patients manage their health at home. Further incorporation of home visit opportunities during internal medicine training may increase trainee comfort as well as improve the quality of patient care.

The Right Heart for The Wrong Rhythm: A Case Of Symptomatic Ventricular Tachycardia In the Setting Of Borderline ARVC

Resident: Shoshana Streiter, MD

Mentors: Varidhi Nauriya, MD and James Lai, MD

Learning Objectives:

1) Recognize arhythmogenic right ventricular cardiomyopathy (ARVC) as a rare cause of ventricular tachycardia

2) Review the diagnostic criteria and management of ARVC

Case Report:

A 65 year old man with a history of alcohol abuse and chronic pancreatitis, with no personal or family history of cardiovascular disease presented to the hospital with syncope. He experienced three episodes of syncope in the two weeks prior to presentation. Each event occurred in the setting of physical exertion, and was immediately preceded by palpitations.

Initial vitals were normal. Admission labs revealed normal electrolytes, and an undetectable troponin. Shortly after arrival, this gentleman experienced an episode of palpitations. An ECG performed at the time runs of non-sustained ventricular tachycardia with an inferior axis and left bundle branch morphology. Baseline ECG from three months prior showed sinus rhythm with no epsilon waves or T wave abnormalities. A TTE showed normal systolic function with mild diastolic dysfunction and mildly increased right ventricular size. A nuclear stress test showed no evidence of ischemia. Cardiac MRI revealed globally depressed right ventricular function with dyskinesis and outpouching of the right ventricular free wall with a right ventricular ejection fraction of 34%, as well as moderately impaired left ventricular systolic function, with a left ventricular ejection fraction of 48%. These findings were concerning for a diagnosis of ARVC.

Telemetry on hospital day two was notable for continued runs of NSVT. On hospital day three, the patient was started on sotalol, and the runs of NSVT resolved. An AICD was placed on hospital day eight.

Discussion:

ARVC is a rare condition characterized by progressive replacement of the right ventricular myocardium with fibro-fatty tissue, resulting in ventricular arrhythmias arising from the right ventricle. Although most cases are characterized by focal involvement of the right ventricle, left or biventricular involvement can be seen in a minority of cases. While an estimated 40% of patients with ARVC go undiagnosed the most common presenting symptoms are palpitations and syncope. Diagnosis of ARVC is based on the 2010 revised Task Force criteria, which categorizes patients with suspected ARVC as having either a definite, borderline, or possible diagnosis. Major and minor criteria for diagnosis are based on a constellation of findings, including family history, ECG findings, cardiac imaging, and genetic testing. Our patient, who meets one major criterion, based on his cardiac MRI findings, and one minor criterion, based on ECG characteristics of his ventricular tachycardia, is classified as having a borderline diagnosis of ARVC. Because ARVC is a recognized etiology of sudden cardiac death, prompt recognition and management with antiarrhythmics and AICD is potentially lifesaving for these patients.

Premature Cellulitis Bias: Re-evaluating Skin and Soft Tissue Infection Management in a Complex Host

Resident: Thilan Wijesekera, MD

LEARNING OBJECTIVES: (a) Review Uncommon Organisms for Skin and Soft Tissue Infections (SSTI) in a Complex Host (b) Identify Appropriate Time for Debridement of a Necrotizing Infection

CASE PRESENTATION: A 61-year-old woman with past medical history of psoriatic arthritis was admitted for painful, erythematous right lower extremity swelling and paresthesia with recent vomiting and diarrhea in the setting of recently handling raw shellfish and caring for pet cats.

Physical exam was notable for sinus tachycardia and right lower extremity warmth, erythema, pustules and edema circumferentially from the tibial tuberosity to the plantar foot, albeit without appreciable crepitus, bullae, or sensory deficits. Investigations demonstrated leukocytosis (WBC) of 14,500 units/L with neutrophilic predominance, blood urea nitrogen to creatinine ratio of 42 mg/dL to 1.9mg/dL from a baseline of 5 mg/dL to 0.5 mg/dL, erythrocyte sedimentation rate of 114 mm/hr, C-reactive protein of 255 mg/L, but with X-ray and ultrasound showing no air or deep vein thrombosis, respectively.

Blood cultures were drawn and patient was started on intravenous (IV) vancomycin for cellulitis, but her lesion became progressively ecchymotic and edematous, with scattered petechiae developing into golden-crusted weeping bullae. Patient's antibiotic coverage was broadened to vancomycin, ampicillin-sulbactam, and ciprofloxacin. Patient then developed new numbness and weakness in affected area, and was immediately taken for surgical exploration and debridement. Intraoperative and pathology findings were significant for necrotic epidermis and superficial dermis, but healthy subcutaneous tissue, likely due to early identification. She was discharged with IV ciprofloxacin and amoxicillin clavulanate, with markedly improved lower extremity edema, sensation and ambulation at one month.

DISCUSSION AND LEARNING POINTS: SSTI are frequently encountered in the outpatient and inpatient settings, with streptococci and staphylococci being the primary etiologies. Nevertheless, it is always important to consider intrinsic and extrinsic factors of the host including immunocompromise, diabetes, and exposures including travel, animals, freshwater, and toxins. Our patient's exposures included recent shellfish and somewhat distant biologic use, predisposing her to more uncommon microbes, including vibrio and pseudomonal species, which possibly informed her initial poor response.

The necrotizing nature of this infection was also uncommon, with an incidence of 0.04 cases per 1000 persons-years in the United States. Distinguishing between necrotizing soft tissue infection is difficult, but necrotizing fasciitis can sometimes be suggested by WBC > 20,000 units/L, blood urea nitrogen > 18mg/dL, creatinine > 1.2 mg/dL, and x-ray showing gas formation in subcutaneous tissue. It is also import to be mindful of how the condition evolves with crepitus, bullous formation, ecchymosis, and loss of sensation suggesting necrosis warranting surgical intervention, as in this patient's hospital course.