

Proceedings From the 2024 Annual Meeting of the American College of Physicians, Wisconsin Chapter

The following abstracts were presented during the 68th Annual Scientific Meeting of the Wisconsin Chapter of the American College of Physicians on September 6-7, 2024 in Wisconsin Dells. Internal medicine residents and medical students from Wisconsin programs presented their research and/or unusual clinical experience via clinical- and research-based vignettes and posters. Winning vignettes and posters are published here. Additional presentations are available online at https://www.acponline.org/sites/default/files/documents/about_acp/chapters/wi/24_ACP_Abstract_Book_AWARDS_v2.pdf

CLINICAL ORAL VIGNETTES

Winner: (Mental Status) Goes Down, Down, Down in a Burning Ring of Fire

Jake Thomas, DO; Kelsey Lamb, MD; Amit Taneja, MD

Introduction: Toxoplasmosis represents the clinical disease of infection with the intracellular protozoan *Toxoplasma gondii*. Infection primarily occurs via 2 methods: the first through ingestion of oocysts typically in food contaminated with cat feces and the second through consumption of undercooked meat contaminated within cysts. Infection primarily remains asymptomatic in immunocompetent hosts; however, immunocompromised populations may experience reactivation of latent cysts. This has been described classically in the HIV/AIDS population; however, allogeneic hematologic stem cell transplantation (HSCT) represents another group susceptible to infection. Here we describe a case of central nervous system (CNS) toxoplasmosis in a patient who underwent allogeneic HSCT.

Clinical Course: A 64-year-old male with acute myeloid leukemia status post allogeneic HSCT presented with fever and elevated creatinine 30 days posttransplant. He was started

on cefepime and metronidazole while a large infectious workup was started. Four days after admission, he became acutely altered. Head CT was negative for acute intracranial abnormalities. CNS studies revealed elevated protein and nucleated cells. Brain magnetic resonance imaging (MRI) later revealed multiple ring-enhancing lesions. Serologic testing of blood and CNS revealed positive IgG and IgM toxoplasma antibodies. He was started on high-dose trimethoprim-sulfamethoxazole and later was transitioned to pyrimethamine, clindamycin, and leucovorin due to hyperkalemia. His altered mental status gradually improved with antibiotics. polymerase chain reaction (PCR) toxoplasma via blood sample was negative prior to discharge, and he was discharged on the pyrimethamine, clindamycin, and leucovorin with a transition to trimethoprim-sulfamethoxazole in the outpatient setting.

Discussion: This case highlights a unique case of CNS toxoplasmosis in an HSCT recipient. Roughly 11% of immunocompetent individuals have serologic evidence of toxoplasmosis infection. Many toxoplasmosis cases are the result of reactivation of latent infection. The incidence of toxoplasmosis in allogeneic HSCT recipients

ranges from 0.1% to 6%, with incidence varying by region. However, the mortality rate attributed to these infections is between 60% and 90% with the majority of cases being diagnosed postmortem. Due to its high mortality and the possibility of being underrecognized, clinicians need to keep toxoplasmosis encephalitis as part of their differential diagnosis when considering altered mental status for patients who underwent allogeneic HSCT.



Author Affiliations: Medical College of Wisconsin, Milwaukee, Wisconsin

Runner-up: Adult-Onset Still's Disease Complicated by Macrophage Activation Syndrome

Zabraa Qambieh, MBBS, PMSc; Dalia Sriwi, MBBS; Sean O'Neill, MD

Introduction: Adult-onset Still's disease (AOSD) is a rare inflammatory disorder typically seen in young adults and characterized by recurrent fever, rash, arthralgias, and other systemic manifestations. Its etiology involves genetic susceptibility, infectious triggers, and cytokine storm. Diagnosis is by exclusion, aided with the Yamaguchi criteria. One potential complication is macrophage activation syndrome (MAS), which occurs in 1.7% of patients and often is triggered by infection or treatment changes. This case presents AOSD with MAS/hemophagocytic lymphohistiocytosis (HLH) likely triggered by infection.

Case Presentation: A 20-year-old healthy female presented with a week-long history of fevers, sore throat, migratory polyarthralgia, and ankle swelling after exposure to a sick roommate. She was tachycardic (120

beats per minute) with otherwise stable vitals. Labs revealed white blood cell count (WBC) 23.8, predominantly neutrophils; alanine aminotransferase (ALT) 69 U/L; aspartate aminotransferase (AST) 83 U/L; and C-reactive protein (CRP) 32.9 mg/dL. Computed tomography (CT) neck reported pharyngitis, but throat culture was negative. Transthoracic echocardiogram (TTE) was negative for valvular disease or carditis. Symptoms improved with intravenous (IV) antibiotics and nonsteroidal anti-inflammatory drugs (NSAID) for presumed postinfectious immune activation; however, she re-presented with diffuse skin papules and worsening peripheral swelling. Lab tests showed persistent leukocytosis with new anemia (hemoglobin 8.8 g/dL) and high ferritin (5000 ng/mL). Consultations with Rheumatology, Infectious Disease, and Dermatology led to extensive workup notable for positive DNase B. She was started on penicillin for rheumatic fever; however, symptoms persisted with rising ferritin levels (62 000 ng/mL) and a positive interleukin 2 receptor. Bone marrow biopsy was normal. Eventually, Rheumatology favored a diagnosis of AOSD—based on the 1992 Yamaguchi criteria—complicated by MAS. She was started on dexamethasone and anakinra with near resolution in symptoms.

Discussion: Timely diagnosis of AOSD is challenging owing to its diverse manifestations and the absence of serologic markers, increasing risk of complications like permanent joint damage, disseminated intravascular coagulation, and pulmonary hemorrhage. Early collaboration among specialties is crucial. While there are no universal guidelines for treatment, steroids, disease-modifying antirheumatic drugs, and interleukin 1 inhibitors have emerged as common approaches.

...

Author Affiliations: Department of Internal Medicine, University of Wisconsin Hospital, Madison, Wisconsin.

RESEARCH ORAL VIGNETTES

Winner: Comparative Evaluation of Various Artificially Intelligent Chatbots for Management of Common Internal Medicine Conditions

Daniel Willcockson MD, MPH

Introduction: The integration of artificial intelligence (AI) in health care—particu-

larly within internal medicine—holds the potential to significantly enhance diagnostic accuracy, patient management, and clinical workflows. Advanced AI tools, such as ChatGPT-4o, Gemini Pro, and Perplexity Pro, are capable of interpreting clinical data, generating differential diagnoses, and automating various administrative tasks. These advancements can streamline medical procedures and personalize treatment plans.

Methods: This study aimed to compare the accuracy and reliability of ChatGPT-4o, Gemini Pro, and Perplexity Pro in responding to internal medicine-related medical management questions, including those related to acute coronary syndrome, type 2 diabetes, acute kidney injury, and others. Each chatbot's response was reviewed independently by itself and against the others using an answer key derived from current literature on UpToDate. Responses were rated on a 10-point Likert scale, with 10 indicating the highest accuracy. The overall statistical significance was assessed using the Friedman test, while pairwise comparisons between chatbots were conducted using the Mann-Whitney U test.

Results: The analysis showed no significant difference in the chatbots' abilities to answer medical management questions accurately and reliably when using the Friedman test ($P=0.06-0.72$). Despite the lack of statistical significance, ChatGPT-4o and Perplexity Pro repeatedly achieved higher Likert scores compared to Gemini Pro. However, pairwise comparisons revealed significant differences between ChatGPT-4o and Gemini Pro ($P<0.01$) and between Gemini Pro and Perplexity Pro ($P<0.01$) but no difference between ChatGPT-4o and Perplexity Pro ($P=0.48$).

Discussion: AI chatbots like ChatGPT-4o, Gemini Pro, and Perplexity Pro demonstrate substantial potential for enhancing internal medicine practices. While the Friedman test showed no significant difference, pairwise comparisons revealed that ChatGPT-4o and Perplexity Pro were superior in answering internal medicine-related medical questions compared to Gemini Pro ($P<0.01$). The comparable performance among these chatbots underscores the necessity for continued development and evaluation to ensure their effectiveness in clinical settings. Future studies should focus on refining these AI tools and exploring their integration into clinical

practice, such as answering patient portal messages. Of note, AI was used in the development of this abstract.

...

Author Affiliations: Department of Internal Medicine, University of Wisconsin Hospital, Madison, Wisconsin

Runner-up: Utilization of Point-of-Care Ultrasound in the Emergency Department: A Systematic Review and Meta-Analysis

Apurva Popat, MD; Sweta Yadav, MD; Ateeq Rehman, MD

Introduction: Point-of-care ultrasound (POCUS) is an imaging modality that has become a fundamental part of clinical care provided in the emergency department (ED). The applications of this tool in the ED have ranged from resuscitation, diagnosis, and therapeutic to procedure guidance. This review aims to summarize the evidence on the use of POCUS for diagnosis and procedure guidance.

Methods: CrossRef, PubMed, Cochrane Library, Web of Science, and Google Scholar databases were searched extensively for studies published between January 2000 and November 2023. Additionally, the risk of bias assessment was performed using the Quality Assessment of Diagnostic Accuracy Studies 2 (for studies on the diagnostic role of POCUS) and Cochrane Risk of Bias tool (for studies on the use of POCUS for procedure guidance). Furthermore, diagnostic accuracy outcomes were pooled using STATA 16 software (StatCorp, College Station, Texas), while outcomes related to procedure guidance were pooled using the Cochrane Review Manager software.

Results: The study included 81 articles (74 evaluating the diagnostic application of POCUS and 7 evaluating the use of POCUS in guiding clinical procedures). In our findings, sensitivities and specificities for various conditions were as follows: appendicitis, 65% and 89%; hydronephrosis, 82% and 74%; small bowel obstruction, 93% and 82%; cholecystitis, 75% and 96%; retinal detachment, 94% and 91%; abscess, 95% and 85%; foreign bodies, 67% and 97%; clavicle fractures, 93% and 94%; distal forearm fractures, 97% and 94%; metacarpal fractures, 94% and 92%; skull fractures, 91% and 97%; and pleural effusion, 91% and 97%. A subgroup analysis of data from 11 studies also showed that

the two-point POCUS has a sensitivity and specificity of 89% and 96%, while the three-point POCUS is 87% sensitive and 92% specific in the diagnosis of deep vein thrombosis. In addition, the analyses showed that ultrasound guidance significantly increases the overall success rate of peripheral venous access ($P=0.02$) and significantly reduces the number of skin punctures ($P=0.01$) compared to conventional methods.

Conclusions: POCUS can be used in the ED to diagnose a wide range of clinical conditions accurately. Furthermore, it can be used to guide peripheral venous access and central venous catheter insertion.



Author Affiliations: Marshfield Clinic, Marshfield, Wisconsin

RESEARCH POSTERS

1st Place: Perception of Academic Hospitalists About Rounding Methods

Chidinma Ikonte; Mohamed T. Abdelrahim, MA; Pinky Jha, MD, MPH

Background: Bedside rounding traditionally has been viewed as a crucial tool for training learners and providing quality patient care. However, in the last several years, medical professionals in the academic setting have shifted away from rounding at the bedside and adopted alternative methods and settings to complete daily rounds on their patients. This study explores the mixed responses to these changes and aims at identifying strategies for incorporating key educational components for the trainees while ensuring efficient and effective patient care.

Methods: A Qualtrics survey was conducted among academic hospitalists from the Division of General Internal Medicine at the Medical College of Wisconsin. This Institutional Review Board-approved study aimed to understand the perception of hospitalists about rounding methods, including their benefits and barriers. Quantitative data were analyzed using descriptive statistics and Fischer exact tests to examine differences based on gender and years of experience as a hospitalist. All analyses were done using R version 4.1.2. P value <0.05 was considered statistically significant. Additionally, the survey included an open-ended section for free-text commentary, which was reviewed to identify common themes.

Results: Of the 86 hospitalists surveyed, 36 responded to the survey, resulting in a 41% response rate. The respondents were 53% male and 47% female. Most of the respondents (49%) had less than 5 years of work experience as a hospitalist. “Table rounds followed by bedside rounds” was the most preferred method of rounding (33%), followed by “bedside rounds” (24%), and “table rounds” (21%).

Key perceived benefits of bedside rounds included learning communication skills (94%), empathy (92%), and involving patients in shared decision-making (91%). Major barriers to bedside rounding included residents’ duty hour restrictions (89%) and scheduled educational activities/didactics for the residents (86%).

The free-text comments from the survey respondents produced several suggestions for changes to be made to bedside rounding to accommodate evolved hospital workflows while ensuring this form of teaching is retained. Key suggestions included standardizing the format and duration of bedside rounds, aligning patient geographical location with portable computers, and reinforcing the importance of bedside rounds.

Significance: The evaluation of the findings indicates that gender—with the exception of perceptions regarding nonclinical responsibilities as a barrier to bedside rounds—and the number of years as a hospitalist do not significantly influence the overall perception of bedside rounds. Nonetheless, hospitalists advocated for changes to be made to the structure of bedside rounding to ensure its position in the educational process of training physicians. Further research is needed to better analyze and optimize how this process should be addressed and employed.

Conclusions: Hospitalists perceive benefits to bedside rounds but report several barriers. This study highlights the need for innovation in rounding methods that are efficient and effective.



Author Affiliations: Medical College of Wisconsin, Milwaukee, Wisconsin

2nd Place: Breaking the Stigma: Integrating Debriefing Sessions Into Medical Education

Heather Burton, MD; Chana Busbee, MD; Jared Squires, MD

Introduction: Distressing/adverse events are experienced by most medical students and residents. Previous studies show that despite the high prevalence, utilization of support services remains limited, primarily due to time constraints and the stigma associated with seeking help. Debriefing following adverse events offers health care professionals a platform to share healthy coping strategies, manage grief, and maintain professional integrity while improving resilience, increasing career satisfaction, and reducing the risk of burnout. Despite these benefits, less than half of the adverse events experienced by medical students are followed by a debrief.

Methods: We designed a debriefing curriculum for third-year medical students (MS3) and collaborated with the Internal Medicine (IM) clerkship administrative team to integrate it into the MS3 IM core clerkship. During the 2023-2024 academic year, we led six 1-hour debriefing workshops for each group of students at the halfway point of their IM clerkship. The workshops included a large group teaching session followed by small group discussions and practice. We constructed preworkshop and postworkshop surveys to assess MS3 experiences with debriefing throughout their third-year clerkships and general debrief knowledge prior to and following the workshop.

Results: Over the course of the academic year, as well as during their IM clerkships, 80% of MS3s experienced 1 or more adverse events, yet the majority of these were not followed by a debrief (70%). Prior to the workshops, most students agreed that debriefs are important (89%); however, few felt comfortable leading or even requesting a debrief (14% and 27%, respectively). After the workshops, there was a significant increase in students’ ability to identify when a debrief was needed (54% to 87%), and students felt more comfortable requesting debriefs (27% to 67%) and leading debriefs (14% to 52%). Students also found the workshops helpful for teaching the components of a debrief (63%) and empowering their participation (63%). Most MS3s recommended the session (75%).

Conclusions: The implementation of debriefing workshops successfully increased MS3 comfort and competence in debriefing following distressing events and empowered student participation and leading of debrief

sessions. Most students reported positive experiences and recommended the continuation of the program with further integration into the IM core clerkships.

Acknowledgements: The authors would like to acknowledge the additional resident volunteers who assisted with leading the workshops; this includes but is not limited to Sarah Barrett, Luke Clawson, Adriana Jelen, Ilakkiya Thanigaivelan, and Alice Zhang. They also would like to recognize the Internal Medicine Clerkship administrative team for their help in the implementation and coordination of the workshops.

• • •

Author Affiliations: Medical College of Wisconsin Program, Milwaukee, Wisconsin

3rd Place: Determining the Effectiveness of Machine Learning Models for Predicting Hospital Length of Stay: A Systematic Review

Mukul Sharda; Nathaniel Verhagen; Pinky Jha, MD, MPH

Background: The application of machine learning (ML) to predict hospital length of stay (LoS) displays promise for advancements in health care management and patient care. LoS is frequently seen as a metric that can help determine the severity of sickness, cost of care, and resource use. Furthermore, individualized discharge planning has been linked to quantifiable outcomes, including lower rebound admission rates and increased patient satisfaction. However, these results depend on best practice standards being in place for working health professionals. The goal of this study is to determine ML's viability to assist the health care process in predicting LoS. If ML can help predict the LoS, it would help improve patient care and reduce hospital penalizations from the Hospital Readmissions Reduction Program.

Methods: In this publication, a systematic review was conducted using mainly PubMed articles (with 2 exceptions, 1 article from the Association for Computing Machinery and 1 from the Multidisciplinary Digital Publishing Institute) using the keywords "machine learning" and "length of stay." We found 24 studies from January 2020 to January 2024 that highlight the efficacy of different ML models/algorithms in various LoS medical contexts, looking specifically at

their potential to improve operational decisions, resource allocations, and clinical outcomes. The scope of this systematic review is to evaluate recent developments related to the use of ML in LoS prediction.

Results: We found in our systematic review that a majority of studies highlight the accuracy of ML models being very high when predicting LoS. The accuracy rating cited by multiple sources was often greater than or equal to 89%; however, many did mention the limitations of needing a larger data scope and potential biases in the program. The algorithm's predictions can be classified as short-term or long-term LoS predictions for patients, with the former usually being a prediction of fewer than 7 days and the latter being anything past short-term. However, the prediction quality often decreases near the beginning of the long-term marker. This (short and long) marker varies between studies due to factors such as data quality and the ML algorithm/model used. Many studies reference the Random Forest model as having the highest or near highest accuracy when predicting LoS. Furthermore, this accuracy was consistent across different sectors of medicine, with missing or uncategorized data.

Conclusions: ML models hold substantial promise in predicting hospital LoS, potentially transforming health care operations by enabling more informed decision-making, early intervention, efficient scheduling, decreased workload on physicians, a more informed patient, and optimized resource allocation. This would ultimately help create better-personalized discharge plans that would benefit the patient, clinician, and hospital administrators. Programming advancements and further validation are crucial to fully realize the possible benefits.

• • •

Author Affiliations: Medical College of Wisconsin, Milwaukee, Wisconsin

CLINICAL POSTERS

1st Place (tie): A Case of Pernicious Anemia Presenting as Severe Pancytopenia and Hemolysis

Tarek Jaber, DO

Case Presentation: A healthy 18-year-old male who recently immigrated from Mexico and works as a landscaper presented to the

ED with concern for ongoing epistaxis. He reported a varied diet daily but endorsed poor oral intake for the past 1 to 2 months with associated 10-pound weight loss, as well as intermittent epistaxis and bleeding gums after brushing his teeth, which would take 20 minutes to resolve.

On presentation, his initial vitals were stable. Physical exam revealed evidence of mild scleral icterus, abdominal tenderness to the epigastric region, and mild generalized jaundice with no ecchymosis or petechia appreciated.

Lab results included the following: pancytopenia with WBC 2.8, macrocytic anemia with hemoglobin 2.4, mean corpuscular volume 105, and thrombocytopenia (platelets 36). Comprehensive metabolic panel results showed ALT elevation of 43 U/L, AST 64 U/L, and total bilirubin of 2.6 mg/dL. Ferritin was elevated to 221 ng/mL with normal iron levels and total iron-binding capacity at 175 mcg/dL. Infectious workup was noncontributory, with HIV, Epstein-Barr virus, and cytomegalovirus negative. Hepatitis C was also negative. Folate was within normal limits, fibrinogen level and coagulation labs also were normal. Direct coombs was negative. CT chest, abdomen, and pelvis showed evidence of cardiomegaly and hepatosplenomegaly. Lactate dehydrogenase (LDH) was elevated to 4000 IU/L, haptoglobin was <10 mg/dL, and reticulocyte count at .047, which was concerning for hemolysis.

The patient was given 2 units of packed red blood cells and admitted to the medical intensive care unit for further management. His vitamin B12 level returned at <150 pg/mL. Hemepath review of the peripheral smear showed no evidence of blasts or schistocytes, lowering the concern for acute hematologic malignancies, though there was evidence of ring sideroblasts. Due to previous CT findings of cardiomegaly with additional concern for possible anemia-induced cardiomyopathy, TTE was obtained, demonstrating severe left ventricle (LV) enlargement and a preserved ejection fraction. Parvovirus antibodies were negative. The rest of the patient's vitamin B levels were normal. Intrinsic factor inhibitor was negative. erythrocyte sedimentation rate was normal. His parietal IgG levels returned positive, confirming the suspicion of pernicious anemia. Upper endoscopic evaluation demonstrated diffuse gastric erythema with loss of gastric folds.

Through his hospital stay, the patient was given 1000 mcg of B12 supplementation intramuscularly daily for 7 days. His B12 levels were 892 on day of discharge. His pancytopenia improved, with WBC at 9.8, hemoglobin 10.5 g/dL, mcv 96 fL, and platelet count of 458 on day of discharge. His original symptoms greatly improved, and he was discharged with improved appetite, jaundice, and resolved epistaxis episodes.

Discussion: This case demonstrated the effects of longstanding B12 deficiency. As seen in this case, through its role in DNA synthesis, we observe both the classic macrocytic anemia and B12 deficiency's role in causing pancytopenia – affecting all hematopoietic cell lines. Also demonstrated here is severe anemia-induced cardiomyopathy. Lastly, B12 deficiency can lead to intravascular hemolysis due to red blood cell membrane deformity, as our patient had elevated LDH levels and low haptoglobin, with the absence of schistocytes seen on peripheral smear. Therefore, it is important to remember the long-term effects of pernicious anemia, its presentation, and its role in causing pancytopenia.

•••

Author Affiliations: Medical College of Wisconsin Program, Milwaukee, Wisconsin

1st Place (Tie): Iron Deficiency Presenting as Refractory Migraines

Jenna Wettstein; Whitney Lynch, MD

Introduction: Iron deficiency has been recognized by the World Health Organization as the most common nutritional deficiency worldwide and is the predominant form of anemia. Common causes of iron deficiency include heavy menstruation in women, gastrointestinal bleeding, and deficient dietary iron intake or absorption. Reduced blood oxygen levels that result from iron deficiency can cause symptoms of shortness of breath, tachycardia, heart palpitations, fatigue, headaches, and dizziness.

Case Presentation: A 36-year-old female with a past medical history of hypertension, postpartum preeclampsia, gestational diabetes, anxiety, attention-deficit/hyperactivity disorder, hyperhidrosis, heavy menstrual cycles, and migraine headaches consulted her primary care clinician due to increased frequency of migraines that were significantly affecting activities of daily living.

She requested a refill of sumatriptan, which previously aborted her headaches. However, due to ongoing, refractory symptoms, she was changed to rizatriptan, ultimately titrated to 10 mg, with minimal response. Recent menstrual cycles were not noted to be heavy, but the patient had a history of menorrhagia.

Bloodwork was obtained and revealed results consistent with significant iron deficiency (ferritin 3 ug/mL, iron 16ug/dL, total iron binding capacity 472ug/dL, transferrin saturation 3%, and unsaturated iron binding capacity 456ug/dL). Iron infusions were initiated once weekly for 3 weeks with resolution of symptoms. Bloodwork was repeated postinfusion and showed a normalization of iron deficiency markers (hemoglobin 10.6 g/dL, ferritin 162ug/dL, iron 85ug/dL, total iron binding capacity 313ug/dL, transferrin saturation 27%, and unsaturated iron binding capacity 228ug/dL). At that time, the patient was instructed to begin oral iron supplementation with ferrous sulfate 325 mg twice daily with plan for additional workup to rule out possible sources of bleeding given absence of recent abnormal uterine bleeding. Upper and lower endoscopies were obtained to evaluate for evidence of an *Helicobacter pylori* infection, celiac disease, or structural lesions, which were normal. Hematology was consulted to discuss any other potential sources and noted many cases to be idiopathic. They agreed with plan for endoscopy and advised screening for volume of tea use. Additionally, they remarked on the absence of proton pump inhibitor (PPI) therapy on the patient's medication list, as this was another potential source of iron deficiency. The patient did not drink tea regularly and had not previously been on PPI therapy. Hematology recommended continuing oral iron supplementation and advised monitoring iron levels 2 to 3 times per year with replacement as indicated with goal ferritin >50 ng/mL along with a normal hemoglobin level. Labs were repeated 2 months after initiation of oral replacement and showed continued normal levels of iron stores and hemoglobin.

Discussion: This case presents the importance of considering the diagnosis of iron deficiency when faced with intractable and/or worsening migraines. Patients may not always have a historical feature that would

suggest this diagnosis (ie, this patient's more remote history of menorrhagia), and many cases are without a clear source making ongoing follow-up and lab monitoring pertinent to avoiding recurrence of symptoms.

•••

Author Affiliations: Medical College of Wisconsin, Milwaukee, Wisconsin

2nd Place (Tie): Nonbacterial Thrombotic Endocarditis in the Setting of Renal Cell Carcinoma

James Dickman, MD; Michael Witcik, MD

Introduction: Most endocarditis cases are bacterial in etiology; however, rarely, cardiac valve vegetations can be primarily thrombotic in nature. Sterile vegetations in nonbacterial thrombotic endocarditis (NBTE) patients likely form from a combination of endothelial damage and thrombogenic conditions. The biggest risk factor for developing NBTE is active malignancy, especially adenocarcinomas of the lung, colon, pancreas, ovary, and biliary tree. Clinically, NBTE generally presents with thromboembolic manifestations (stroke, splenic infarct, etc) rather than with valvular dysfunction manifestation (heart failure, murmur, etc). The suspected reason for this is that thrombotic valve lesions are more fragile and susceptible to dislodging in comparison to lesions of ineffective endocarditis.

Case Presentation: We present the case of a 76-year-old man with a past medical history of stage IV renal cell carcinoma diagnosed 6 months prior with resulting ischemic stroke in the interim who presented to the ED with progressive severe lower extremity edema and generalized fatigue/weakness for 8 days. The admitting team felt that the primary pathophysiology was likely diastolic heart failure given that a TTE from 2 months prior showed normal left ventricular ejection fraction with moderate diastolic dysfunction; the patient was correspondingly started on an IV furosemide regimen.

Two days into the hospitalization, because of a lack of clinical improvement, a TTE showed normal left ventricular ejection fraction and new mitral regurgitation, along with new small vegetations on the mitral valve. One day after that, a transesophageal echocardiogram confirmed the presence of mitral valve vegetations and demonstrated the presence of aortic valve vegetations as well. Given that the patient was entirely

afebrile throughout this hospitalization and that his blood cultures showed no evidence of growth, the vegetations were presumed to be nonbacterial thrombotic endocarditis. To treat, the patient was started on enoxaparin in addition to furosemide. One day after that, his fluid status was thought to be significantly improved and he was discharged; given the progression of disease, his regimen of nivolumab was discontinued on discharge. Unfortunately, he passed away a few weeks after this hospitalization due to progression of his malignancy.

Discussion: NBTE is generally a poor prognostic factor and can be used to help initiate and conduct goal-of-care discussions. The diagnosis is made when valvular vegetations are seen on imaging with wholly negative cultures (as in this patient). The most common malignancies that co-occur with NBTE are adenocarcinomas; however, NBTE should be suspected in any patient with widely metastatic cancer who presents with cardio-embolic manifestations or heart failure symptoms to expediate treatment (heparin or enoxaparin; generally avoid warfarin and direct oral anticoagulants) and goals-of-care discussion. This case illustrates a rare presentation of NBTE with heart failure manifestations rather than definitive cardio-embolism manifestations, as well as having a more rare etiology, as renal cell carcinoma generally does not cause NBTE.

•••

Author Affiliations: Gundersen Health Program, La Crosse, Wisconsin.

2nd Place (Tie): Double Trouble: Myocardial Infarction With Takotsubo Syndrome

Akinwale Iyeku, MD, MS; Matthew Tattersall, DO, MS

Background: Takotsubo syndrome (TS) is a nonischemic cardiomyopathy characterized by transient acute regional left ventricular (LV) wall dysfunction in the absence of angiographically significant coronary artery disease or acute plaque rupture. The clinical presentation of TS mirrors that of acute coronary syndrome and often is associated with periods of intense emotional or physical stress.

Case Presentation: A 67-year-old female with tobacco use disorder and dyslipidemia presented with central chest pain, new anterolateral T wave inversions with pro-

longed QTc interval, and elevated troponin (peak 9.5 ng/ml) consistent with a non-ST-elevation acute myocardial infarction (NSTEMI). Chest CT was negative for pulmonary embolism or acute aortic pathology. She was placed on dual antiplatelet therapy (DAPT), low molecular weight heparin, and underwent a coronary angiography that revealed severe single-vessel obstructive coronary artery disease of the mid left anterior descending artery (LAD), with successful intravascular ultrasound-guided percutaneous coronary intervention (PCI) with a drug-eluting stent. Primary PCI was complicated by the “jailing” of a small diagonal branch. Post-PCI, the patient had chest pain, likely attributable to the jailed diagonal branch. Serial worsening of anterolateral T wave inversions and QTc prolongation (Bazett’s, peak 505 milliseconds) occurred on electrocardiograms over the subsequent 48 hours, in patterns commonly seen in TS. Echocardiography demonstrated apical circumferential wall motion abnormalities, raising the suspicion of an associated stress-induced cardiomyopathy as a complication of her NSTEMI. Cardiac MRI confirmed a normal LV ejection fraction of 59% with a transmural infarct in the mid to apical anterior segments without apical thrombus. She was discharged on a beta-blocker, statin, angiotensin-converting enzyme (ACE) inhibitor, and DAPT and outpatient cardiac rehabilitation.

Discussion: TS is usually triggered by unexpected emotional or physical stress. The stressful precursor is thought to lead to sympathetic overdrive and catecholamine release, which has been hypothesized to lead to microvascular dysfunction. Such sympathetic surges also occur with acute coronary syndromes. Traditionally, TS is diagnosed by the absence of coronary artery disease, and in classic mid-apical TS variants, exclusion of proximal LAD disease is vital. Although the clinical presentation and electrocardiographic and biomarker profiles are similar between both conditions, this case shows that myocardial infarction is a stressful event that may trigger TS. Post-PCI electrocardiographic data demonstrating a serial worsening of anterolateral changes with QTc prolongation and imaging demonstrating circumferential apical dysfunction discordant with the distribution of the culprit vessel are key to identifying this sequence. While TS is often an

acute and transient cardiomyopathy, its course is not always as benign as previously thought. TS can be associated with significant complications, such as LV thrombus, cardiogenic shock, and malignant ventricular arrhythmias.

Conclusions: Patients presenting with myocardial infarction may develop an additional TS as a complication. The presence of apical ballooning or dyskinesia that does not align with the distribution of the diseased coronary artery is key to diagnosing TS in such cases. This is clinically relevant as the development of TS is associated with increased morbidity and mortality.

•••

Author Affiliations: University of Wisconsin Hospitals and Clinics Program, Madison, Wisconsin

WMJ

*Let us hear
from you!*

If an article strikes a chord or you have something on your mind related to medicine, share it with your colleagues. Email your letter to the editor to

wmj@med.wisc.edu

advancing the art & science of medicine in the midwest

WMJ

WMJ (ISSN 1098-1861) is published through a collaboration between The Medical College of Wisconsin and The University of Wisconsin School of Medicine and Public Health. The mission of *WMJ* is to provide an opportunity to publish original research, case reports, review articles, and essays about current medical and public health issues.

© 2024 Board of Regents of the University of Wisconsin System and The Medical College of Wisconsin, Inc.

Visit www.wmjonline.org to learn more.