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The Journal Reimagined: Coming this Spring

In this time of reinvention and resilience, the Arkansas Medical Society is excited to announce the launch of a redesigned Journal of the Arkansas Medical Society. Established in 1880, The Journal's original mission was to provide valuable information and scientific articles to member physicians and serve as a communications tool for the Society. With this new look, The Journal will continue to bolster our mission of empowering physicians and improving medicine in the state of Arkansas in a brand-new way.

While our goal of providing value to our members through the publication is not changing, we are redesigning what, how, and when the Journal is published. Previously a 12-issue magazine, The Journal will now be published quarterly, beginning with the Spring 2022 issue that will be released mid-April. The Journal will have a fresh, new appearance with content that is member focused and contains timely feature articles, updates on practice management, insurance, legislation, health policy, as well as member news, leadership updates, member profiles, and medical school news.

Publishing The Journal is a team effort, and the Arkansas Medical Society staff is excited to take on this new challenge. Laura Haywood will now serve as managing editor, planning and coordinating content for each issue. Nicole Richards and Laura Hawkins are advertising account representatives and will be coordinating efforts to serve existing and new advertisers. The Journal will continue to be mailed to the current circulation of 4,500, which includes the membership of the Society and paid subscribers, as well as shared digitally on ARKMED.org.

The Arkansas Medical Society is grateful for this opportunity to take a new approach to what our members want to see in the magazine and deliver that in a way that fits the needs of today's physicians. But no matter how or why things change, AMS is still committed to maintaining high standards of editorial excellence in The Journal and will continue to work hard to promote the Society's mission to our members.

AMS Membership Renewal Deadline is March 1

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Events Precipitating Arkansas Food Pantry Utilization: A Qualitative Study

Abstract

Food pantry users experience high rates of food insecurity and chronic illnesses. Events leading to food pantry utilization are not well understood. Semi-structured interviews were conducted with 50 food pantry users to explore events that led to food pantry utilization. Unexpected changes in income, costs associated with acute and chronic illnesses, and changes in household structure were all common events that led to initial food pantry utilization. Future studies should evaluate the efficacy of coordinated responses among the charitable food system, primary care providers, and social services to meet acute needs of food insecure Arkansans.

Introduction

In 2019, 4.4% of households in the U.S. accessed food pantries.[1] Food pantry clients have high rates of food insecurity, which is defined as having difficulty providing sufficient food for all household members to live an active, healthy life.[1] Food insecurity is associated with a variety of chronic illnesses, including diabetes, obesity, asthma, hypertension, and various cardiac diseases.[2-5] Health researchers have recognized that food pantry clients have poor diet quality and poor medication adherence.[6] For these reasons, health researchers and clinicians have begun to implement chronic illness prevention and management interventions in food pantries.[7-9]

As partnerships among health researchers, clinicians, and food pantries grow, it is important to understand events that lead to pantry utilization in order to better respond to food pantry clients' needs. The present study explored food pantry clients' experiences that led to food pantry utilization, including unexpected changes in income, costs associated with acute and chronic illnesses, and changes in household structure.

Methods

Fifty participants were recruited from the lines of seven food pantries in Northwest Arkansas. These participants were a subset of a larger study assessing food security status, frequency of food pantry use, and sociodemographic characteristics.[10] Every third survey respondent was asked to participate in a 15-minute interview until the recruitment target goal of 50 total participants was reached. Fifty (93%) of the 54 participants who were asked to participate in the interview agreed to participate. The informed consent process was conducted by seven trained study team members (two were bilingual) in the language of choice of the participant. Participants received a total of $20 in gift cards for completing the survey and interview. A semi-structured interview guide was utilized to conduct interviews in July and August 2018. The guide was developed based on feedback from local food pantry staff and prior experiences of the authors in food pantries, with the goal of better understanding the lived experiences of food pantry users. Interviews were conducted in quiet areas in food pantries to maintain participant privacy. Seven trained research team members conducted the interviews and informed consent process in the preferred language of the participants. Interviews were conducted in Spanish, Marshallese, or English, depending upon participant preference. All interviews were audio recorded, transcribed verbatim, and translated into English, as needed.

The study team analyzed interview data using the constant comparative method.[11] Two research team members, trained in qualitative methods, completed initial coding of the interviews using *a priori* codes developed from the interview guide and a review of interview responses. The initial codes were used to label data segments in short summaries and to organize the data for more focused codes. A codebook was developed to organize both the *a priori* themes and emergent themes related to participant experiences and perceptions of pantry use. One team member reviewed the coding scheme to ensure analytic rigor and reliability. Discrepancies in codes and data interpretation were resolved via consensus of the research team. The most salient quotes are presented. The UAMS Institutional Review Board reviewed and approved the study protocol (IRB #217560).

Results

Participant Characteristics

Participants' demographic characteristics are presented in Table 1. Participants' median age was 48 years. Most participants (76%) identified as female, and 74% of participants had been using food pantries for more than a year.

Experiences That Lead to Initial Food Pantry Use

Pantry clients reported initial utilization of food pantries was precipitated by events in their lives. The most common events participants described were unexpected changes in income, costs associated with acute and chronic illness, and changes in household structure.

Unexpected Changes in Income

Participants reported unexpected changes in income that led to their initial utilization of food pantries. One participant stated, "Well me and my husband had both lost our jobs. We were working at the same place…the company was going under. We found ourselves unemployed. We had

just enough money for the bills but you still gotta eat, so we came in here and got us some groceries" (P15). Another participant stated that she "got laid off from work"(P4), which led to her accessing food pantries for the first time.

Wage changes leading to initial pantry utilization were not exclusive to job loss. Participants also described changes in their income level at their current job, both related to a decrease in hours and hourly pay. When asked what was happening in their life that led to pantry utilization, one participant stated, "wages got cut, food stamps got cut, and life got hard" (P31), and another, "well less work" (P20). Another participant described the seasonality of employment, resulting in job loss or significant financial strain: "No money, I didn't have a job then and then, like I said, I'm in the landscaping and sometimes it's good and sometimes it's bad" (P16).

Costs Associated With Acute and Chronic Illness

Participants explained how costs associated with acute and chronic illnesses resulted in them having to choose between their health and food. One participant described a medical event that cascaded into applying for federal benefits and accessing food pantries: "Heart attacks, that was the beginning. I applied for food stamps, and they referred me to [food pantries]" (P3). Another participant explained the dilemma of covering health care costs and food: "I lost my job because of my illness, and we went down to one income, which was $24,000 a year, and we were just trapped. We had to start doing something. The cupboards were getting bare" (P37).

When asked why they began going to food pantries, multiple participants expressed that it was due to someone in the household becoming disabled. These participants found themselves in a cycle of using food pantries when they were injured or became ill and had to file for disability benefits, particularly because the timeline for receipt of benefits or the amount of benefits resulted in a major financial gap for the household: "I was living on the streets until I got my disability and it took almost two years for me to get my disability"

Table 1. Sociodemographic Characteristics and Food Pantry Use in Arkansas Food Pantry Users (N=50)

Participant Characteristics	N (%)
SOCIODEMOGRAPHICS	
Age (Median, IQR)	48.0 (39.0-57.0)
Race/Ethnicity	
Non-Hispanic White	21 (42.0%)
Hispanic	14 (28.0%)
Pacific Islander	8 (16.0%)
American Indian/Alaskan Native	4 (8.0%)
African American	2 (4.0%)
Multi-Race	1 (2.0%)
Sex	
Female	38 (76.0%)
Male	12 (24.0%)
Insurance coverage	
No	20 (40.0%)
Yes	30 (60.0%)
Employment status	
Unemployed	22 (44.0%)
Employed	14 (28.0%)
Unable to Work	11 (22.0%)
Retired	3 (6.0%)
Number of household members 18 years of age or older	
One (i.e., only the respondent)	10 (20.0%)
Two	18 (36.0%)
Three	13 (26.0%)
Four or more	9 (18.0%)
Number of household members less than 18 years of age	
Zero	20 (40.0%)
One	7 (14.0%)
Two	8 (16.0%)
Three	5 (10.0%)
Four or more	10 (20.0%)
Currently receiving SNAP benefits	
No	35 (70.0%)
Yes	15 (30.0%)
Currently receiving SSI or SSDI benefits	
No	32 (64.0%)
Yes	18 (36.0%)
FOOD PANTRY USE	
How many times in the past 30 days did you obtain food from food pantries? (Median, IQR)	2.0 (1.0-2.5)
For how long have you obtained food from food pantries?	
More than 5 years	12 (24.0%)
Between 2-5 years	18 (36.0%)
Between 1-2 years	7 (14.0%)
Between 6 months and 1 year	5 (10.0%)
Less than 6 months	8 (16.0%)
Note. IQR = interquartile range; SNAP = Supplemental Nutrition Assistance Program; SSI = Social Security Income; SSDI = Social Security Disability Insurance	

(P7). A participant explained they began accessing food pantries because "I got on disability. I was unable to work" (P36). Another stated, "I got laid off from work and my husband became disabled" (P4).

Changes in Household Structure

Participants explained how fluctuations in the number of individuals in a household affected the financial burden associated with food costs. Changes in household structure, with individuals leaving or joining the household, and its impact on household food costs were often exacerbated by changes in income. One participant remarked, "I lost my job, baby momma left, less income from help from her, so therefore it put me in a bind feeding my children and stuff, so I started coming here" (P17). Another participant described his experiences after his son was born: "Well I just moved, and my little boy was born, and I couldn't find a job nowhere, and times are just hard. We just didn't have nothing. We found out about the food pantry and that we could go there about once a week. They took care of us" (P29).

One participant stated, "Well my son got killed last month so we've been having to have a little help because food and stuff" (P33). Another participant discussed the burden associated with the addition of family members, particularly children, when asked about why they started going to the food pantry: "My husband lost his job. My daughter moved back in with us. She had a child and I got custody of four of my grandchildren" (P59).

Discussion

This qualitative study explored food pantry clients' experiences that led to food pantry utilization in their own words in individual interviews. Awareness about events that precipitate utilization of food pantries will allow health care providers, policymakers, and community members to both identify high-risk community members and begin to better respond to acute and chronic food needs. This study provides evidence that events that precipitate utilization of Arkansas food pantries include unexpected changes in income, costs associated with acute and chronic illness, and changes in household structure.

SNAP participation rates in Arkansas continue to be low. Compared to other U.S. states, Arkansas has implemented particularly strict eligibility requirements, including household asset limits.[12] These requirements result in either lack of eligibility or a significant gap between onset of food insecurity and receipt of benefits. There is opportunity for collaboration between state authorities and the charitable food system to institute a referral program that would serve as a stop gap for the time between benefit application and receipt. This programming could also serve as a measure for better meeting the needs of individuals who would not immediately qualify for benefits but would still consider their households food insecure.

The interplay between illness and food pantry use is complex. Food insecurity and chronic illness is correlated and there is little known about the temporal nature of the association.[2-4] Participants discussed the costs associated with acute and chronic illnesses as a main contributor to food pantry utilization. Other research has demonstrated that food insecurity and a lack of nutritious food can negatively affect the development and management of chronic illness.[2] As food pantries continue to implement programs aimed at improving dietary outcomes, there will be increased need for collaboration between primary care providers and food pantries to improve food insecurity and health outcomes for patients, particularly those with chronic illnesses. Primary care providers can have an impact on screening and referral to resources to combat food insecurity.[13] One study found that patients had higher enrollment rates in SNAP at follow-up after primary care referrals to charitable food resources compared to other non-referred food insecure patients.[13]

Unpredictability characterizes the three primary drivers for participants in this study to access food pantries. Individuals who face such events should be connected to coordinated resources that address their acute food needs as well as provide access to additional services important for overcoming unexpected challenges. Most Arkansas pantry clients who participate in this study and other studies have been accessing food pantries for at least two years.[10] Clients' need for long-term food pantry access demonstrates how difficult it is for families to manage the events that led them to seek out food pantries. Programs implemented in pantries should include coordination of services for families who have encountered unexpected life events that precipitate food insecurity.

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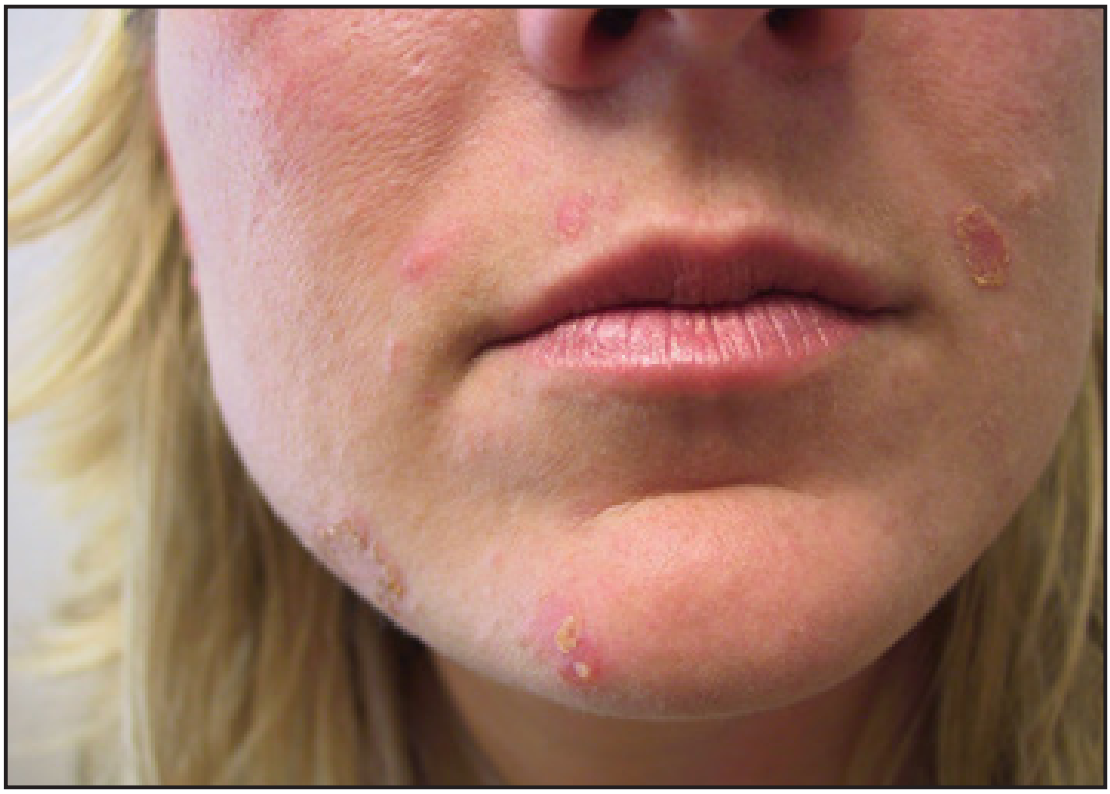
by MAURI LESTER

MD Candidate, Class of 2025, Oklahoma State University School of Medicine, Tulsa, Ok.

A 21-year-old woman presents with a 10-day history of pruritic, erythematous macules and patches surmounted by yellow, seropurulent crusts in a perioral distribution. Pink papules appeared initially then rapidly evolved into pustules. The eruption began within just a few days of beginning a new summer job at a daycare center. The patient states she enjoys hiking and spends much of her free time outdoors. Medical history is pertinent for atopic dermatitis. The patient denies concomitant cough or fever and any recent travel outside the U.S.



Based on the patient's history and clinical presentation, what is the most appropriate intervention?

A) Perform a potassium hydroxide (KOH) scraping to confirm the clinical impression of tinea faciei. Initiate a two-week course of a topical azole or allylamine antifungal. Inform patient that in order to reduce the risk of re-infection, household members and pets should be examined and treated if they are found to be the source of infection.

B) Based on the patient's history and clinical presentation, this is most likely phytodermatitis or plant dermatitis. Reassure patient that this will most likely resolve spontaneously, provided repeat contact with the responsible plant is avoided. To expedite improvement, prescribe a mid-potency topical corticosteroid. Inform patient that this is not contagious, and she can continue working.

C) The eruption most likely represents impetigo. Instruct the patient to gently cleanse the areas daily with antibacterial soap, and prescribe mupirocin ointment to apply to the nares one-to-two times daily for seven days. An oral antibiotic such as cephalexin may be prescribed. Inform the patient that impetigo is contagious and that she/patient should avoid returning to work until a few days after starting antibiotics.

D) The patient most likely is experiencing primary herpes simplex infection, and as such, prescribe oral acyclovir or valacyclovir. Educate the patient regarding the recurrent nature of this infection and that subsequent episodes are very likely.

Answer: C. The patient is experiencing an impetigo infection. The lesions begin as papules, which quickly evolve into flaccid vesicles or pustules and, once ruptured, a characteristic yellow or "honey colored" crust forms. Children aged 2-5 years are most commonly affected, but impetigo may also be seen in older children and adults as well. The face and extremities are the most common sites of infection. The diagnosis is typically made clinically, but if doubt exists, a bacterial culture may be obtained.

Staphylococcus aureus most commonly causes impetigo, although Beta-hemolytic streptococci may be the responsible pathogen in a minority of cases. A warm and humid climate favor infection. Patients who have impaired skin barrier function are at higher risk of developing bacterial infections such as impetigo. Any skin trauma, including but not limited to wounds, abrasions, burns, dermatitis, scabies, and pre-existing dermatitis, can all be factors that predispose patients to impetigo. Post-infectious sequelae are rare, but glomerulonephritis and rheumatic fever may occur after streptococcal skin infection.

Treatment of impetigo includes topical therapy such as mupirocin or retapamulin if localized, or systemic antibiotics such as cephalexin or dicloxacillin in more extensive or "deeper" (ecthyma) cases.

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A Patient Without Hemoglobin A1c

Abstract

Diabetes prevalence is high. International diabetes federation determined that 463 million adults live with diabetes (2019), and the projected number will increase to 578 million by 2030.

Glycated hemoglobin is routinely measured in the clinical laboratory to diagnose and monitor diabetes mellitus. The hemoglobin (Hb) variants can affect the HbA1c measurement's accuracy either through analytical interferences or by influencing the HbA1c result's interpretation by changing RBC lifespan. The most prevalent types are HbS, HbC, HbD, and HbE. In a patient with HbE, HbA1c may not be detectable by ion-exchange chromatography but may be measured by immunoassay technique.

Case Presentation

A 77-year-old male was presented with painful left-foot ulceration with surrounding cellulitis, after a fall and foot fracture sustained about two months previously. The patient had a history of diabetes type 2 and was scheduled for below-knee amputation. The orthopedic team ordered CBC, BMP, C-reactive protein (CRP), Hb A1C, and troponin as pre-procedure screening (Table 1).

For Hb A1C, we use HPLC technology D-100 cationic liquid chromatography (Bio-Rad Clinical Diagnostic Solutions); a flag "No Hb A1C peak" was shown (Figure 1). We sent the specimen to our sister pediatric hospital for HbA1c by immunoassay on Vitros 5600 Ortho Clinical Diagnostics. The result using this method was 5.8%. Based on the HbA1c result flag and the immunoassay's result, we reached out to the clinical team and advised them to order either glycated albumin or fructosamine to confirm the glycemic control. The result for fructosamine reported by our reference laboratory was within the reference interval of 200-285 µmol/L (i.e., fructosamine= 266 µmol/L). The fructosamine was measured using colorimetric assay (absorbance is measured photometrically at 546 nm), which depends on its ability to reduce nitroblue tetrazolium to formazan in an alkaline solution (Package insert: Roche Fructosamine reagent, Roche Diagnostics Corp., Indianapolis, IN 1999).

We observed a prominent peak in the E window after reviewing the HbA1c chromatogram (Figure 1). We reanalyzed the specimen using the D-10 extended (HbP) program. A peak of 85.6% in the A2 area was found. According to our procedure, as hemoglobin D and E have been observed to co-elute with HbA2, we sent the specimen to our reference laboratory for confirmation by a different methodology; electrophoresis cascade. The patient is confirmed to have HbE (93.0 %) (Table 2).

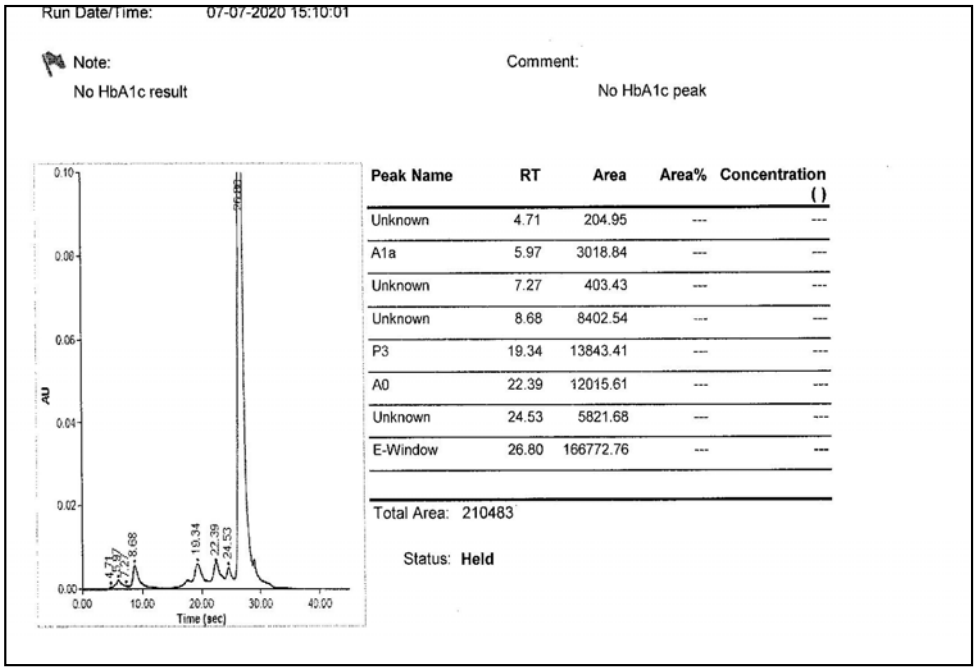
Table 1. Patient's laboratory test results

Lab test	Value (reference interval)
CBC	
RBC	5.08 M/µL (4.50 - 5.70 M/µL)
Hb	10.2 g/dl (13.0 - 17.0 g/dL)
Hct	30.5 %(40.0 - 50.0 %)
MCV	60 fl (80.0 - 100.0 fL)
MCHC	33.4 g/dl (32.0 - 36.0 g/dL)
RDW	17% (12.0 - 15.0 %)
WBC	16.48 K/µl (3.60 - 9.50 K/µL)
PLT	219,000 K/µL(150 - 450 K/µL)
K	3.2 mmol/L (3.5 - 5.1 mmol/L)
Ca	8.0 mmol/L (8.6 - 10.2 mg/dL)
BUN	35 mg/dl (6 - 20 mg/dL)
Creatinine	1.9 mg/dl (0.6 - 1.3 mg/dL)
ESR	97 mm/hr (0 - 20 mm/hr)
CRP	50.90 mg/L (<=10.00 mg/L)
Plasma glucose	110 md/dl (70 - 110 mg/dL)

Discussion

The glycated hemoglobin (HbA1c) has been proved as a gold standard biomarker for long-term glycemic control and can also be used to diagnose diabetes. Highly precise and accurate HbA1c assays, under supervision of the National Glycohemoglobin Standardization Program (NGSP) certification, allow clinicians to monitor diabetic patients, make treatment modifications, and analyze outcomes.[1] HbA1c concentration depends on the erythrocyte (RBC) lifespan and is related to the glucose concentration over the last 90-120 days. Due to the dynamic balance of the formation, breakdown, and removal of RBC together with their HbA1c molecules as the old RBC cohort leaves the circulation; the HbA1c is more

Figure 1: D-100 Chromatogram



Peak Name	RT	Area	Area%	Concentration ()
Unknown	4.71	204.95	---	---
A1a	5.97	3018.84	---	---
Unknown	7.27	403.43	---	---
Unknown	8.68	8402.54	---	---
P3	19.34	13843.41	---	---
A0	22.39	12015.61	---	---
Unknown	24.53	5821.68	---	---
E-Window	26.80	166772.76	---	---

Total Area: 210483

Status: **Held**

considerably weighted towards plasma glucose concentrations of the past four weeks, with only about 25% of HbA1c contributed by glycemia 60-120 days before the measurement.[1] HbA1c varies between 4.6-5.7% of the total hemoglobin in non-diabetic people. The prediabetic HbA1c limit is equal to or more than 5.7% though less than 6.5%, and the diabetic's value is equal to or more than 6.5%.[1,2]

Various factors may influence HbA1c measurements and interpretation accuracy, including hemoglobin variants and chemically altered hemoglobin derivatives (e.g., carbamylated hemoglobin in renal failure patients). The effects depend on the type of hemoglobin variant or derivative and the HbA1c method.

More than 1,000 hemoglobin variants have been recognized, many of them being clinically silent. One percent variation in HbA1c equals a change of 1.4 – 1.9 mmol/L in average blood glucose concentration. Accordingly, a false HbA1c value caused by clinically silent hemoglobin variants may influence the diabetic patients' treatment, which could be over-or under-treatment depending on the direction of effect. Cation-exchange high-performance liquid chromatography (HPLC) is a widely used method for measuring HbA1c, and it is affected by the hemoglobin variants, as described previously.[1, 2, 3]

Roughly 7% of the world's population carries a hemoglobin variant, which makes these variants one of the most prevalent monogenic diseases and a vital health care issue worldwide. Although the Mediterranean countries Asia and Africa are the well-known origin for hemoglobin variants, international migration leads to the spread of these mutations globally, and the pathologic variants are now classified as endemic diseases in many countries. Hemoglobin modification can lead to decreased red blood cell (RBC) survival. However, the extent to which the Hb variant may alter RBC survival needs further studies. Other variants may cause only silent, undetectable conditions.[4]

In cases with hemoglobin variants that may impede the interpretation of HbA1c results, using HbA1c to manage or diagnose diabetic patients may be complicated. Factors affecting the interpretation of HbA1c results include analytical interferences from the most common hemoglobin variants, which have been well defined, and the effect of modified RBC turnover, which is less understood.

Because diabetes is a widely prevalent disease, it is crucial to understand how the most common hemoglobin variants may influence the clinical interpretation of HbA1c results for the diagnosis and management of diabetes.[3,5] Glycated protein measurement, including glycated albumin and/or fructosamine (total serum glycated proteins), are alternative glycemia markers that have been approved to add supplementary information to HbA1c or offer a reliable measure when HbA1c cannot. While HbA1c monitors the exposure to circulating glucose in the previous three months, glycated albumin and fructosamine represent exposure for a shorter time, which may be helpful to monitor rapid metabolic adjustments or changes in diabetes therapy.[6]

Hemoglobin E (HbE) is an abnormal hemoglobin caused by a replacement of

Table 2. D10 Hb profile, reference laboratory result

D-10 Hb profile		
Parameter	Result	Reference intervals
Hemoglobin A Quantitation	16.2 Low	95.0 - 100.0 %
Hemoglobin A2	>11.4 High	1.5 - 3.7 %
Hemoglobin F	3.7 High	0.0 - 2.0 %
Hemoglobin S	0.0	<=0.0 %
Unknown peaks		
Reference Laboratory Result		
Hemoglobin A Quantitation	0	95.0 - 98%
Hemoglobin A2	4.5 High	1.5 - 3.3 %
Hemoglobin F	2.5 High	0.0 – 0.9 %
Hemoglobin S	0.0	<=0.0 %
Hb E	93.0 %	

the amino acid glutamic with lysine at position 26 (E26K) due to a single point mutation in the β chain.[7] The HbE variant was discovered in 1954, and there are still doubts about many aspects of its pathophysiology. HbE diseases could be heterozygotes (AE), homozygotes (EE), and compound heterozygous states (e.g., HbE/ β-thalassemia, sickle cell/HbE disease). Both heterozygotes and homozygotes are asymptomatic with a lower degree of anemia and have microcytic and hypochromic RBCs. However, when β E allele is associated with a β-thalassemia mutation in the compound heterozygous state, a variable – usually severe anemia – will occur, with Hb levels ranging from 3 to 11 g/dl.[4]

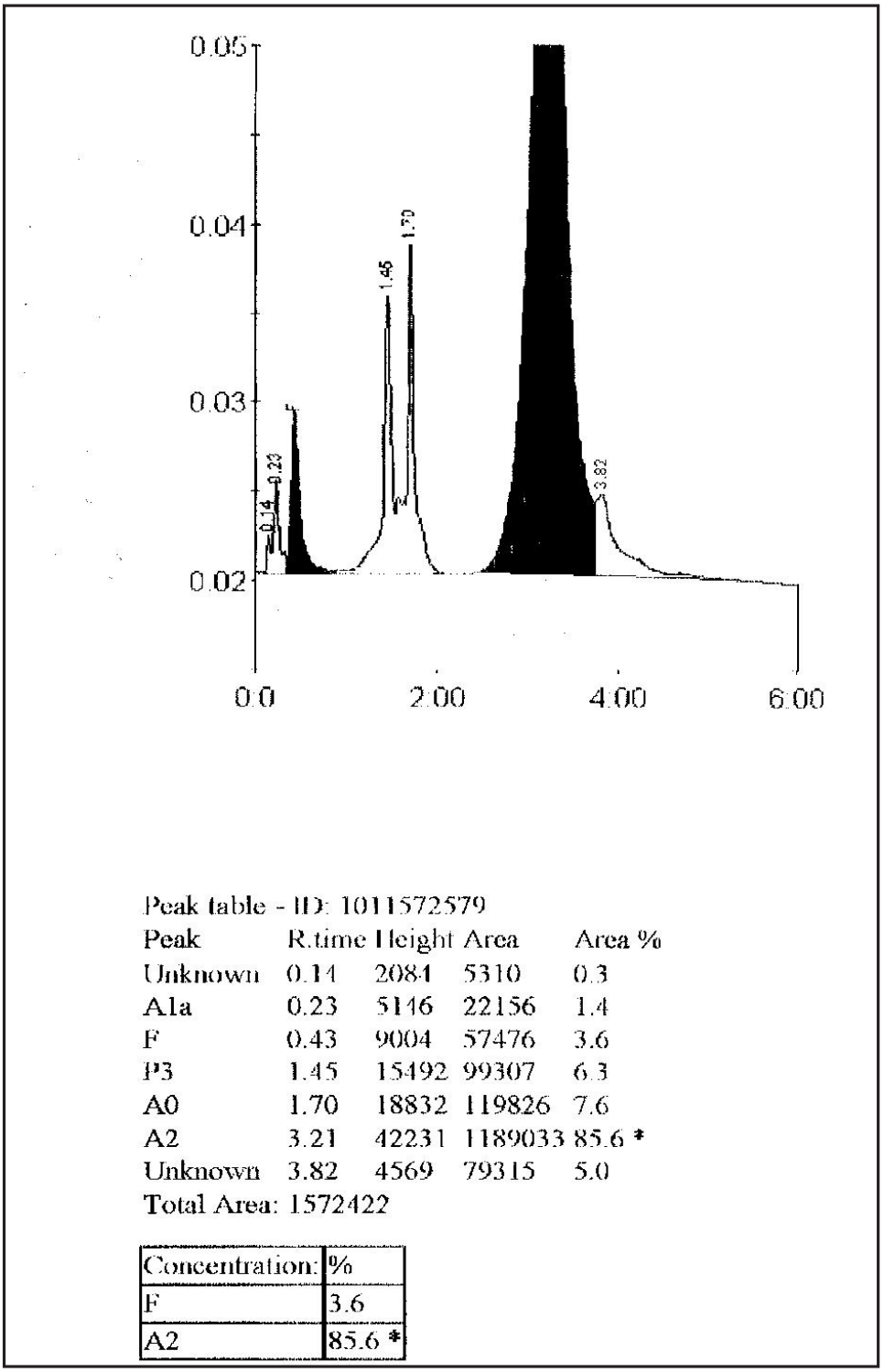
Considering the history, clinical findings, and laboratory test results, our case is most likely diagnosed as homozygous HbE disease, which causes only a mild, usually asymptomatic anemia with microcytosis and erythrocytosis. Peripheral smear examination showed spherocytes.[8] Spherocytosis could be related to either membrane damage due to oxidation or elimination of precipitated, unbalanced β globin chain and/or crystallized HbE.[8] If the HbA1c method is affected by the presence of HbE, using HbA1c in glycemic control in the endemic areas for HbE should be carefully reconsidered.[7]

HbE disease does not impact the immunoassay technique of HbA1c estimation, as the mutation is away from the site of the antibody reaction. However, it affects the ion-exchange HPLC method, as the mutation leads to alter the ionic charges on the Hb.[9]

Double heterozygous HbE/ β-thalassemia is a differential diagnosis in this case. Anemia, the presence of HbE by Hb electrophoresis, and target cells on peripheral blood smear have been described in both HbE disease and HbE/ β-thalassemia.[10]

Since HbE/ β-thalassemia cannot be entirely excluded in this case, genetic testing has been done to the patient. The final patient diagnosis for our patient is Homozygous Hb disease based on Beta Globin Gene Sequencing which leads to absence of HbA1c by cationic change HPLC (D100).

Figure 2: Hb Profile



Peak table - ID: 1011572579

Peak	R.time	Height	Area	Area %
Unknown	0.14	2084	5310	0.3
A1a	0.23	5146	22156	1.4
F	0.43	9004	57476	3.6
P3	1.45	15492	99307	6.3
A0	1.70	18832	119826	7.6
A2	3.21	42231	1189033	85.6 *
Unknown	3.82	4569	79315	5.0

Total Area: 1572422

Concentration:	%
F	3.6
A2	85.6 *

Conclusion

When evaluating a patient's HbA1c values it is important to consider the limitations of analytic methodology and possible hemoglobin variants, particularly in the context of non-congruence between a patient's glycemic pattern and the reported HbA1c. Different HbA1c methods and/or alternative markers to assess long-term glycemic control in patients with a hemoglobin variant should also be considered.

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Email ams@arkmed.org for a complete list of references.

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Recurrent Cardiac Conduction Abnormalities in a Young Caucasian Female as an Unusual Presentation of Cardiac Sarcoidosis

Abstract

Sarcoidosis is a multisystemic disease of exclusion that may involve virtually any organ in the body, including the heart. Due to the adverse clinical outcomes associated with cardiac involvement, it is crucial for clinicians to keep this diagnosis in mind. Although cardiac sarcoidosis was once considered rare, advancements in imaging studies, such as cardiac magnetic resonance imaging and positron emission tomography, have proved cardiac sarcoidosis more common than previously thought. Cardiac sarcoidosis is commonly asymptomatic, and sudden cardiac death due to fatal conduction system abnormalities often occurs before the diagnosis is made. When symptoms do occur, arrhythmias and congestive heart failure are common clinical presentations. With increasing awareness of the disease and appropriate clinical suspicion, it is possible that cardiac sarcoidosis can be detected and treated early.[1]

Case Description

A 23-year-old Caucasian female with a history of recurrent cardiac conduction abnormalities, chest pain, and exertional dyspnea presented for evaluation of ongoing symptoms. Her symptoms began six years prior, when she was diagnosed with SVT and treated with metoprolol. Due to recurrent cardiac palpitations, the patient elected to undergo cardiac ablation. Conduction abnormalities continued to persist sporadically after this procedure, prompting an echocardiogram that revealed mild pericardial effusion as well as mitral and pulmonic valve regurgitation. Cardiac CT was then performed, which incidentally exposed a pulmonary nodule. The nodule was biopsied, and histologic examination of the tissue revealed necrotizing granulomas. Acid fast bacteria and Grocott's methenamine silver stains of the tissue were both negative, and other fungal and mycobacterial causes were ruled out with extensive serum and urine antigen testing. Serum antibodies for c-ANCA, p-ANCA, PR3-ANCA, and myeloperoxidase were also negative as were rheumatoid factor (RF) antibodies, cyclic citrullinated peptide (CCP) antibodies, C- reactive protein, and anti-double stranded DNA antibodies. ANA screening was positive, suggesting an autoimmune origin of disease. As a diagnosis of exclusion, sarcoidosis was suspected. The patient began treatment for cardiac sarcoidosis shortly after FDG-PET/CT scan (Figure 1) revealed focal areas of hypermetabolism in a pattern consistent with the disease. The patient was started on a slowly tapering dose of high-dose prednisone and is currently being maintained on methotrexate.

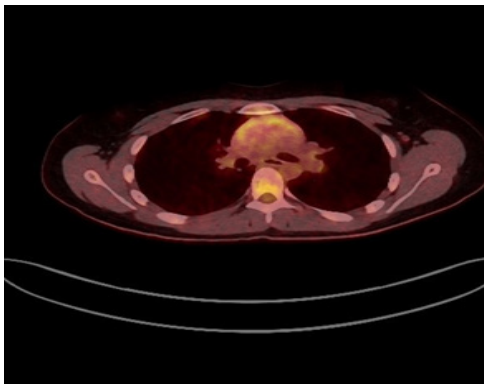

Figure 1. Cardiac Sarcoidosis- PET/CT scan showing patchy hypermetabolism of FDG in a pattern consistent with cardiac sarcoidosis.

Discussion

Cardiac sarcoidosis is a serious disease that is often found at autopsy due to the lack of early and specific clinical findings. As sudden cardiac death is highly associated with cardiac sarcoidosis, this diagnosis is crucial to keep in mind in patients presenting with arrhythmias and conduction system abnormalities. Though the myocardium and conduction system are most often affected, sarcoidosis is not confined to a specific region of the heart and may manifest clinically in a variety of ways. Cardiac valvular involvement is uncommon, but most commonly manifests as mitral valve regurgitation. If coexisting pulmonary involvement is present, pulmonary hypertension may also lead to pulmonary valve regurgitation. It is important to note that cardiac involvement of sarcoidosis is associated with poor clinical outcomes, making early diagnosis and treatment crucial to the patient's overall prognosis. When other causes of arrhythmia and conduction system abnormalities have been ruled out, cardiac sarcoidosis is an imperative diagnosis for clinicians to keep in mind.[1,2]

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Enriching the Surgical Clerkship Experience While Bolstering Interest in Anesthesiology

Abstract

In a state with an academic medical center with two geographically separate campuses, scheduling of third-year surgical and anesthesiology rotations is different. All students at the regional campus are exposed to anesthesiology, while only some students at the main campus complete anesthesiology as an elective rotation. This study examined students' experiences with the differing approaches via a survey. Students who rotated on anesthesiology reported greater comfort with procedures, enhanced understanding of and comfort within the operating room setting, and felt it contributed to their overall success on their surgical clerkship. Our data suggests a benefit from an anesthesiology rotation, and we encourage discussion about making this a component of medical education on both campuses.

Introduction

Anesthesiology clerkship requirements vary widely within medical schools across the U.S. According to the AAMC 2018-2019 academic year report, just 18% of medical schools required an anesthesiology clerkship ranging from one to four weeks, and occurring in the M2, M3, or M4 year. A 2018 study conducted at the Emory University School of Medicine concluded that a week-long anesthesiology clerkship positively impacted third-year students' knowledge of perioperative medicine when strategically placed in the middle of the surgical clerkship.[1] A number of other studies have concluded that required anesthesiology rotations have a positive impact on overall medical student education, regardless of the students' ultimate specialty choices, in addition to stimulating an increased interest in the field.[2-4]

In a state with an academic medical center that has two geographically distant campuses, third-year students have varied educational experiences in anesthesiology. At the older, fully established campus, 100% of the eight-week surgical clerkship is focused exclusively on surgery. At the regional campus, medical students complete a one-week integrated anesthesiology rotation embedded within their first week of the eight-week surgical clerkship. Separately, students at both campuses complete two "selective" rotations, each two-week rotations of the students' choices from eight options including but not limited to anesthesiology, emergency medicine, and surgical subspecialties. These selective rotations occur at different times throughout the year based on individual students' schedules, with some students completing them before the surgery clerkship and some after. In summary, all students at the regional campus are exposed to anesthesiology, specifically before their surgical clerkship, while students' exposures on the main campus occurs only if they elect to take the anesthesiology selective, which may occur before or after their surgical clerkship.

These differences in approach provided an opportunity to study how the presence and timing of exposure to anesthesiology impacts medical student education. Components examined include medical students' perceived knowledge of perioperative medicine; acquisition of procedural skills such as peripheral IV placement, bag mask ventilation, and endotracheal intubation; understanding of and interest in anesthesiology as a career choice; knowledge of the flow of the operating room and the role of the student in the operating room; and students' perceptions of their success within their surgical clerkship. Students who rotated on anesthesiology prior to their surgical clerkship were queried whether this preparatory experience influenced their overall success within their surgery clerkship.

Materials & Methods

A Likert scale survey was generated via a computerized survey software (REDCaps) and securely distributed via email to all 350 third- and fourth-year medical students at UAMS in spring of the academic year 2019-2020. The survey was collected anonymously and did not ask for identifying factors. Eighty-seven responses (25%) were received. Students were sorted based on their schedule. Group 1 consists of medical students who completed any anesthesiology training prior to their surgical clerkship. This included both the embedded one-week rotation at the regional campus and the two-week anesthesiology optional selective/clerkship at both campuses. Group 2 consists of medical students who completed an optional two-week selective/clerkship in anesthesiology after their surgical clerkship. Group 3 consists of students who had no exposure to anesthesiology.

Students were asked to indicate their opinion on a series of statements. For statistical analysis, "strongly disagree" responses were grouped with "disagree;" "strongly agree" responses were grouped with "agree."

A section was included for optional narrative explanations/comments. This study was approved by the Medical School's Institutional Review Board. Distribution of questionnaire responses are presented using frequencies and percentages. Sta-

tistical differences in question responses are determined using chi-square tests. Statistical significance was set at alpha< .05 for all analyses. The data management and analysis were conducted using Stata 14.0 (College Station, Texas).

Results

Results are displayed in full in Table 1. Overall, a higher percentage of students in groups 1 and 2 agreed with gaining sufficient knowledge of perioperative medicine appropriate for the medical student level and with having confidence in peripheral iv placement, bag mask ventilation, and endotracheal intubation than students in group 3 did with a statistical significance. A higher percentage of students in groups 1 and 2 also felt they understood what a career in anesthesiology encompassed and to be interested in one when compared to students in group 3, with a statistical significance.

Students in group 1 were more likely to feel they had a sufficient knowledge of the flow of the operating room than students in group 2 or 3, while students in group 2 and 3 were more likely to disagree with this statement, a result with statistical significance. A higher percentage of students in group 1 also agreed with being more confident in their role as a student in the operating room than group 2 or 3, although this result was not statistically significant. When asked if they felt they succeeded in the surgery clerkship to the best of their abilities, results between the groups were variable, and not statistically significant. Finally, most students in group 1 who completed an anesthesiology rotation

Table 1

	% pf Responders									
	Group 1 - Rotation Before			Group 2 - Rotation After			Group 3 - No Rotation			p-value
Survey Questions	Disagree	Neutral	Agree	Disagree	Neutral	Agree	Disagree	Neutral	Agree	
Q1: I have gained sufficient knowledge of perioperative medicine appropriate for the medical student level. (n=87)	3%	14%	83%	5%	14%	82%	50%	33%	17%	<0.01*
Q2: I am confident in my skills for peripheral IV placement. (n=87)	49%	37%	14%	36%	23%	41%	80%	17%	3%	<0.01*
Q3: I am confident in my skills for bag mask ventilation. (n=87)	6%	9%	86%	0%	5%	95%	20%	24%	57%	0.01*
Q4: I am confident in my skills for endotracheal intubation. (n=87)	18%	31%	51%	14%	50%	36%	77%	13%	10%	<0.01*
Q5: I understand the scope of what a medical career in anesthesiology encompasses. (n=87)	6%	14%	80%	5%	14%	82%	27%	40%	33%	<0.01*
Q6: I am interested in a career in anesthesiology. (n=87)	65%	14%	20%	41%	27%	32%	93%	3%	3%	<0.01*
Q7: Before my surgery clerkship, I had sufficient knowledge of the flow of the operating room. (n=84)	21%	12%	68%	57%	14%	29%	48%	14%	38%	0.027*
Q8: Before my surgery clerkship, I was confident in my role as a student in the operating room. (n=84)	32%	24%	44%	57%	14%	29%	48%	10%	41%	0.349
Q9: I feel that I succeeded in my surgery clerkship to the best of my abilities. (n=84)	3%	24%	74%	0%	5%	95%	0%	24%	76%	0.162

prior to their surgical clerkship felt that it was beneficial to their surgical clerkship; however, this result did not hold statistical significance.

Discussion

Exposure to anesthesiology enhanced medical students' perceived knowledge of the specialty and of perioperative medicine and provided an increased comfort level with performing important medical procedures utilized in a range of medical specialties. In addition, students who completed a rotation had a significantly increased interest in pursuing careers in anesthesiology than those who did not. It is not clear whether this may be attributed to students having a prior interest signing up for the rotation.

Limitations to this study include the very low response rate of 25%, along with variation contained within groups and non-uniformity of the length of rotation. Group 1 contains students who completed a one, two, or three-week rotation. Having separate campuses with different faculty, students, and educational facilities also introduces confounders. The study is retrospective, and there is likely survey response bias related to timing of administration of the survey, with some students being further removed from the rotations compared to others; we anticipate students further removed were less likely to respond and to recall accurately. Students interested in anesthesiology were also likely more willing to respond. There is lack of an analysis of survey results before the rotation, which would be useful to determine any change present before and after the rotation.

In conclusion, in our study an anesthesia rotation before the surgery clerkship increased students' confidence level with the flow of the operating room. This may lead to better interactions between students and members of the surgical team, in addition to increased student self-efficacy. However, there were no statistical differences in students' perceived confidence in their specific role.[5-6] A potential goal of future studies is analysis of perceived stress levels related to interpersonal interactions in the operating room of the different groups of students. In addition, there were no statistical differences in their perceived success in the surgery clerkship. While this may point to the surgical clerkship being adequate without the anesthesia integration, the majority of students who completed the anesthesia rotation before surgery did feel that it contributed to their success in the surgery clerkship. This generates actionable implications for medical education curriculum order to best support student success and can also inform faculty who advise medical students in pursuing surgery as a specialty. From this study, we propose a one-week anesthesiology rotation as an introduction/integration at the beginning of the surgical clerkship as being beneficial to overall student education.

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Gastric Volvulus With Complete Gastric Obstruction in Suspected Non-ST-Elevation Myocardial Infarction Patient

Abstract

Gastric volvulus is the abnormal rotation of the stomach causing varying degrees of outlet obstruction. We discuss here the case of a 69-year-old woman presenting with chest and abdominal pain and nausea and vomiting, who was being worked up for a suspected Non-ST elevation myocardial infarction (NSTEMI). Acute gastric volvulus was suspected on chest x-ray. CT of abdomen confirmed the diagnosis, showing a hiatal hernia with organoaxial volvulus and gastric outlet obstruction. Laparoscopic repair was performed with reduction of the stomach, crural repair, Nissen fundoplication, and gastropexy with G tube placement. Patient developed an acute ischemic stroke postoperatively and was transferred for neurointervention.

Introduction

Gastric volvulus is a malrotation of the stomach along its long or short axis, which can lead to varying degrees of gastric outlet obstruction.[1,3] Generally, a rotation of more than 180 degrees, if not recognized, will lead to strangulation and necrosis with perforation of the stomach[4]. In addition, there are certain anatomical abnormalities that will increase patient risk for gastric volvulus, such as abnormalities of the gastric ligaments. The most likely cause of gastric volvulus in adults, however, is the presence of a hiatal hernia, specifically a paraesophageal hernia.[2]

Gastric volvulus will commonly present with chest and epigastric pain associated with vomiting. Historically, these symptoms may be acute or chronic and often intermittent. As such, an initial workup that includes a history of chest pain often suggests a cardiac etiology. Failure to consider the diagnosis of acute gastric volvulus with complete obstruction may delay definitive treatment and increase patient morbidity and mortality.

Case Report

This case study describes a 69-year-old woman with a known symptomatic hiatal hernia who presented to an outside medical facility with chest and abdominal pain, nausea and vomiting. Her past medical history was significant for hypertension and gastroesophageal reflux disease, with biopsy proven esophagitis. There was no evidence of metaplasia on the biopsy. Her chest film showed a large hiatal hernia with a significant portion of her stomach in her chest. Her EKG showed t wave changes in her inferior leads. Troponin lab results were not available. The patient received IV fluids and electrolyte replacement. Oxygen was administered, and her chest pain and nausea were successfully treated. The patient was then transferred to our facility with the diagnosis of an NSTEMI.

The patient was evaluated in our emergency room. She was alert and had no specific complaints other than mild nausea. Her blood pressure was 110/75, with an irregular pulse. Her previous studies were reviewed. Her chest x-ray suggested a gastric volvulus present with gastric outlet obstruction (Figure 1). A second EKG revealed atrial fibrillation with a rapid ventricular rate. Her physical exam revealed

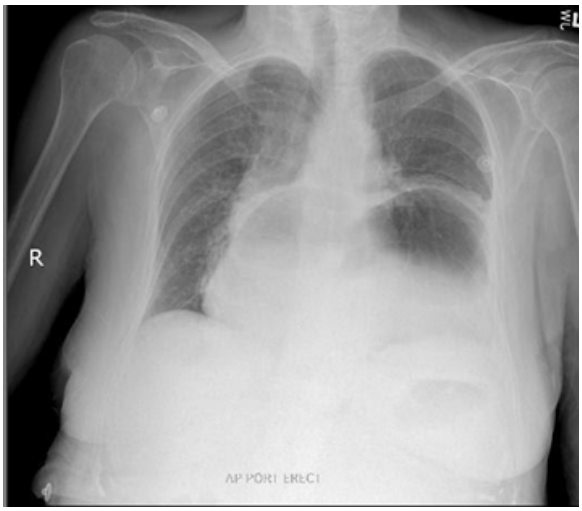

Figure 1. Chest X ray showing large hiatal hernia, CT was suggested to confirm gastric volvulus

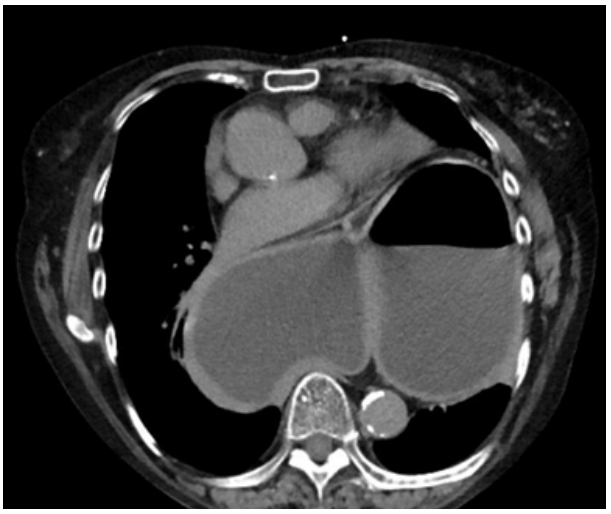

Figure 2. CT of Abdomen and Pelvis showing large hiatal hernia with gastric volvulus.

mild abdominal distension with mild epigastric tenderness and no peritoneal signs. A nasogastric tube could not be passed. Lab work was unremarkable; however, arterial blood gas revealed a metabolic alkalosis. Finally, a CT scan of the abdomen and pelvis was done, which confirmed the diagnosis of a large hiatal hernia with gastric volvulus as the etiology of her gastric outlet obstruction (Figure 2). The patient was medically optimized and prepared for surgery. Intraoperatively, organoaxial gastric volvulus was found, with herniation of the stomach into the left chest. The hernia was reduced, and the volvulus corrected. There was no evidence of gastric ischemia. A 360-degree posterior fundoplication was performed with crural repair. A gastropexy via placement of a gastrostomy tube completed the procedure.

Discussion

The majority of cases of gastric volvulus present in the elderly, beginning in the fifth decade.[2,3] There is no association with a particular sex or race. Risk factors, other than age, include diaphragmatic abnormalities such as hiatal hernia, eventration, and sequelae of phrenic nerve paralysis. Certain musculoskeletal problems, such as kyphoscoliosis, also increase the risk. In general, gastric volvulus is characterized as primary or secondary. Primary or idiopathic is due to abnormalities of gastric ligaments responsible for gastric fixation. This failure of gastric fixation specifically relates to agenesis, elongation, or disruption of those ligaments. The symptoms associated with this are usually chronic. Secondary gastric volvulus is associated with diaphragmatic abnormalities, commonly a paraesophageal hernia and other hiatal hernias.[2]

Acute gastric volvulus presents with pain in the abdomen or lower chest and is associated with nausea and vomiting. The combination of abdominal pain, vomiting, and the inability to pass a nasogastric tube is known as Borchardt's triad. Seventy percent of patients present with this triad.[1,2] With complete gastric obstruction, the stomach is usually dilated with air fluid levels, best documented on plain films and CT scan. Other physical findings at presentation include hypotension, tachypnea, abdominal distension, and epigastric tenderness. Gastric sounds may be auscultated in the chest. Signs of peritonitis are a late finding. Chronic gastric volvulus may have vague and intermittent symptoms.[1] Those symptoms are abdominal discomfort, bloating, dysphagia, retching, early satiety, and heartburn. It is often associated with a gastric ulcer. The diagnosis of chronic gastric volvulus is more difficult and may require additional testing such as an upper gastrointestinal series and endoscopy.

The treatment of acute gastric volvulus begins with attempting to pass an NG tube and decompress the stomach. Likewise, endoscopy may be used. Resuscitation is usually needed to include fluid and electrolyte management. Broad spectrum antibiotics are begun. Surgery is the definitive treatment, and emergency surgery is needed if the stomach cannot be decompressed.[5] In general, surgery consists of volvulus reduction, crural repair, and an antireflux procedure.

Finally, because of the increased risk of gastric volvulus and ulceration in patients with a symptomatic paraesophageal hernia, elective repair should be considered.[5,6] Whether this should be done in the asymptomatic patient is not as clear.

Conclusion

Gastric volvulus is a rare occurrence and the correct diagnosis is often difficult. Patient outcomes are generally poor without early recognition. This is demonstrated when a cardiac etiology is the initial diagnosis, even in the presence of a large hiatal hernia. The diagnosis of gastric volvulus often suggests a cardiac etiology because gastric rotation can be intermittent in nature and mimic angina historically. Ultimately, the physical findings of epigastric tenderness, radiographic findings of a large gastric air fluid level in the presence of a hiatal hernia, followed by CT scanning usually confirm the diagnosis. With acute gastric volvulus, emergent surgical correction is the definitive treatment.

In this specific case, the patient had a large hiatal hernia with reflux symptoms treated medically. There are times during patient follow up that elective repair of the hiatal hernia should be considered. This is especially true in the case of a paraesophageal hernia. Gastric volvulus, although not common, should be considered in the differential diagnosis of a patient presenting with chest pain and abdominal symptoms, especially in the presence of gastric outlet obstruction associated with a large hiatal hernia.

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