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South Dakota medicine

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PROACTIVE TAX PLANNING: DON'T LET TAXES HAPPEN TO YOU

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Why Proactive Tax Planning Is Important

Most people treat taxes the same way they treat an annual doctor's appointment: something you deal with once a year, hope for good news, and then forget about it until next year. You gather all of your W-2's, 1099's, and charitable giving receipts, deliver them to your accountant, and cross your fingers that the numbers land in your favor.

If taxes don't land in your favor, you may discuss options with your accountant or financial advisor but often, it's too late to do anything about it. This is reactive. It's letting your taxes happen to you. While there may be some opportunities to contribute to an IRA or some other methods to bring down your income a bit, most of the opportunities to plan proactively are gone.

Proactive tax planning works differently. It's forward-looking. It gives you the ability to influence your tax bill, reduce surprises, and make intentional decisions while they still matter. People who plan proactively don't walk into tax season hoping for a certain outcome. They already know what to expect because the strategy has been in place for months.

What Does Tax Planning Actually Look Like?

Tax planning isn't limited to complex strategies. There are some simple strategies that could benefit just about anyone. For example, reviewing your income mid-year and figuring out whether you're on track to hit a higher tax bracket. If so, maybe you should adjust the amount of income being taken from a pre-tax source and take some from non-qualified. For others, it's finding tax savings through contributions to retirement accounts such as 401(k)'s or IRA's.

In all cases, you should be looking at the broader, multi-year picture vs just this year. This may even mean intentionally taking more income and paying more tax this year, if you expect your tax brackets to increase in the future. This could result in paying a bit extra now to pay a lot less in the future. And sometimes, it's as straightforward as adjusting your tax withholding mid-year instead of being surprised next April by a large tax bill. Ultimately, reviewing your tax situation either on your own or with a qualified tax professional before the year ends is vital for proactive tax planning.

Why It Matters More Than Ever

Change happens all the time. Changes both in personal circumstances (such as employment, spending, health) and changes in tax policy. What made sense one year may not make sense the next. Strategies that were once good may no longer be relevant. It's important not only to establish a plan, but also to review it regularly so you're not caught off guard by new rules or changes when it's time to file your taxes. Proactive tax planning involves keeping up on the changes and making sure they are considered in the plan while there is still time to make adjustments.

Proactive Planning Could Provide Peace of Mind

If you find yourself experiencing some anxiety at tax time, there is a better way: tax planning. It isn't about squeezing every last deduction or memorizing tax code. It's about taking control of one of the biggest financial factors in your life. When you make decisions proactively, you may experience peace of mind by minimizing uncertainty, potentially reduce your tax burden, and align your financial future with intention rather than chance depending on your individual circumstances.

At Foster Group, we help people move from reactive to proactive, so that taxes become less of a surprise and more of a planned part of your financial strategy. We know our clients are looking for more than just status; they're looking for purposeful ways to use their wealth.

988 Offers Mental Health Support for Physicians: A Lifeline When You Need It Most

Janet Kittams
CEO, Helpline Center

The practice of medicine is rewarding, but it's no secret that it comes with immense pressure. Long hours, high-stakes decisions, and the emotional weight of caring for patients can lead to stress, burnout, and even feelings of isolation. At the Helpline Center, we understand these challenges—and we want you to know that help is always available.

988: A Simple Number, A Powerful Resource

The 988 Suicide and Crisis Lifeline is a free, confidential service available 24/7 for anyone experiencing emotional distress or a mental health crisis—including healthcare professionals. This isn't just a resource for your patients; it's for you. If you ever feel overwhelmed, anxious, or in crisis, dialing 988 connects you with trained counselors who provide immediate support and guidance. There's no judgment, no stigma—just a trained professional who is ready to listen and offer support and hope.

Physicians often put their own well-being last, prioritizing patients and families above themselves. But mental health is essential for providing quality care. Reaching out for help is not a sign of weakness—it's a sign of strength and self-awareness. By calling, texting or chatting 988, you take an important step toward protecting your own health and sustaining your ability to care for others.

Beyond Crisis: Building Resilience Through Training

While 988 is there for immediate support, prevention and resilience are equally important. That's why the Helpline Center offers mental health trainings for organizations and businesses. These sessions are designed to help teams recognize signs of stress and burnout, respond effectively to mental health concerns, and create a culture of openness and support.

Our trainings cover topics such as:

- ` Suicide prevention and intervention strategies
- ` Recognizing warning signs of mental health challenges
- ` Building a supportive workplace culture
- ` Reducing stigma and encouraging help-seeking behaviors

These programs empower healthcare teams to care for themselves and each other, fostering environments where mental health is prioritized alongside physical health. When physicians and staff feel supported, patient care improves—and so does overall well-being.

Why This Matters Now

The healthcare profession has faced unprecedented challenges in recent years. Rates of burnout, depression, and even suicide among physicians remain high. By embracing confidential resources like 988 and taking part in mental health education, we can change this narrative. We can create a culture where asking for help is normalized and where support systems are strong.

After a Suicide

The Helpline Center provides support and care for the family, friends and coworkers after there has been a loss by suicide. Grief support groups, resource materials and supportive phone calls/visits are available for any loss across the state, simply reach out by email griefsupport@helplinecenter.org or call 988.

Take Action Today

We encourage you to share information about 988 with your colleagues and keep it in your own toolkit for moments when life feels overwhelming. Consider partnering with us to bring mental health training to your organization. Also know that all of our marketing materials are free and can be requested at www.helplinecenter.org (great for office break rooms or where all staff can see it as a reminder that there is help out there). Together, we can ensure that those who dedicate their lives to caring for others have the care and support they need themselves.

For more information about 988 or to schedule a training, call 211 or email training@helplinecenter.org. Remember: you are not alone. Help and hope are just three digits away.

About the Author:
Janet Kittams, CEO, Helpline Center, Sioux Falls, South Dakota.

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From Guidelines to Practice – Leveraging Target: BP™ for Better Patient Outcomes

Sidra Saleem, MD

Editor's note: To mark American Heart Month, we're featuring this overview of the Target: BP™ initiative and the latest 2025 hypertension management guidelines. This piece provides physicians with actionable strategies and quality improvement tools to help bridge the gap between diagnosis and effective blood pressure control within their practices. – Keith Hansen, MD

February is American Heart Month, which makes it a great time to pause and focus on one of the most common and modifiable risk factors not only for heart disease, but for stroke, heart failure, kidney disease, cognitive decline and dementia: High blood pressure.

Nearly half of U.S. adults – 122.4 million people – are living with high blood pressure, according to the 2025 American Heart Association Statistical update. Yet, just a quarter of them have their BP under control. Hypertension is called the "silent killer" for a reason – too often it goes unnoticed until serious damage is done. It also imposes a substantial economic burden, accounting for nearly $50 billion in annual health care costs in the U.S.

In August 2025, the American Heart Association released a new clinical guideline for the prevention, detection, evaluation and management of high blood pressure in adults, which included new or updated recommendations for blood pressure management based on the latest scientific evidence to achieve the best health outcomes for patients. The updated guideline is designed to support health care professionals with the diagnosis and care of people with high blood pressure. It also empowers patients with practical tools that can help support their individual health needs as they manage their blood pressure, whether through lifestyle changes, medications or both.

Preventing and managing high blood pressure with healthy lifestyle behaviors, such as following a heart-healthy diet, including reducing salt intake, regular physical activity, weight management and managing stress – combined with early treatment with medication to lower blood pressure if necessary – are recommended to reduce the risk of chronic disease. By identifying individual risks earlier and offering more tailored strategies across the lifespan, the 2025 guideline aims to aid clinicians in helping more people manage their blood pressure and reduce the toll of heart disease, stroke, kidney disease, type 2 diabetes and dementia.

One way that healthcare professionals can work with patients to manage their BP is through clinical programs like the American Heart Association's Target: BP™ initiative. This program leverages the American Medical Association's evidence-based MAP framework and the American Heart Association's experience with quality improvement to help health care organizations consistently deliver top-line care.

The program assists and supports health care organizations to improve and sustain BP control with professional education, practice tools and resources, including support through the associations' quality improvement programs. It also recognizes organizations annually with achievement awards celebrating commitment to improvement, adoption of evidence-based BP care and achieving BP control rates of 70% or greater among their patients. In 2025, the associations recognized 2,307 health care organizations across 49 states.

Since the launch of Target: BP™, more than 4,900 health care organizations have joined the nationwide movement to make heart health a priority. For the past five years, approximately 80% of participating organizations have continued their engagement year after year – reflecting a continuous commitment to improving BP and sharing a common goal to improve health outcomes. Through programs like Target: BP, we're seeing how health care organizations and care teams can work to close gaps in blood pressure control through patient awareness and education and improve overall well-being.

Hypertension control is achievable when physicians, care teams and patients work collaboratively. The Target: BP program provides physicians and care teams with the tools they need to effectively partner with patients and ensure all Americans have access to quality care to manage their blood pressure. Interested sites can visit TargetBP.org for more

information and use the Contact Us form to get in touch with a local American Heart Association staff person for additional support.

Quality improvement programs like Target: BP underscore the prevention and management recommendations in the 2025 hypertension guidelines. It is important for people to be aware of the recommended blood pressure goals and understand how healthy lifestyle behaviors and appropriate medication use can help them achieve and maintain optimal blood pressure. Effective prevention, early detection and appropriate management of high blood pressure are critical to long-term heart and brain health, which means longer, healthier lives.

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HISTORICAL SERIES

Famous South Dakota Physicians and Scientists

Chester Bidwell McVay, MD, PhD

Photo From: BF Herzog. Chester B. McVay: Small town surgeon, world famous herniologist. Surgery. 2007;141(1):119.

Chester B. McVay was born in Yankton in 1911. He graduated from Yankton College. He then entered Northwestern University earning his medical degree and subsequently a PhD in anatomy studying the anatomy of the abdominal wall and groin. He did a surgical residency at the University of Michigan during which time he developed his hernia repair technique. He authored numerous articles, book chapters, as well as texts. They include the popular text, *Surgical Anatomy*, one of the first clinical anatomy textbooks, which was co-authored with Barry J. Anson, PhD. McVay was known internationally and was a national leader in the American College of Surgeons and the American Surgical Association.

In the face of a need for more physicians in South Dakota, particularly in rural areas, and the increasing difficulty in transferring our students who had finished the two-year program, the push to develop an MD-granting school was critical and given that, it was difficult to recruit a dean without absolute assurance the school would be accredited and financially supported to the degree necessary. McVay was an important proponent of the plan. He was encouraged to consider the deanship but turned it down, happy in his private practice and the ability to teach medical students. When the 4-year school was approved, Dr. McVay was asked and accepted the challenge to chair the department of surgery and also agreed to chair the critical Curriculum Committee, which would be primarily responsible for developing the teaching program. At the inaugural commencement ceremony on May 14, 1977, Dr. McVay was honored with the outstanding faculty service award, and appropriately he administered the Affirmation of the Physician. Dr. McVay died in Yankton at age 76 in 1987.

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The Lawrence Brothers

Ernest and John Lawrence were brothers born in Canton, South Dakota, Ernest in 1901 and John in 1905. The nature and significance of the achievements by these two brothers was, truly remarkable.

Ernest O. Lawrence, MD

Photo From *Nobel Foundation Archives.*

Ernest Lawrence sstarted college at St. Olaf but then transferred to the University of South Dakota graduating with a BA in chemistry. He subsequently received a master's degree from the University of Minnesota, and a PhD from Yale. He also spent one year studying physics at the University of Chicago. He joined the physics department at the University of California – Berkely in 1928 and was appointed as an Assistant Professor. In 1929-30, then an Associate Professor, he invented the cyclotron. He was promoted to full professor in 1930, the youngest at Berkely at the time. The first successful cyclotron was demonstrated in early 1931. Lawrence received the Nobel Prize for Physics for his invention in 1939. Then, in 1961, element 103

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The South Dakota State Medical Association Foundation, the philanthropic arm of the South Dakota State Medical Association, is a tax-exempt 501(C)(3) non-profit corporation, was established to assist and support medical research, medical teaching and medical education at the Sanford School of Medicine.

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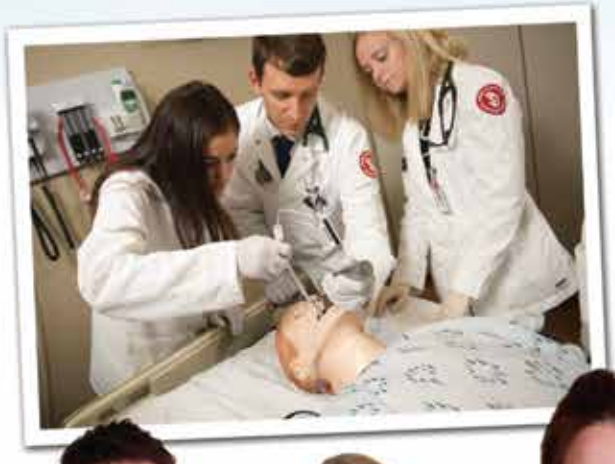

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was discovered by a team from Berkely and was named Lawrencium posthumously in honor of Lawrence. In 1957 Ernest was awarded the Enrico Fermi Award established by President Eisenhower and the Atomic Energy Commission for Fermi's life-time achievements in physics, particularly, atomic energy. The cyclotron has been instrumental in the discovery and synthesis of several elements. In addition to his foundational discoveries in medicine, Ernest also played a crucial role in the Manhattan Project, specifically the electromagnetic separation of uranium-235. Lawrence suffered from ulcerative colitis and died of a severe flare-up of the disease in 1958. Shortly after his death, the California Board of Regents renamed two of the university's nuclear research laboratories after him: the Lawrence Livermore National Laboratory and the Lawrence Berkely National Laboratory.

John H. Lawrence, MD, PhD

Photo From *Alchetron, The Free Social Encyclopedia.*

John Lawrence graduated from the University of South Dakota and Harvard Medical School and completed a residency in internal medicine. He taught internal medicine at Yale for a few years. In 1935 John arrived at the University of California – Berkely joining his brother Ernest. He was named Chair of the Division of Medical Physics at Berkely and founded a research laboratory that evolved into the Donner Laboratory, considered the birthplace of nuclear medicine. He was a pioneer in nuclear medicine. John was interested in conducting research on the medical applications of radiation. In an early experiment, he injected leukemia-infected mice with radioactive phosphorus (P-32) produced by one of Ernest's cyclotrons. Following a fishing vacation, John returned to find the mice alive and vigorous. John's excitement could hardly be contained and he subsequently, administered a dose of radioactive phosphorus to a 28-year-old with chronic myelogenous leukemia. This was the first time a human was injected with a radioactive isotope for treatment. Little is known about the patient's ultimate course, but the initial response demonstrated that the patient's "blood counts had normalized." This was considered a success and ushered in the clinical application of nuclear medicine. Lawrence also used P-32 to successfully treat polycythemia vera and used I-131 to study the thyroid gland. His laboratory produced many radioactive isotopes that became commonly used in nuclear medicine both diagnostically and therapeutically, including technetium-99, and thallium-201. John was awarded the Enrico Fermi Award in 1983 and numerous other awards including an honorary degree from the University of South Dakota. John Lawrence was lauded by many in the nuclear medicine community as the "Father of Nuclear Medicine," although another distinguished figure, the Hungarian radiochemist George de Hevesy, who studied radioactive tracers has been given that recognition by many others in the field. Regardless, the scientists were both instrumental in the development of nuclear medicine with de Hevesy given the credit for establishing the fundamental concept of using radioactive tracers and Lawrence recognized for pioneering the clinical application of nuclear medicine. John Lawrence died at age 87 in September of 1991.

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Chronic Mesenteric Ischemia Presenting in Multiple Locations and Masquerading as Stomach Ulcers

Jyotroop Kaur, MD; Kennedy Forest, MD; and Harald Schoeppner, MD, PhD, FACG

Abstract

Chronic gastrointestinal ischemia (CGI) tends to remain asymptomatic for prolonged duration due to extensive vascular collateralization until significant multi-vessel atherosclerotic disease has ensued. The presentation can be challenging, especially when there is ischemia involving less commonly affected regions of the gastrointestinal tract, including the stomach and the liver. This unique case describes a patient found to have multiple gastric ulcers, hepatic ischemia, and endoscopic biopsies revealing necrotic and reactive changes, ultimately diagnosed with CGI when vascular imaging confirmed significant atherosclerotic disease. This paper reviews the approach to CGI in patients with atypical presentations.

Introduction

Chronic gastrointestinal ischemia (CGI) is a peripheral vascular disease resulting from insufficient splanchnic blood flow to meet the postprandial metabolic requirements of the gastrointestinal tract. Although the prevalence of asymptomatic chronic stenotic mesenteric disease varies from 3% (below the age of 65 years) to 18% (above the age of 65 years)[1], the incidence of symptomatic ischemia remains low.[2] Symptoms can cause severe and incapacitating disease along with the life-threatening complication of acute mesenteric ischemia.[3] Presentation may be nonspecific leading to delay in diagnosis and definitive management through mesenteric revascularization. Although CGI can result in ischemia to different parts of the gastrointestinal tract, stomach ulcerations with bleeding complications have been rarely reported. This case of CGI displays extensive simultaneous involvement of the stomach, liver, and small intestine offering insight into diagnostic possibilities and challenges in the management of these patients.

Case Report

We report the case of a 74-year-old female who presented to the hospital with large diarrheal stools, progressive weakness, and considerable weight loss. She had a significant medical history consisting of coronary artery disease treated with bypass graft surgery and multiple coronary stents, ischemic stroke, hypertension, and a 60-pack year history of smoking. She denied a history of alcohol consumption or non-steroidal anti-inflammatory use. She was noted to have orthostatic hypotension on admission, and the physical exam revealed generalized abdominal tenderness without rebound or guarding.

Laboratory results revealed a hemoglobin of 9.8 g/dL (baseline of 12-13 g/dL) with a mean corpuscular volume of 95 fL, alanine aminotransferase 406 U/L, aspartate aminotransferase 233 U/L. Bilirubin, creatinine, and lactic acid levels were within normal limits. CT scan of the abdomen and pelvis with IV contrast showed a hyperattenuating area with enhancement at the ileocecal junction concerning for a polypoid mass along with two indeterminate lesions in the liver. Colonoscopy revealed necrotic, foul smelling, abnormal tissue in the ileocecal region appearing to invade the wall in a sessile fashion. Biopsy from the mass was suggestive of necrosis. Esophagogastroduodenoscopy (EGD) revealed large, linear, crated ulcers extending from the fundus down along the posterior wall with heaped edges along with scattered small ulcers around the lesser curvature sparing the antrum, consistent with Forrest Class III ulcer. Biopsies from the ulcer described reactive/chemical gastropathy. Mesenteric ultrasound revealed significant stenosis within the celiac artery (CA) and superior mesenteric artery (SMA) with increased postprandial SMA velocities. CT angiogram of abdomen confirmed significant diffuse atherosclerotic vascular disease with significant plaque at the origin of SMA and moderate luminal narrowing of the origin of

CA. Colonoscopic evaluation was repeated for additional biopsies from the cecal lesion, but only a large ulcer remained with biopsies revealing reactive necrosis and no evidence of malignancy. Hepatic tissue biopsy showed ischemic necrosis with rare, atypical bile ducts as well.

Despite initial discharge on conservative medical management as the patient was a poor procedural candidate due to her medical comorbidities, readmission for ongoing blood loss requiring transfusions ultimately led to necessary vascular intervention. Shockwave lithotripsy was undertaken for the CA occlusion along with stent reconstruction of the SMA. This was ultimately successful with flaring of the stent into the abdominal aorta and shockwave lithotripsy of the right common iliac artery.

Discussion

Vascular insufficiency can present as an acute ischemic process or as long-standing chronic stenosis insufficient to meet the metabolic needs of the gastrointestinal organs. Late symptomatic presentation of CGI is a result of extensive vascular overlap between the vascular beds with collateral formation.[4,5] The classic triad of symptoms of CGI including postprandial pain, abdominal bruit, and significant weight loss, is reportedly only present in an estimated 20% of cases, making it a challenging clinical diagnosis.[6,7]

Gastric ischemia is relatively rare with only a few reported cases.[8] Chronic gastric ischemia occurs most commonly due to severe atherosclerosis affecting multiple vascular beds in the setting of cardiovascular risk factors including hypertension, hyperlipidemia, obesity, and smoking.[9] Gastric ischemia may be asymptomatic or have vague gastrointestinal symptoms including occult bleeding that can lead to shock in advanced cases.[10]

Similarly, hepatic ischemia is an uncommon presentation in CGI and mild elevation of serum aminotransferase levels occur in only 10% of patients and typically normalize after successful revascularization.[11]

Due to vague symptoms and lack of diagnostic lab values, the average time from presentation to diagnosis of CGI can vary anywhere between 20-25 months.[12] Duplex ultrasonography is a validated screening tool to assess blood flow in patients with suspicious symptoms of mesenteric ischemia, but it requires experienced operators to achieve diagnostic accuracy. Computed tomography angiography (CTA) has become the standard tool for diagnosis of mesenteric stenosis owing to its accuracy, widespread availability, and ability for anatomical resolution. Magnetic resonance angiography (MRA) is another modality that may be used for mesenteric vascular assessment as a useful alternative to CTA in patients with contraindications.[12] The diagnosis of CGI is established with symptoms of ischemia paired with multi-vessel disease visualized on CTA. Endoscopy offers estimation of the extent and severity of gastric ischemia as systemic hypoperfusion can present as diffuse or patchy discoloration with pale-appearing mucosa, loss of mucosal vascular pattern, diffuse erosions, and ulcerations. To predict the risk of rebleeding and guide treatment decisions, ulcers visualized in the upper gastrointestinal tract are typically graded based on the Forrest classification system as described in Table 1. [13,14] Ischemic ulcers usually trace the area of anastomoses between the 2 arterial arches from the lesser to greater curvature supplying the stomach, a pattern referred to as the "double stripe sign" consistent with the gastric watershed areas.[15]

Initial management of CGI includes conservative measures and management of comorbid conditions to prevent further advancement of atherosclerosis, but definitive treatment requires mesenteric revascularization.[16] For patients requiring revascularization, minimally invasive endovascular strategies, such as primary stenting, are the preferred treatment. For cases that present with anatomical complexity

Table 1. Forrest ulcer classification system for upper gastrointestinal bleeding.[13,14]

	Endoscopic appearance	Rebleeding rate	Mortality rate
Acute bleeding			
Forrest Ia	Active spurting	55%	11%
Forrest Ib	Active oozing	55%	11%
Signs of recent bleeding			
Forrest IIa	Non-bleeding visible vessel	43%	11%
Forrest IIb	Adherent clot	22%	7%
Forrest IIc	Flat pigmented spot	10%	3%
Without active bleeding			
Forrest III	Clean-based ulcer	5%	2%

or technical difficulty for the endovascular approach, surgical revascularization can be utilized.[4,12]

In the end, CGI can affect multiple areas of the GI tract simultaneously, including the stomach and liver in rare cases. Despite its ability to masquerade as other gastrointestinal etiologies such as neoplasms, inflammatory bowel disease, or peptic lesions, CGI should always be included in the differential diagnosis in patients with high cardiovascular risk factors to improve chances of early diagnosis and definitive treatment with revascularization.

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Evaluation of Factors Affecting Clinical Trial Consideration and Enrollment for Cancer Patients

Logan Stacey, MS III; Bing Xu, PhD; Crystal Hattum, PharmD MS; Tobias Meissner, PhD; Rachel Elsey, PharmD; Michaela Bertram, RN, BSN; Robin Lockhorst PharmD; and Casey Williams, PharmD, MBA

Abstract

Background: Clinical trials are essential for advancing cancer treatment, yet participation remains low, particularly among populations affected by social determinants of health (SDOH). This study aimed to evaluate how factors such as age, rurality, race, and language influence consideration for clinical trial enrollment.

Methods: A retrospective analysis was conducted on cancer patients treated at Avera Cancer Institute from 2018 to 2022. Demographic and socioeconomic data were extracted from electronic medical records. Patients considered for clinical trials were identified through internal databases. Statistical analyses, including chi-square tests, t-tests, and logistic regression, were used to assess associations between SDOH and trial consideration.

Results: Younger patients were significantly more likely to be considered for clinical trials, regardless of rural or urban residence. While rurality alone was not a significant predictor, increased distance from trial sites and older age were associated with decreased odds of trial consideration. Race and language showed limited impact due to small sample sizes and data limitations.

Conclusions: Age and geographic distance are key barriers to clinical trial consideration, with compounded effects observed in older rural patients. These findings highlight the need for targeted strategies to improve trial accessibility, such as expanding trial locations and addressing logistical barriers. Improved data collection on SDOH is critical to designing equitable clinical trial opportunities

Introduction

Clinical trials offer patients access to advanced treatment options compared to standard of care that have yet to be proven effective.[1] It is important for clinical trial participants to reflect the broader patient population to ensure efficacy and tolerability will be accurately predicted for patients post approval. Despite the potential benefits, only a small portion of cancer patients, around 2-10%, participate in clinical trials even though studies found that a third of patients would consider participation if offered.[2-4] Social determinants of health (SDOH), including race, ethnicity, age, and rurality, have been shown to reduce the likelihood of clinical trial enrollment.[5] This study aimed to increase the understanding of how these social determinants of health may impact consideration of cancer clinical trials within a community cancer center in the Great Plains region.

Methods

This retrospective study was approved by the Institutional Review Board with a waiver of informed consent (#2023.034). The study was conducted in accordance with the protocol, International Conference on Harmonization, Good Clinical Practice guidelines, applicable regulations, and ethical principles according to Declaration of Helsinki. The study included data from patients treated for cancer at Avera Cancer Institute from 2018 to 2022. Demographic and socioeconomic variables, including race, ethnicity, residential location, and primary language, were extracted from the electronic medical record (EMR) alongside their cancer diagnosis. Rural and urban designation were based on rural-urban continuum codes from the U.S. Department of Agriculture (USDA). Data were limited to patients from South Dakota and the surrounding states of Iowa, Minnesota, Nebraska, and North Dakota. Patients who were evaluated for clinical trials were identified through a database, through clinical trial management software or pre-screening databases. We compared characteristics of patients enrolled in clinical trials, those formally considered by research staff,

and all patients treated for malignancy. Driving distance from patients' residence to the trial location was calculated using the R package osrm (version 4.1.1).[6] Student's t-test and chi-square tests were used to compare means and proportions between patients formally considered for clinical trials and those who were not. All statistical tests were two-sided, and a p-value of <0.05 was considered statistically significant. R 4.2.2 was used for all statistical analysis.[7]

Results

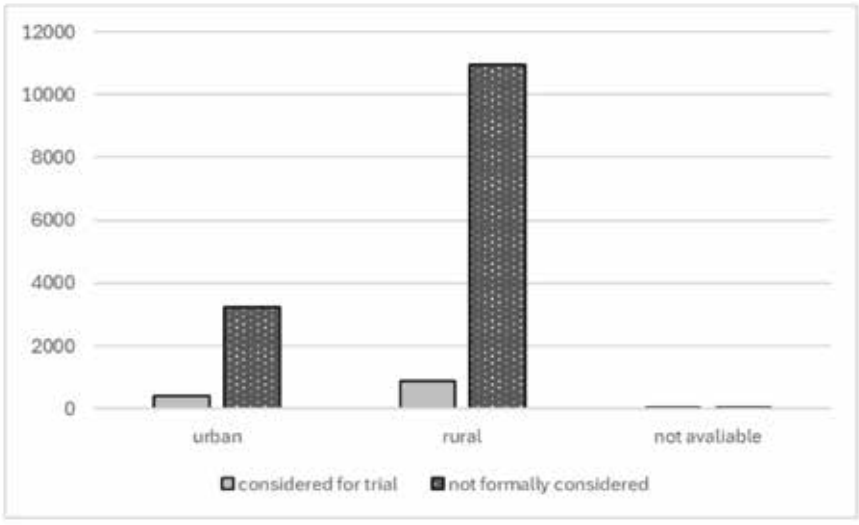
Patients were more likely to be considered for trials at a younger age, a finding consistent in both urban and rural populations. Among urban patients, the average age for patients considered and not formally considered for trials was 66.97 and 70.57 years respectively ($p < 0.001$). Among rural patients, the ages were 67.35 and 72.96 years ($p < 0.001$). However, for patients <60 years, no significant difference in consideration for trials was observed between urban 13.57% (109/803) and rural patients 12.1% (225/1856; $p = 0.33$). For patients 60-70 years, the population considered was significantly higher among urban patients 14.0% (125/891) compared to rural patients (9.3%, 279/2986; $p = < 0.001$). The difference persisted for patients 70-80 years, (urban:11.2%, 124/1106; rural: 7.0%, 254/3623; $p < 0.001$) and >80 years (urban: 7.2%, 62/865; rural: 3.9%, 131/3362; $p < 0.001$).

The logistic regression model reveals that both distance to the nearest trial site and age are statistically significant predictors of trial participation, while metro residency status is not. Specifically, for each additional mile, the odds of trial participation decrease by approximately 0.3% (OR = 0.996, $p < 0.0001$), and for each additional year of age, the odds decrease by about 2.6% (OR = 0.974, $p < 2e\text{-}16$). Conversely,

Table 1. Demographics including age, race, language spoken, and cancer type for patients who were considered for clinical trial compared to total cancer population.

	Considered for clinical trial (n = 1,311)	Not formally considered (n = 14,203)	p-value
Age (mean (min, max))	67.2 (21, 98)	72.4 (18, 109)	<0.001
Gender			
Female	973 (74.2%)	8,003 (56.4%)	<0.001
Male	338 (25.8%)	6,200 (43.6%)	
Race			
Caucasian	1,242 (94.7%)	13,257 (93.3%)	0.06
Language			
English	1,049 (80.0%)	11,445 (80.6%)	0.65
Cancer type			
Breast (39 trials)	562 (42.9%)	4,010 (28.2%)	
Hematologic (47 trials)	275 (21.0%)	2,855 (20.1%)	
Gynecologic (35 trials)	181 (13.8%)	1,125 (7.9%)	
Lung (23 trials)	113 (8.6%)	1,738 (12.2%)	
Colorectal (15 trials)	84 (6.4%)	1,380 (9.7%)	
Prostate (3 trials)	32 (2.4%)	1501 (10.6%)	
Skin (3 trials)	24 (1.8%)	817 (5.8%)	

Figure 1. Total number of patients considered or not considered for clinical trial based on urban and rural status.



being in a rural area slightly increases the odds by 1.5% (OR = 1.015), but this effect is not statistically significant. Overall, distance and age are meaningful predictors of trial consideration, whereas geographic residency (rural vs. urban, $p = 0.859$) appears to have no significant impact by itself.

Discussion

This study evaluating patients considered for clinical trial shows significant differences in population characteristics in some previously reported SDOH measures, but not in others. However, there are several limitations to this study. Patients categorized as considered for clinical trial were tracked on an internal database, which may not have captured every patient formally considered. The data for formal clinical trial consideration were collected and entered manually, which may introduce inaccuracies. Additionally, not all data was available for every patient treated for malignancy at our institution, such as race and language spoken.

The age of patients considered for trial was significantly lower than that of the total population, consistent with current literature showing underrepresentation of older patients in clinical trials.[8] This disparity has been found to be worse in industry sponsored trials and affected by physician perception of toxicity tolerance, but not necessarily comorbid medical conditions.[8,9]

Urban patients were significantly more likely to be considered for clinical trials even when residing hundreds of miles away, compared to rural patients. This may relate to occupation, access to major highways affecting drive time, or confounding socioeconomics factors.[11] Rural patients may face barriers to enrollment due to the frequency of required visits to the study site. Patients with multiple barriers to clinical trials (older age and rural) showed a significantly worse likelihood of being considered for clinical trial. This is in line with qualitative data previously published in a similar geographic region as patients with more factors to overcome may be found by providers to be difficult to enroll based on additional requirements put upon patients by trials.[14]

Race was also found to be significantly different between the two groups, consistent with prior studies, although the numbers were very small and EHR reporting of race is flawed.[3] Language spoken was not statistically significant for consideration for enrollment in clinical trials, even with the additional burden of translating trial information and consents which is in line with previously reported results, but numbers were quite small.[10]

Women were considered for trials at a much higher rate than men and had a much higher enrollment rate, which is contradictory to current literature. [12] This is best described by the cancer types and available clinical trials being most common for breast cancer and, to a somewhat lesser extent, gynecological cancers as well. We found that uninsured patients enrolled in clinical trials at a higher rate than patients with other insurance types. This is notable, as previous studies have found that uninsured patients are underrepresented in clinical trials .[13]

In conclusion, our study found that around 10% of all patients treated for malignancy were offered to participate in clinical trials. These data highlight the opportunities for removing

barriers to participation, such as expanding available clinical trials for underrepresented cancer types, offering trials at satellite locations closer to patients, or providing financial assistance for travel to study sites. However, the lack of data at a population level limit detection of SDOH markers that may have the most impact as barriers for consideration. By improving data available for evaluation of SDOH measures, we may best be able to find solutions that make it possible for patients who would like to participate in clinical trials to do so.

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Plaque-like CD34+ Dermal Fibroma Presenting as a Papule in a 70-year Old Male: A Case Report

Elise V.H. Meide, MS IV; Amy Kerkvliet, MD; and Marcus L. Frohm, MD

Abstract

A 70-year-old male presented to dermatology clinic with an acquired skin colored papule on the pre-auricular cheek. Pathology was initially inconclusive requiring further excision. Diagnosis was ultimately a plaque-like CD34+ dermal fibroma, which is more common in younger females on the neck, torso, or extremities.

Introduction

Plaque-like CD34+ dermal fibroma (PDF) was first identified and classified as a medallion-like fibroma in 2004 by Rodriguez-Jurado et al.[1] It occurs more commonly in females, and as a pediatric congenital lesion.[1,2] However, there are instances of acquired cases in older adults.[3–5] Rodriguez-Jurado found PDF lesions from three patients to be positive for CD34, factor XIIIa, and fascin.[1] PDF is a benign lesion, however, it shares several histological characteristics with dermatofibrosarcoma protuberans making it important to distinguish between the two. Due to this, some reports suggest using molecular studies to differentiate between them.[2,3,5]

Case Report

A 70-year-old man with a history of actinic keratoses and non-melanoma skin cancer presented with a 5-mm, firm, skin colored papule on the pre-auricular cheek. A shave biopsy with 2-mm margins was performed to rule out basal cell carcinoma. The original pathology report found compact orthokeratosis overlying focal acanthosis with a small area of superficially transected spindle cell proliferation (Figures 1 and 2). The spindle cells were positive for CD34 (Figure 3) and Factor XIIIa, and negative for desmin, SOX10, and p40 on immunohistochemistry. The suggested differential was broad but included a fibrohistiocytic or fibroblastic proliferation with a recommendation for conservative excision.

Two weeks later the patient returned for an excision with 0.5 cm margins from the edge of the biopsy scar. The specimen contained a small, fairly circumscribed residual lesion with spindle cells and fibrotic stroma tracking along the follicles and between fat lobules (Figure 4).

Figure 1. H&E biopsy stain at 10x magnification showing compact orthokeratosis (yellow arrow) with overlying focal acanthosis (orange bracket). There is a spindle cell proliferation within the dermis (red arrow).

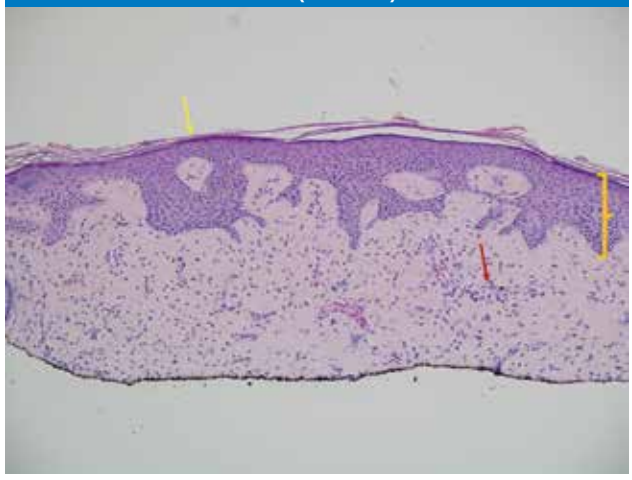


Figure 2. H&E biopsy stain at 20x magnification showing acanthosis (yellow arrow) and spindle cells in the dermis (red).

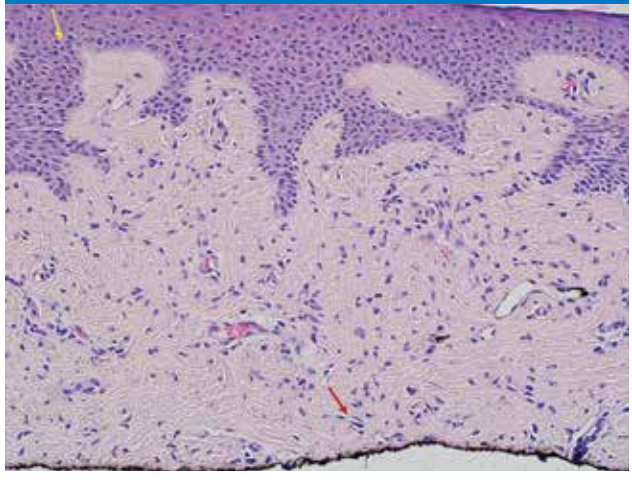


Figure 3. Immunohistochemical staining of original biopsy showing CD34+ spindle cells at 10x magnification. Positive staining is indicated by the brown coloration.

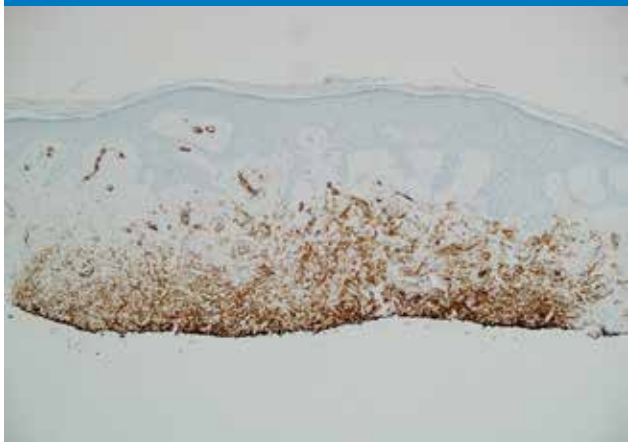


Figure 4. Excision H&E stain at 4x magnification demonstrating spindle cells tracking along follicles within a fibrotic stroma (red arrow).

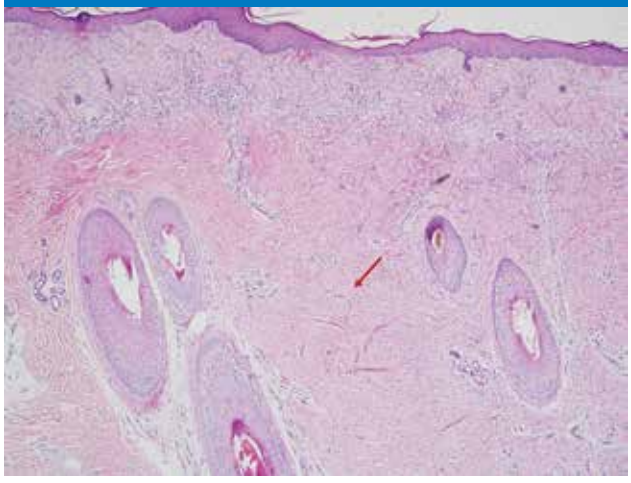
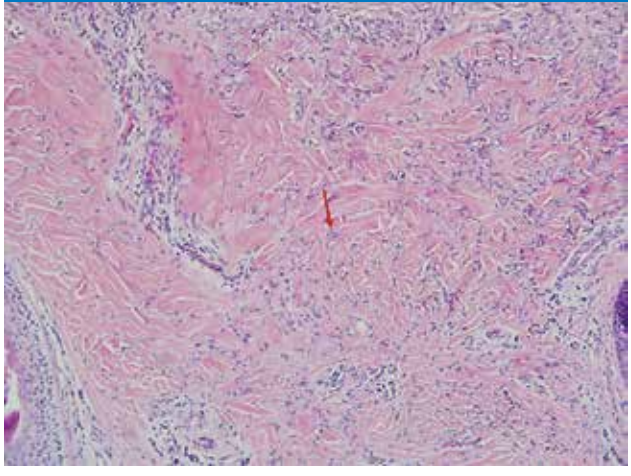


Figure 5. Excision H&E stain at 10x magnification with tumor cells (red arrow) dissecting through thickened collagen bundles.



Tumor cells dissected through thickened collagen bundles (Figure 5). Microscopically it displayed some features of a dermatofibroma, but with CD34+ staining. The pathology report provided a final diagnosis of a benign spindle cell neoplasm, with consideration for CD34+ medallion like fibroma.

Discussion

This case represents a unique presentation of PDF in an older male, with a papular lesion located on the face. Stuart et al. were the first to show an elevated profile of a PDF lesion versus a plaque like presentation, while a papule like PDF lesion was reported on a female patient.[6,7]

The diagnosis of atypical fibroxanthoma was also considered in this patient. Atypical fibroxanthoma occurs in areas exposed to sunlight, often in proximity to actinic keratoses, basal cell or squamous cell carcinomas. They frequently occur on males over the age of 60, such as our patient. Histology includes atypical spindle cells as well as cellular and nuclear pleomorphism.[8] Atypical fibroxanthoma require immunohistochemistry to differentiate from other spindle-cell neoplasms. Unlike PDF, IHC staining is typically negative for CD34 in atypical fibroxanthoma.[9] Mohs surgery is preferred with complete surgical excision, while Mohs is not recommended for PDF.[10]

Common histological features for PDF include CD34+ spindle cells that are storiform or fascicular and a dense, band-like proliferation in the upper part of the dermis. The spindle cells often track down adnexal structures with concentric arrangement around vessels or nerves, a feature that was present in our specimen.[1,7] An important tumor to rule out is plaque-like dermatofibrosarcoma protuberans (DFSP). DFSP involves the dermis as well, but unlike most PDF, can involve the subcutis with a honeycomb pattern of infiltration into subcutaneous fat.[11] Similar to PDF, DFSP tumor cells will have a storiform pattern and will track around adnexal structures without invading. Conventional DFSP also express CD34 in all cases.[11] Based on the histopathology and IHC staining, the lesion in our case report was determined to be PDF rather than atypical fibroxanthoma or DFSP.

Molecular studies may also be performed to differentiate PDF from DFSP; these include reverse transcription-polymerase chain reaction and fluorescence *in situ* hybridization. DFSP has a COL1A1-PDGFB fusion transcript in 93% of cases from a t(17:22) chromosomal translocation, which is not present in PDF in molecular studies.[12] Mohs micrographic surgery or wide local excision are the standard treatment for

DFSP.[13] However, in patients with unresectable or metastatic DFSP, tyrosine kinase inhibitors such as imatinib have been used as neoadjuvant therapy.[14]

Conclusion

This case elucidates another clinical variant of a benign spindle cell tumor. It is important to distinguish benign PDF which only needs reassurance or narrow margin excision from tumors such as DFSP, which require Mohs micrographic surgery or wide local excision.

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Life and Hope After Stroke

ADVERTISEMENT

Sioux Falls man shares his inspiring story of stroke recovery

On Friday, October 1, 2023, Alex Hickman was in pain. He'd been fighting what he thought was a pulled muscle in the left side of his neck for a few days and decided to try to see if a chiropractor might be able to help him sort it out. After adjusting his hips, back and neck, the doctor told him that if it wasn't feeling better by Monday to stop back in.

After a weekend of not feeling particularly better, Alex went back to the chiropractor with his wife on Monday morning and had another adjustment. But this time, something went wrong. Alex experienced a stroke. His wife, an ICU nurse, spotted the stroke symptoms right away and called 911. The ambulance transported Alex to a stroke-capable hospital in Sioux Falls where he received clot-busting drugs and then had an emergency thrombectomy, which is a surgical procedure to remove the clot from his brain.

After surgery, Alex spent 5 days in the ICU and had in-patient physical therapy to help him recover and rehabilitate from some lingering left-side numbness in his body. Alex says from the time his wife spotted his stroke symptoms and called 911 to his arrival in the operating room, only about 2-1/2 hours passed. He says he woke up from surgery nearly fully recovered from his stroke, thanks to the quick actions of his wife.

"It can happen to anybody!" Alex says. "Before I had a stroke I thought it was extremely rare. It's a lot more common than I thought it was. And it does not discriminate on age."

Stroke can happen to anyone, at any age. But there is life – and hope – after stroke. As in Alex's case, survival and recovery for those who experience stroke depends on the quick actions of those around.

"Know the signs. Use FAST," Alex says. "Stroke might not happen to you, but know the signs for the people around so you can save their lives"

South Dakota's Mission: Lifeline Stroke project is working across the state of South Dakota to strengthen the full spectrum of stroke care for patients like Alex in all corners of the state. The $5.05 million project, a collaboration between the American Heart Association and The Leona M. And Harry B. Helmsley Charitable Trust, was launched in October 2024. Today, more than 27 acute sites and more than 25 post-acute sites are participating in the project.

Mission: Lifeline Stroke focuses on connecting all components of acute stroke care into a smoothly integrated system that reinforces the use of evidence-based guidelines to timely and effectively treat stroke patients. It brings together hospitals, emergency medical services and first responders, rehabilitation facilities, communications and regulatory agencies, and state and local government to forge a proactive system of stroke care that saves and improves lives.

For stroke survivors like Alex, Mission: Lifeline Stroke is working to ensure the best possible outcomes for everyone, everywhere.

"Your zip code shouldn't determine whether you survive a stroke," said Joani Guzman, Mission: Lifeline Stroke project coordinator for South Dakota. "No matter where you live in South Dakota, you should have the opportunity for your fullest potential recovery from stroke."

Alex says he thinks about how his family's world would have changed if he hadn't experienced such a good recovery and outcome from his stroke. "I don't think I could have laid on the ground with my kids, picking them up, taking them for walks, pushing them in a stroller… or even feeding and rocking my son to sleep at night," he says. "I think about that a lot and I'm grateful that I had the outcome that I did."

To learn more about the Mission: Lifeline Stroke SD project, visit **www.ActFASTSD.org.**

Congratulations to the following South Dakota facilities who have joined the American Heart Association and American Stroke Association's Mission: Lifeline Stroke acute and post-acute initiatives.

These providers have agreed to follow the Association's treatment guidelines and have made a commitment to providing care that is based on standards aligned with American Stroke Association science: *Sites listed as of 11/30/25*

Post-Acute Sites

- Avantara Groton
- Avantara Mountain View
- Avantara North
- Avantara Redfield
- Avantara Watertown
- Avera Eureka Health Care Center
- Avera McKennan Inpatient Rehabilitation
- Avera Prince of Peace
- Avera St. Benedict Health Center
- Bethany Home Brandon
- Bethany Home Sioux Falls
- Bowdle Healthcare Center
- Community Memorial Hospital
- Encompass Health Rehabilitation Hospital of Sioux Falls
- Faulkton Area Medical Center
- Madison Regional Health System
- Monument Health Sturgis Hospital
- Platte Health Center Avera
- Sanford Chamberlain
- Sanford Clear Lake Medical Center
- Sanford Medical Center Inpatient Rehab
- Sanford Vermillion
- St. Michael's Hospital Avera
- Sunset Manor Avera
- Wakonda Heritage Manor

Acute Sites

- Avera McKennan
- Avera Queen of Peace
- Avera Sacred Heart
- Avera St. Luke's
- Avera St. Mary's
- Avera St. Michael's
- Bowdle Healthcare Center
- Brookings Health System
- Community Memorial Hospital
- Huron Regional
- Mobridge Regional
- Monument Health Custer
- Monument Health Lead/Deadwood
- Monument Health Rapid City
- Monument Health Spearfish
- Monument Health Sturgis Hospital
- Pioneer Memorial Hospital & Health Services
- Platte Health Center Avera
- Prairie Lakes Healthcare System
- Sanford Aberdeen
- Sanford Health Canton
- Sanford Health Chamberlain
- Sanford Health Clearlake
- Sanford Health Vermillion
- Sanford Health Webster
- Sanford USD Medical Center
- Winner Regional Health

For more information on Mission: Lifeline Stroke, email Joani.Guzman@heart.org or Caitlin.Schlosser@heart.org

Learn more about this initiative at heart.org/PostAcuteStroke

American Heart Association. Mission:Lifeline® Stroke

Amniotic Fluid Embolism: A Case Report

Sean McCann, MS IV; and Brenda Kallemeyn, MD, FACOG

Abstract

In obstetrics, an amniotic fluid embolism (AFE) is a rare and highly devastating event. This case highlights the presentation of an amniotic fluid embolism and its treatments. A 35-year-old G1P0 became pulseless shortly after her cesarean section and was successfully resuscitated with high-quality CPR, fluid administration, and a regimen of atropine, ondansetron, and ketorolac. She was under general anesthesia for her cesarean due to non-reassuring heart tones and remained intubated when transferred to the intensive care unit. Due to the rapid responsiveness of treatment, she had a favorable outcome unlike a majority of AFEs. This case highlights the presentation of AFE and importance of prompt treatment. While there are specific diagnostic criteria atypical AFEs are not uncommon, and the threshold should be low for the initiation of treatment. The article reviews the most recent standards of care put forth by the Society for Maternal Fetal Medicine. It also adds to the data that supports the use of various experimental treatments to prevent morbidity and mortality.

Introduction

Amniotic fluid embolisms, while relatively rare, are still a severe obstetric complication leading to high rates of mortality and even higher rates of morbidity. Their mechanism was first proposed in 1926 as a mechanical pathophysiology. Since then, an inflammatory process that is mediated by the immune system has become more prevalent as the proposed mechanism and is growing in support. Because of this pathophysiology, the term anaphylactoid syndrome of pregnancy has been proposed as a more appropriate name and in some instances is used interchangeably with amniotic fluid embolism. Amniotic fluid has been shown to be antigenic in the blood causing release of cytokines via pattern recognition, complement activation, or non-IgE mediated hypersensitivity. This is the proposed mechanism of circulatory collapse. Amniotic fluid has also been shown to have procoagulant properties which likely leads to the coagulopathies seen in a typical AFE. There has yet to be one perfect explanation of the clinical presentation and therefore, many presentations of AFE exist.[1] Despite the proposed name change, amniotic fluid embolism continues to be more widely used and will be term used throughout this paper.

Mortality rates have dropped from approximately 60-85% to 15-25% but there is also concern for widespread underreporting of amniotic fluid embolisms.[2] Despite nearly 100 years of anecdotal evidence and research, the details of pathophysiology, diagnosis, and treatment are debated. Early recognition and supportive treatment have been overwhelmingly supported in literature and is consistently one of the most important facets of successful treatment to reduce mortality and morbidity.[3] As theories of pathogenesis are further researched and more is known about amniotic fluid embolisms, the evolution of treatment options follows.

While supportive cares are widely beneficial and accepted as standard of care, there are novel regimens being used to try to further improve outcomes. Using a combination of atropine, ondansetron, and ketorolac (A-OK) have been reportedly successful.[4] This case of a 35-year-old with AFE treated with both supportive measures and novel A-OK therapy adds to the growing evidence of its effectiveness.

Case

A G1P0 35-year-old woman at 35 weeks and 5 days gestation was admitted for a medical induction of labor for preeclampsia with severe range blood pressures. She was diagnosed with preeclampsia eight days prior to admission at an outlying facility. Her past medical history includes morbid obesity (BMI 46.6), hypothyroidism, nephrolithiasis, pelvic Schwannoma, seizure disorder vs. syncope, ADHD, depression, and marijuana use. No other signs or symptoms of neurofibromatosis type 1 were previously documented or found on physical examination including neurofibromas or café au lait spots. Her past surgical history includes pelvic mass resection, laparoscopic cholecystectomy, and wisdom tooth extraction. On admission, her labs were unremarkable except

for her urine protein:creatinine ratio which was elevated at 0.5. Initial vitals were BP 164/119, pulse 134 bpm, temperature 97.9F, respirations 16, and SpO_2 at 98% on room air. Sterile vaginal exam showed revealed a cervix 0.5 cm dilated, 60% effaced, and -2 station. Fetal heart rate (FHR) was 140s with a category 1 tracing. An electrocardiogram was completed that showed sinus tachycardia, and her last echocardiogram less than two years prior showed an ejection fraction of 60%. Misoprostol (50 mcg and 75mcg) and dinoprostone were given for cervical ripening. Labetalol (20mg IV) was used for severe-range blood pressures, and magnesium sulfate was given intravenously for seizure prophylaxis.

Approximately 24 hours after induction began cervical dilation was at 1cm and a Foley intracervical catheter was placed, and oxytocin labor augmentation was initiated. After the cervix dilated to 3cm, the intracervical catheter became dislodged, and artificial rupture of membranes was performed, and an intrauterine pressure catheter was placed to monitor progression of labor with oxytocin. Approximately two hours later a fetal scalp electrode (FSE) was placed to better monitor the fetal heart tracing (FHT). Nearly five hours after FSE was placed, with the oxytocin infusing at 22 milliunits/min, the patient reported increased discomfort, and IV pain medication (100 mcg fentanyl) was used while an epidural was pursued. FHR remained in the 140s but at this point was classified as a category 2 due to decreased variability. After placement of the epidural, the patient demonstrated significant hypotension that was treated with ephedrine. FHR demonstrated a category 3 tracing at this point with recurrent late decelerations; oxytocin augmentation was immediately discontinued, and resuscitative measures were started. While opioid pain medications have previously demonstrated the potential for decreased FHT variability, fentanyl is a short-acting medication and would not explain well the continued deterioration 90 minutes later.[5] It would also not cause the recurrent late decelerations that are a sign of hypoxia. Of note, she did not have any respiratory depression after epidural placement indicative of high spinal anesthesia. Due to concerning FHT and patient's hypotension after epidural placement, attending OB and anesthesiologist elected to perform cesarean section under general anesthesia.

The patient was transferred to the OR where she was prepared for the procedure with urinary catheter placement, FHR confirmation, preoperative antibiotics, and induction of general anesthesia. A viable female infant weighting 2570 grams was delivered with APGAR scores of 6 and 8 at 1 and 5 minutes. Ten minutes after delivery the anesthesia team noted difficulty ventilating the patient with need for increased ventilation pressure achieving lower perfusion. Pulses were subsequently lost, and a code was initiated. AFE was suspected amongst possible causes in differential diagnosis and, along with ACLS and supportive cares, 1 mg IV atropine, 8 mg IV ondansetron, and 30 mg IV ketorolac (A-OK) treatment was given. Six minutes later, return of spontaneous circulation (ROSC) was achieved. Other possible causes were discussed for approximately 15 minutes when, at that time, pulses were lost again. A code consisting of high-quality CPR following the epinephrine administration ran for eight minutes before ROSC was achieved again. Alteplase (tPA) was used initially for treatment of possible pulmonary embolism, but it was stopped after increased bleeding. JADA system balloon was used for increased bleeding following tPA administration. Two units of packed red blood cells were transfused and massive transfusion protocol was initiated.

Patient was transferred to the ICU until she was stable enough to undergo further workup. AFE is a clinical diagnosis of exclusion and therefore further workup was done to support AFE diagnosis. CT/CT angiogram chest PE study after stabilization was negative for pulmonary embolism and bilateral duplexes of lower extremities were negative for deep vein thromboses. Echocardiogram showed acute heart failure with ejection fraction of 30-35% likely secondary to cardiac arrest. Hemorrhagic shock occurred due to post-partum hemorrhage and possible DIC versus bleeding secondary to tPA administration. During the course of her stay, her condition rapidly improved and the patient was able to discharge to home on post-operative day 4. Echocardiogram eight weeks after discharge showed an ejection fraction of 50-55% treated with long-term beta blocker, and a recovery that is free of long-term cardiac sequelae.

Discussion

The diagnosis for an amniotic fluid embolism remains a clinical diagnosis based on the cardiovascular collapse, hypoxia, and coagulopathy in the absence of a better explanation. The diagnostic criteria also vary based on location of practice. In the case of research reporting, there are four criteria that are implicated to be required to fulfill the diagnosis. The uniform diagnostic criteria include 1) a sudden onset of cardiorespiratory arrest or both hypotension and respiratory compromise as evidenced by systolic blood pressure <90 mm Hg and oxygen saturation <90%, respectively; 2) documentation of overt DIC using standard scoring system before dilutional changes noted; 3) onset during labor or within 30 minutes of placenta delivery;

Figure 1. Timeline of patient status.

and 4) no fever implicating signs of septic shock and end organ failure.[6]

This case demonstrates a sudden onset cardiovascular collapse with both systemic hypotension and hypoxia. This all happened within 30 minutes of delivery of fetus and there were no recorded fevers during labor. Unfortunately, this case was unable to demonstrate overt disseminated intravascular coagulation (DIC) using the Modified International Society on Thrombosis and Hemostasis which uses PT/INR, platelet, and fibrinogen lab values. This may have been in part due to the rapid onset of collapse and pulselessness precluding accurate lab collection and results in order to provide life-saving CPR. Expert review has also shown that approximately 20% of AFE present atypically meaning they don't fulfill all four diagnostic criteria used for research classifications.[7] Furthermore, the administration of tPA may have also been a confounding variable when measuring for signs of DIC. Presence of increased uterine bleeding at the time made DIC highly likely as well as concern for overall presence of coagulopathy.

The Society for Maternal-Fetal Medicine released a checklist in 2021 for initial management which was used to help guide initial management of an AFE. They stress the importance of having such check-lists due to the rarity of occurrence and need for a readily available resource to reference. The four main points listed are to manage circulatory collapse; anticipate uterine atony, DIC, hemorrhage; manage pulmonary hypertension and right ventricular failure; and post-event debrief.

Management of circulatory collapse include basic airway, breathing, and circulation (ABCs) management. CPR should be initiated if no pulses are present making sure to displace the uterus if the patient is still pregnant. Move to the operating room if it can be accomplished in less than two minutes and if the patient remains pulseless for four minutes or greater a resuscitative hysterotomy (cesarean section) should be performed.

Uterine atony, DIC, and hemorrhage should be treated with oxytocin prophylactically and other uterotonics as needed. Tranexamic acid should also be used if DIC or hemorrhage. Massive transfusion protocol per facility should be activated but product should be used judiciously as to not cause volume overload. For this reason, cryoprecipitate is preferred over fresh frozen plasma.

Pulmonary hypertension and right ventricular failure are a finding in amniotic fluid embolism as an obstetric emergency, but anesthesiology, critical care, or cardiology is usually present to help manage these complications specifically. An echocardiogram should be completed to better evaluate function. Avoid fluid overload, vasopressors, inotropes, and pulmonary vasodilators should also be considered. Norepinephrine is the vasopressor of choice. Inotropes such as dobutamine or milrinone are recommended and pulmonary vasodilators delivered either as inhaled nitric oxide or epoprostanol, IV epoprostanol, or oral sildenafil if patient is alert and awake enough to take medication by mouth. Extracorporeal membrane oxygenation (ECMO) should be considered in patients who received prolonged CPR or have refractory heart failure. Oxygen saturation goals should be maintained between 94-98% with use of supplemental oxygen if needed.

Debriefs are also an important component of high stakes, high stress cases. Because of the infrequent nature of the event, this will help to identify areas for improvement and what interventions went well. This is the time to discuss any personal or professional support needs and a reminder to report the case to amniotic fluid embolism registry.[3]

The regimented approach to treatment put forth by the Society for Maternal-Fetal Medicine allows for a consistent and comprehensive approach to the management of AFE. The use of simulation scenarios in obstetric emergencies has also demonstrated improved outcomes by allowing a safe space to provide high quality education without high-risk outcomes. Simulations allow for formal training of rare

events, like AFE, and the repetitions also make personnel more comfortable with interventions needed in these various emergency situations. Learners across all levels of experience demonstrate improvement in delivery of care, which will make the exercises beneficial to all who participate and decrease the amount of total adverse outcomes.[8]

This case was an example of how the current standards of care helped to provide life-saving care for the patient and further reinforces the validity of initial management interventions. Her secured airway at the time of pulselessness likely contributed to her desirable neurologic outcome. The availability of both obstetric and anesthesia staff was able to help reduce any possible delay in initiation of treatment. This case also incorporated less widely accepted treatments successfully with the use of the A-OK regimen. The proposed mechanism inhibition of the vagal reflex by atropine in order to combat the decreased cardiac output caused by bradycardia therefore maintaining adequate perfusion. The anti-serotonergic properties of ondansetron decreases pulmonary vasoconstriction and prevents platelet activation. Ketorolac also provides antiplatelet properties as well as anti-inflammatory properties by thromboxane inhibition. Moreover, ketorolac interrupts the coagulation cascade and further prevents consumptive coagulopathy. Combined, these medications in theory work to mitigate the complications secondary to the immune-like reaction that is proposed to be the cause of many of the sequelae of an AFE.[4]

Conclusion

The theory regarding causes of AFE over time has proven less and less likely to be a true embolism. Prevailing theories for mechanism of pathophysiology are helping to guide novel treatment options, but standard of care is still focused on supportive measures rather than disease modifying treatments. The supportive cares provided have clearly shown a benefit as we continue to see decreased rates of mortality due to AFE, but the morbidity for both mother and fetus remains high.[2] This case report helps to add to the growing body of evidence for use of A-OK in AFE treatment.[9] Its proposed mechanism is in line with current prevailing theory and has a low side-effect profile. When the risk of death and debilitating morbidity remains so high with AFE, the benefits outweigh the risks. This will allow for more published evidence to be analyzed and contribute to further treatments and improved outcomes.

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When Hypertrophy Hides a Rarer Diagnosis: A Case of Danon Disease

Sanjana Manimaran, MD; Patrick Biskupski, MD; Holly Gerberding, MS IV; Dawood Shehzad, MD; Naveen Rajpurohit, MD; and Maria Stys, MD, FACC

Abstract

Danon disease (DD) is a rare X-linked dominant lysosomal storage disorder caused by mutations in the LAMP2 gene. It is typically characterized by a triad of intellectual disability, skeletal myopathy, and cardiomyopathy. Due to the X-linked inheritance pattern, males often present with more severe manifestations. We report an atypical presentation of DD in a young male with isolated cardiomyopathy, incidentally diagnosed during evaluation of an abnormal electrocardiogram showing a pseudo–left bundle branch block in the setting of a Wolff-Parkinson-White pattern. Further workup revealed heart failure with reduced ejection fraction on echocardiography, and cardiac MRI demonstrated late gadolinium enhancement of the left ventricular walls with sparing of the basal septum. Genetic testing confirmed the diagnosis of DD. The patient was managed with guideline-directed medical therapy and received an implantable cardioverter-defibrillator for primary prevention of arrhythmia. He ultimately underwent heart transplantation with a satisfactory clinical outcome. This case underscores the importance of maintaining a high index of suspicion and pursuing comprehensive cardiac and genetic evaluation in young patients with unexplained cardiomyopathy, as early diagnosis of underlying conditions like DD can enable timely and potentially life-saving interventions.

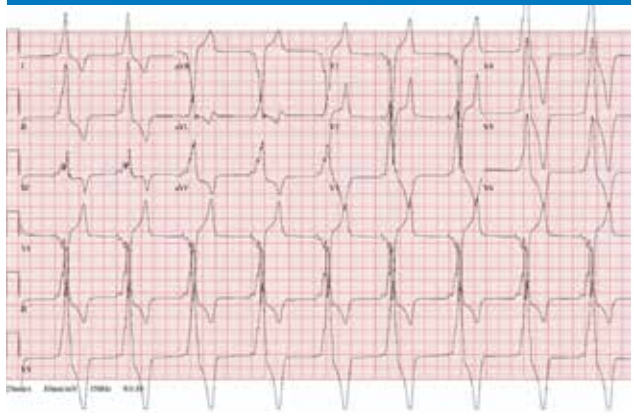
Introduction

Danon disease (DD) is an extremely rare X-linked dominant lysosomal storage disorder caused by a defect in the *LAMP2* gene located on Xq24.[1,2] Although its precise function is not fully understood, LAMP-2 is believed to play roles in lysosomal enzyme targeting, autophagy, lysosomal biogenesis, and cholesterol and triglyceride metabolism within lysosomes.[3] While the exact prevalence of DD remains unknown, it is estimated to account for approximately 5% of pediatric hypertrophic cardiomyopathy cases.[4] The disease is characterized by a classical triad of cardiomyopathy, skeletal myopathy, and intellectual disability.[5–7] Due to its X-linked inheritance pattern, males are typically more severely affected than females.[8] We present a case of incidentally diagnosed DD in a young male who was referred to cardiology for evaluation of an abnormal electrocardiogram (EKG).

Case Presentation

A 20-year-old male with a past medical history of anxiety disorder was referred to cardiology following the incidental finding of an abnormal EKG identified during pre-initiation evaluation for behavioral/psychiatric medications. The EKG was notable for a pseudo–left bundle branch block (LBBB) pattern with prolonged QTc in the setting of Wolff-Parkinson-White (WPW) syndrome (Figure 1). The patient reported episodic lightheadedness while lifting weights exceeding his body weight at the gym, but denied chest pain, exertional dyspnea, palpitations, syncope, muscle weakness, or lower extremity swelling. He self-reported difficulty with mathematics during high school but was otherwise able to complete his education without issue. He denied alcohol use, tobacco smoking, or illicit drug use. Family history was

Figure 1. EKG showing pseudo-LBBB with prolonged QT interval in the background of WPW pattern.



notable for early cardiac death at age 31 in his maternal grandfather, who also had a history of WPW, as well as WPW and syncope in a maternal cousin. Physical examination was largely unremarkable.

Laboratory evaluation was unrevealing except for an isolated elevation in transaminases. Further workup was negative for infectious, autoimmune, and metabolic causes of liver disease. The aminotransferase pattern, with a predominance of alanine aminotransferase (ALT), was suggestive of congestive hepatopathy or ischemic liver injury secondary to passive hepatic congestion.

Subsequent cardiac evaluation included transthoracic echocardiography (TTE), which demonstrated severe global hypokinesis of the left ventricle with a left ventricular ejection fraction (LVEF) of 25–30%, along with severe concentric left ventricular hypertrophy (interventricular septal thickness in diastole [IVSd] measuring 1.7 cm) (Figure 2). Cardiac magnetic resonance imaging (cMRI) revealed severely dilated left and right ventricles, marked concentric hypertrophy of both ventricles, and mid-transmural late gadolinium enhancement involving multiple segments of the left ventricle with sparing of the basal septum (Figure 3).

Given the early-onset cardiomyopathy and suspicious cMRI findings, genetic testing was pursued. Analysis revealed a pathogenic hemizygous variant in *LAMP2* (c.183_183+4del; splice site) and a variant of uncertain significance (VUS) in *ALPK3* (c.1544G>A; p.Gly515Glu), consistent with a diagnosis of Danon disease. Genetic testing was offered to the patient's mother and brother, given the X-linked pattern of inheritance. The patient subsequently underwent implantable cardioverter-defibrillator (ICD) placement for primary prevention of sudden cardiac death. The patient was readmitted with cardiogenic shock requiring mechanical circulatory support. He was subsequently transferred to a higher-level center, where he was initiated on extracorporeal membrane oxygenation (ECMO) and ultimately underwent orthotopic heart transplantation with a favorable clinical outcome.

Figure 2. TTE showing severe LVH with IVSd 1.7 cm.

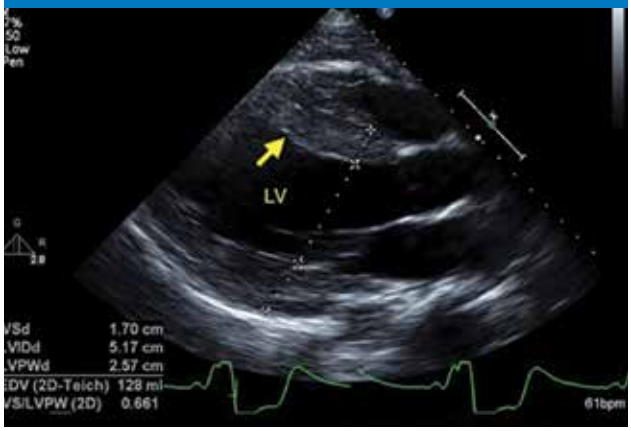
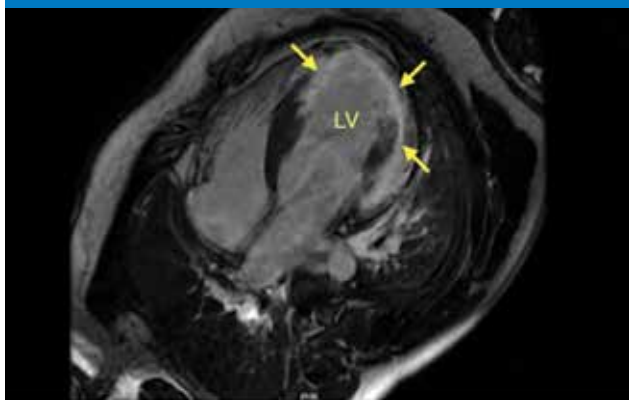


Figure 3. Late Gadolinium enhanced images showing mid-transmural hyperenhancement involving LV walls with sparing of basal septum.



Conclusion

Danon disease is a rare X-linked dominant multisystem disorder associated with significant morbidity and mortality, primarily due to its cardiac manifestations.[9] In male patients, the disease typically presents with the classic triad of hypertrophic cardiomyopathy, skeletal myopathy, and neuropsychiatric involvement.[8,9] Cardiac symptoms often precede the onset of skeletal or cognitive features, with a mean age of presentation around 12 years.[8,9] Males tend to exhibit an earlier onset and a more aggressive clinical course compared to females. In contrast, female patients more commonly present later in life with isolated cardiomyopathy, often without skeletal or cognitive involvement.[8-10]

Wolff-Parkinson-White (WPW) syndrome is the most common electrocardiographic (ECG) abnormality observed in male patients with Danon disease, present in 69% of cases.[11-13] Cardiac magnetic resonance imaging (MRI) in Danon disease typically reveals symmetric hypertrophic cardiomyopathy, followed by asymmetric hypertrophy, and, less commonly, dilated cardiomyopathy. Atypical patterns of late gadolinium enhancement (LGE) are frequently observed, particularly non-ischemic subendocardial enhancement with mid-basal septal sparing and predominant involvement of the apex and lateral free walls.[14]

We report a case of Danon disease in a male patient who presented with an atypical, isolated cardiomyopathy, initially identified through incidental EKG abnormalities. Despite sex-based differences in phenotypic expression, both males

and females are at risk for severe cardiac outcomes.[10,15] This case underscores the importance of maintaining a high index of suspicion and pursuing comprehensive cardiac and genetic evaluation in young patients with unexplained cardiomyopathy, as early diagnosis of underlying conditions like Danon disease can enable timely and potentially life-saving interventions.

Currently, there are no disease-specific treatment guidelines for Danon disease. Management remains supportive, adhering to established protocols for cardiomyopathy and heart failure, with a strong emphasis on early and aggressive cardiac monitoring and intervention. Implantable cardioverter-defibrillators (ICDs) are frequently indicated for primary arrhythmia prevention in both sexes, and definitive treatment often involves heart transplantation.[10,12] Given the high mortality rates associated with Danon disease, family genetic testing and genetic counseling are indicated.

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Community Engaged Medical Education: Give Kids the World

Megan M. Jorgensen, MS IV; Claire M. Kittock, MS IV; Alison Gisi, MS IV; Aaron Fest, MS IV; Belle Grady, MS IV; Katelyn Kenzy, MS IV; and Michelle Schimelpfenig, DO

Abstract

Adequately preparing students to be well-rounded physicians is a challenge in medical education. Medical schools have been integrating community engaged medical education (CEME) to broaden learning experiences, diversify populations their students serve, and benefit the community. The Legacy Trip is a unique CEME opportunity available at the University of South Dakota Sanford School of Medicine (USD SSOM) during which students spend five days volunteering at Give Kids the World Village, serving children with medical complexity (CMC) and their families. Students rated their comfort levels interacting with CMC and their families and reflected on their experiences and feelings before, throughout, and after the experience. These data were analyzed to determine impacts on student comfort levels and identify common themes related to development of professional and interpersonal skills. Student reflections revealed significantly increased comfort interacting with CMC and their families after the five-day experience ($p<0.0001$), with the increased interactions reported as the primary driver. Open-ended responses revealed themes of finding common ground, accessibility and inclusion, facilitating joy, and professional development. The Legacy Trip was an effective way for students to gain increased exposure with CMC and their families, enhancing their development as future physicians in multiple domains. These findings support ongoing student participation in the Legacy Trip and highlight the benefits of CEME at USD SSOM.

Introduction

Medical schools are faced with the challenge of preparing students for the wide variety of professional interactions and emotional situations physicians encounter.[1] However, the rapid expansion of medical knowledge that must be taught has decreased emphasis on the humanities courses that foster emotional preparedness.[1,2] This leaves students feeling underprepared to manage the emotional and psychosocial requirements of high-quality patient care.[1,3,4] There is extensive literature demonstrating that medical student involvement outside of healthcare makes students better prepared to serve and communicate with patients in the clinical setting.[5,6] Benefits in student professional development are seen when medical students participate in interests outside of medicine or in community engagement, which prompt critical thinking, problem-solving, and the ability to relate to others.[7,8]

To address the need for humanities education and medical education, institutions are increasingly looking towards community engaged medical education (CEME) to fill this gap. CEME, also called community engaged learning, involves medical schools working with their local communities and may consist of community outreach and service, policy and advocacy, education, clinical care, and research.[9,10] CEME can create long-term benefits for both students and the broader community, adding new dimensions to student education, promoting community health, and contributing to health equity.[9,10] Physicians with community engagement experience, such as student-run clinics or cultural immersion experiences, are better able to address needs related to social determinants of health, feel more able to meet their patients' needs, and have decreased burnout.[11-13] The University of South Dakota Sanford School of Medicine (USD SSOM) incorporates approximately 27 different opportunities to participate in CEME in pre-clinical years, and approximately 16 different opportunities (including the Legacy Trip) to participate in CEME during clinical years.[14]

Medical students get minimal experience with children with medical complexity (CMC), children with life-altering conditions requiring high health care needs.[15,16] In clinical interactions with these patients, medical students have struggled with feelings of uncertainty, awkwardness,

intrusiveness, and helplessness.[15,17] The USD SSOM has provided a unique CEME experience, the Legacy Trip, for students to gain emotional preparedness for interacting with CMC and their families. During the Legacy trip, one week is spent volunteering at Give Kids the World (GKTW), an oasis for critically ill children and their families to spend quality time together and experience Disney World.[18] Volunteer positions include serving or clearing food and running activities and attractions.[19] The Legacy Trip, since its implementation in 2023, has allowed 36 USD SSOM medical students the opportunity to participate in CEME by volunteering at GKTW.[20] The Legacy Trip is a quintessential example of CEME in action, with some of its benefits for students described herein.

Methods

Surveys for the Legacy Trip were developed to assess the effectiveness of the trip on the educational objectives via student responses. Survey questions were created following a review of the literature on CEME and working with CWC. The educational objectives were as follows: (1) discern the importance of CEME as a part of medical education, and (2) assess the comfort in working with CWC and their families in a non-clinical setting. Surveys were disseminated as anonymous Google Forms. Pre- and post-trip reflection forms and daily reflection forms were collected to assess comfort level in engaging with CWC and included numerous open-ended prompts to garner students' perceptions of their experience. Data collected was analyzed in aggregate. Themes were identified by the authors evaluating aggregate reflections, and themes that recurred were tallied. GraphPad Prism 10.4.1 was used for data analysis. Statistical significance was determined via two-tailed t-test. The University of South Dakota Institutional Review Board determined full IRB review was not required for this analysis. All work was conducted within relevant ethical principles and guidelines according to the Declaration of Helsinki. Participation was voluntary with no identifiable data collected.

Results

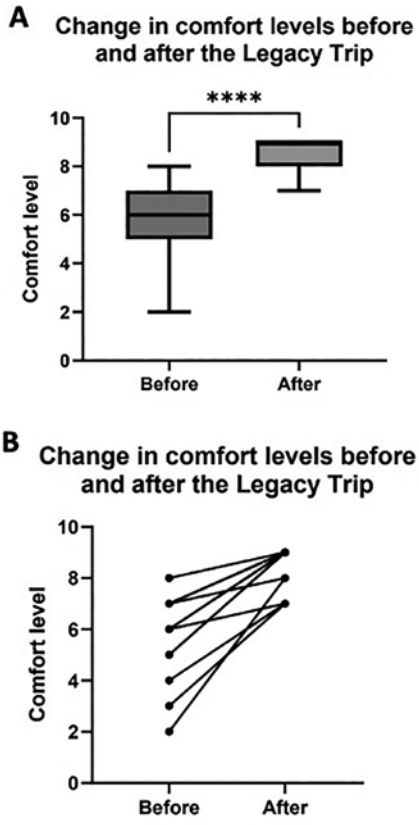
A total of 16 medical students attended the Legacy Trip. The fraction of responses received are listed in Table 1. 100% of students who responded to the pre-trip form indicated that they had received little to no formal training in working with CMC. In an open-ended reflection, 50% of students indicated they desired more formal opportunities for education in this area, and 36% of students indicated that they interact with CMC in clinical settings.

By the last day of the Legacy Trip, students indicated a significant increase in their comfort level engaging with this population, rating their comfort levels 2.73 points higher after the trip ($p<0.0001$) (Figure 1A). Every student reported an increase in comfort level by at least 1 point (Figure 1B). 82.9% of responses indicated that the reason for their increased comfort level was increased experience with CMC and their families. 88% of responses demonstrated that students were able to interact with families outside of their

Table 1. Percent of medical students who submitted each survey.

Survey	Percent responses (out of 16)
Pre-trip reflection	87.5%
Day 1 reflection	68.8%
Day 2 reflection	37.5%
Day 3 reflection	31.3%
Day 4 reflection	75%
Day 5 reflection	93.8%
Post-trip reflections	75%

Figure 1. Change in self-rated medical student comfort levels with interacting with children with medical complexity and their families. (1A) Average medical student comfort levels before (left) and after (right) the volunteer experience. Graph represents mean +/- SD. Significance by two-tailed t-test, **** $p<0.0001$, n = 15. (1B) Changes in individual student comfort levels before (left) and after (right) the volunteer experience, n = 15.



required roles as volunteers (Figure 2).

Reflections were assessed for common themes. Direct quotes from student reflections can be seen in Table 2. One theme included the ease of finding common ground with children and families, with 20% of responses touching on this theme. 50% of responses remarked on enjoying facilitating joy for children and families, and 22.7% of responses remarked on enjoying receiving gratitude from families and children. Though most responses indicated that there were no points of discomfort during volunteering (73.0%), some discomfort was noted and was related to the sadness in working with CMC and terminal illnesses (7.5%), intrafamily stress (18.5%), and stress related to parent frustration towards the volunteer (7.5%). Themes relating to the positive educational impact of the Legacy Trip include professional development, increased awareness and knowledge of issues regarding accessibility and inclusion, and the high quality of the volunteer experience. 100% of student respondents reported that this trip directly impacted their professional development, stating this trip will help them be a better physician, communicator, and/

Figure 2. Percentage of medical student responses reporting interacting with children with medical complexity and their families in addition to communication required for their volunteer role, compared to the percentage who did not interact outside of what was required for their volunteer role, and the percentage whose volunteer role did not give the opportunity to interact with the children or their family. N = 50.

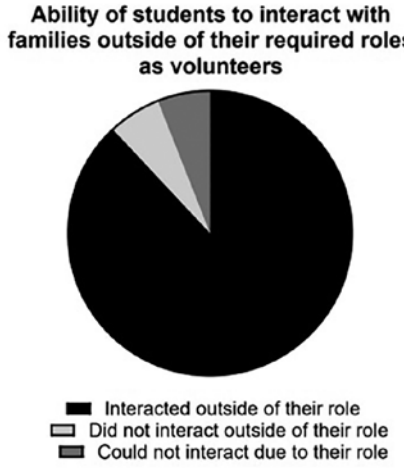


Table 2. Themes identified from medical student reflections, with associated quote(s).

Theme	Quote(s)
Improved comfort related to increased exposure	"I think I have become more comfortable talking to parents about their children ...I feel that I have learned how to navigate these discussions in a manner that honors the child."
	"Today I saw more kids who required a lot of complex cares which I feel helped me to understand a little bit more what life looks like for these families."
	"Increased positive interactions with disabled children and their families has definitely changed my comfort level."
Ease of finding common ground	"A conversation about a hat with a mom led her to telling me her son's journey with cancer. I felt like she just wanted to be heard."
	"Observing the families as people instead of as patients is important and I was able to do that on this trip."
Enjoyment of facilitating joy	"It made me happy to see parents telling their kids to 'eat whatever they want' or to get multiple helpings of their favorite food. It made me happy to hear parents and families saying that they were having the best time of their lives on this trip."
	"I loved seeing how a small ride on a carousel can change the entire demeanor of a kid!"
Enjoyment of receiving gratitude	"It was fun seeing families over multiple days. I got a few 'I remember you!' comments which made me feel like I was having a positive impact."
	"I was handed key chain item from a family and I thought that was really special and something that I will cherish. It is just an item that is more tangible and the thoughtfulness that goes behind a gift like that was very kind and I enjoyed very much."
Professional development	"I know that my experience on the trip will be extremely valuable for my future and working with patients, getting to focus on them as people as a whole."
Accessibility/inclusion	"This trip broadened my perspective on accessibility and the importance of inclusion. I feel I will be a better advocate for my patients of all abilities because of my time at GKTW."
Use of clinical knowledge	"I found myself at times trying to gauge the severity of a child's condition or try to 'diagnose' them. I quickly learned that I wouldn't be able to do that and that it wasn't relevant or important to my work at the village. Every family and every child had the same opportunities at the village and their medical conditions really were not relevant or important during this week."

or advocate. 66.7% of students noted the Legacy Trip as an extremely positive volunteer experience. Likewise, 66.7% of students noted an increase in awareness of topics related to accessibility and inclusion of CMC.

To assess if the educational benefits from the Legacy Trip was related to medical knowledge, we asked students if they used their medical knowledge during the trip. 41.7% of students reported they used no or minimal clinical knowledge. 41.7% of the students noted they found themselves using clinical knowledge to guess the diagnosis of patients, though of these students, 40% of those students noted that they realized the knowledge of the child's diagnosis was immaterial to their connection with the children and families. 16.7% of students reported that medical knowledge was helpful in connecting with parents and children.

Discussion

Community engaged medical education (CEME) is a valuable way for medical students to gain skills not otherwise taught in medical school yet are crucial for becoming well-rounded physicians. Through the Legacy Trip, we focused on the benefit of working with children with medical complexity (CMC). We found a significant increase in medical student comfort with CMC after participating in the Legacy Trip, indicating a direct positive benefit to medical student education. Most students indicated they have received little to no training in working with CMC and their families in medical school and indicated a desire to receive this training. The Legacy Trip is an excellent way to receive this training that students are seeking out. The positive interactions between medical students and the population served was the primary driver of the increase in comfort level. We identified additional themes including the ease of finding common ground, enjoying facilitating joy, and enjoying receiving gratitude. Students indicated in open-ended reflection that this was a high-quality volunteer experience. This was also reflected in the data. Daily reflections indicated that most students increased their comfort level by interacting with children and families, and 88% of volunteer opportunities enabled these interactions beyond the role of what was required for the position. This indicates that the Legacy Trip is well designed to facilitate CEME. The Legacy Trip had a positive impact on medical students beyond increasing student comfort in interacting with CMC. Reflections demonstrated positive effects on professional development and awareness of accessibility and inclusivity. Many students expressed that the Legacy Trip directly impacted their medical education and will make them better future physicians. In summary, the Legacy Trip had a profound, positive impact on medical student participants. The Legacy Trip is a quintessential example of CEME and enables medical students to become better future physicians through numerous positive interactions with children and families at GKTW.

This was a primary study and the open-ended nature of the study design means that aspects of the quality of the experience were likely missed from lack of recording. Future steps would include a more in-depth prospective analysis of the benefits of the Legacy Trip with more targeted questions to capture increased data on the identified themes.

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Diagnosing Myelodysplastic Syndrome in a Rural Setting: A Case Report

Tate Blankespoor, MS IV; Colton D. Carlson, MS IV; and Nanci Van Peursem, MD

Abstract

Myelodysplastic syndrome (MDS) is a rare group of diseases defined by cytopenias, abnormal cellular morphology and various symptoms including anemia, infections, and bleeding. This wide array of nonspecific symptoms creates a challenge in diagnosing MDS, especially in a rural setting. In this case study we present an 81-year-old female who presented to a rural family medicine clinic for evaluation of a severe macrocytic anemia that persisted despite repeated transfusions. The patient was evaluated with a variety of labs including complete blood count, vitamin levels, endocrine evaluation and immunoglobulins before being referred to hematology for a bone marrow biopsy and diagnosis of MDS. This case highlights the challenges of diagnosing MDS in a rural setting and discusses methods that can be used by primary care providers to differentiate MDS from other hematological conditions prior to a subspecialist referral.

Introduction

Myelodysplastic syndromes (MDS) are an uncommon group of diseases with an array of symptoms that can present a challenging diagnosis especially in a rural setting. MDS are hematological disorders characterized by peripheral cytopenias in one or more cell lines and an increased risk of acute myeloid leukemia (AML).[1] The yearly incidence of MDS is 4 per 100,000 people with an increased risk in the elderly population, males and Caucasians.[2] Patients are commonly asymptomatic at presentation although symptoms such as fatigue, infection and bleeding can be present depending on the cell lines affected.[2,3] Erythrocytes are the most common cell line affected with up to 85% of patients presenting with anemia. Thirty to 45% of patients experienced thrombocytopenia and 18-40% of patients experienced neutropenia on presentation.[4,5] While tests such as a complete blood count (CBC), reticulocyte count or peripheral blood smear can help to differentiate MDS from other hematological abnormalities, a bone marrow biopsy with iron stain and cytogenetics is required for definitive diagnosis of MDS.[1,2,5] Once diagnosed, erythropoiesis stimulating agents (ESA) are the first line therapies for treating low-risk MDS related anemia with a variety of other agents used to treat refractory cases or deficiencies in other cell lines.[1,2] In this case report, we describe a case of low-risk MDS that presented in a rural setting and use this case to discuss when MDS should be suspected and how to begin diagnosis in a primary care setting.

Case Presentation

An 81-year-old female with a past medical history of atrial fibrillation and chronic kidney disease presented to the clinic for a medication recheck with routine labs. A CBC revealed a hemoglobin level of 8.5 g/dL (12 -16 g/dL) with white blood cell count and mean cell volume (MCV) within reference ranges and platelet count at 128 K/uL (140-450 K/uL) which was stable with the patient's previous lab work. The patient's atrial fibrillation was controlled with a watchman device after trials of Warfarin and a direct oral anticoagulant had resulted in gastrointestinal bleeding. The patient had recently started clopidogrel for a suspected TIA.

Gastrointestinal bleed and iron deficiency anemia due to chronic kidney disease were suspected and an iron level was found to be 21 ug/dL(50-212 ug/dL). The patient was given an infusion of 400mg iron sucrose, started on ferrous sulfate 325 mg PO daily and clopidogrel was discontinued. On recheck CBC one week later, the hemoglobin was 6.3 g/dL with a MCV of 102.8 fL (80-100 fL). and the patient was given one unit of packed red blood cells and an additional infusion of 400 mg iron sucrose. Vitamin B12, folate, and peripheral blood smear were unremarkable. Occult blood testing was positive. The patient agreed to an endoscopy but denied a colonoscopy.

Endoscopic services were only available every other week at

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this rural facility and the patient had to wait a month to be placed on the schedule. While waiting for the endoscopic procedure, the patient was hospitalized with lower leg cellulitis and hemoglobin was found to be 7.8 g/dL requiring another unit of packed red blood cells. Once performed, endoscopy showed no evidence of H. Pylori, dysplasia, malignancy, ulcers, or areas of active bleeding. Due to persistently low hemoglobin concentrations, further diagnostic workup was performed by the primary care doctor. Erythropoietin was elevated at 84 mU/mL (4-27 mU/mL), parathyroid hormone (PTH) was elevated at 524 pg/mL (12-88 pg/mL), IgA was elevated at 510 mg/dL (84-499 mg/dL) and free kappa and lambda light chains were also elevated at 103.80 mg/L (3.30-19.40 mg/L) and 73.30 mg/L (5.71-26.30 mg/L) respectively. A hematology-oncology consult was placed at this point.

This rural healthcare facility had an outreach hematologist that came once a month, so the patient waited an additional six weeks as they requested not to travel for physician visits. While waiting to see the hematologist the patient presented to the clinic with fatigue requiring another unit of packed red blood cells. When the patient met with the hematologist a bone marrow biopsy was ordered and established the diagnosis of low-risk myelodysplastic syndrome.

Discussion

While not uncommon for a hematologist to observe, MDS is a rare and difficult diagnosis in the primary care setting. Higher-risk MDS often presents with more severe cytopenias and symptoms such as severe fatigue, bleeding or recurrent bacterial infections leading to a more direct diagnosis.[5] Lower-risk patients however are often asymptomatic or present with vague symptoms such as "fatigue". To complicate the diagnosis further, anemia, the most common laboratory finding in MDS, is a common and nonspecific finding in older adults. An estimated 11% of men and 10.2% of women over the age of 65 have anemia with most cases being a result of chronic kidney disease or iron deficiency.[6,7]

Whenever anemia is suspected, a CBC should be the first test performed.[8] In microcytic anemias (MCV <80 fL), dietary iron deficiency, chronic blood loss, chronic kidney disease or anemia of chronic disease should be suspected and a proper workup should be performed for these conditions.[8] In macrocytic anemias (MCV >100 fL) a peripheral blood smear, reticulocyte count, vitamin B_{12} level and folate level should be evaluated.[8] MDS should be suspected in the setting of a macrocytic anemia with an abnormal peripheral smear or a macrocytic anemia after vitamin B_{12} deficiency, folate deficiency and hemolysis are ruled out. MDS should also be suspected in all chronic bicytopenias or pancytopenias.[5]

After initial laboratory evaluation, a detailed history should be the next step in evaluation. While 85-90% of MDS cases are idiopathic, 10-15% of cases are the result of toxic exposure from the environment or chemotherapeutics.[9] In the primary care setting, the National Comprehensive Cancer Network (NCCN) suggests that all suspected cases of MDS be worked up with a CBC with platelets, differential and reticulocyte count; a peripheral blood smear; serum erythropoietin levels prior to any red blood cell transfusion; evaluation of folate and serum vitamin B_{12} levels; assessment of serum ferritin levels; and documentation of transfusion history.[10] Following this workup, if no alternative explanation has been found for the hematological anomalies, then a specialist referral should be placed for further evaluation.[5]

Thrombocytopenia is also a common finding in MDS but, as with anemia, it is a nonspecific finding with many causes. A detailed history should again be the first step in diagnosis. Diseases including malaria, rickettsiosis and dengue fever can present with thrombocytopenia and could be suspected in the case of travel to endemic regions or other corroborating symptoms.[11] The list of medications causing thrombocytopenia is also ever expanding and drug induced thrombocytopenia should be considered in the case of thrombocytopenia shortly after starting a new medication.[12] Finally, certain physiological conditions such as pregnancy or chronic alcohol use can result in thrombocytopenia and should be evaluated during history taking. [11] After completion of a thorough history, a peripheral blood smear should be performed to differentiate true thrombocytopenia from platelet clumping resulting in pseudo-thrombocytopenia.[11] Immune thrombocytopenia is the most common cause of isolated thrombocytopenia but is largely a diagnosis of exclusion and should only be considered once other possible causes are ruled out.[13]

Isolated neutropenia is the least common presenting cytopenia in MDS and is much more common in conjunction with other cytopenias. Isolated neutropenia is rare overall and is often secondary to drugs such as anti-epileptics, sulfonamides, clozapine or anti-thyroid medications.[14] Some infectious agents or autoimmune conditions can also result in sustained neutropenia but rural providers should strongly consider early referral to hematology in cases of prolonged, clinically significant neutropenia for further evaluation.

Rural settings present their own unique challenges. Only 9% of physicians in the U.S. work in a rural setting despite about

20% of the U.S. population living in rural areas.[15] This results in rural areas lacking resources and having limited access to specialized services which can lead to delays in the diagnosis of complex diseases such as MDS. Some rural patients are also not willing to travel to larger cities for definitive diagnosis which adds additional delays and challenges to diagnosis. By understanding the common features of MDS and standard diagnostic measures for specific cytopenias, rural healthcare providers can help to use resources as efficiently as possible, provide the best care for their patients and know when a referral is necessary without over-referring patients.

Conclusion

Myelodysplastic syndromes are a rare class of disorders that can present with non-specific syndromes and laboratory findings creating a difficult diagnosis in a rural setting. While MDS would rarely be the primary consideration in cases of isolated anemia, it should always be kept on the differential and evaluated further if other causes of anemia are ruled out. MDS should also be considered in all cases of chronic bicytopenias and pancytopenias and workup should be performed early in these cases to rule out MDS. While initial evaluation in the primary care setting can include tests such as CBC, iron levels, folate and vitamin B_{12}, a definitive diagnosis will require a hematology consult for a bone marrow biopsy.

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A New Era of Hope and Healing for Pediatric Mental Health

A groundbreaking new chapter for pediatric mental healthcare has begun in Nebraska. The Behavioral Health & Wellness Center at Children's Nebraska is now open, establishing a world-class facility offering the full spectrum of pediatric mental health services. This milestone marks a new era of hope for children, teens and families across the region.

Built in partnership with the Mental Health Innovation Foundation, the center is nationally distinctive for providing comprehensive, integrated care in one dedicated space. "When you arrive, you can expect to be greeted warmly and fully seen and heard. This is the place to find support and connection," says Renee Rafferty, LIMHP, senior vice president of Behavioral Health & Wellness. "We are happy to support the whole child and the whole family with the region's most comprehensive offerings for pediatric mental healthcare and an innovative model in one place."

Through this innovative model, families can access every level of support they might need from crisis to recovery, through a single door.

A Full Spectrum of Integrated Care

For many families, one of the greatest challenges is finding the right level of care at the right time. The Behavioral Health & Wellness Center brings primary care, crisis assessment, outpatient therapy, partial hospitalization and inpatient treatment together in a single facility.

"Through one door, children, teens and their families can access every level of support they might need from crisis to recovery, whenever they need it," says Renee. "Families can access any type of care in the moment, feeling safe, seen and heard. The Behavioral Health & Wellness Center solves this by offering a complete continuum of services, all seamlessly integrated within the Children's Nebraska healthcare system."

This "no wrong door" approach ensures that any child from birth to age 19 who seeks help will receive it, eliminating the confusion of navigating multiple entry points and ensuring timely assessments and a clear plan forward.

This commitment to holistic support extends to wraparound services that address the full needs of the child and family.

A Place of Support and Connection

Every aspect of the Behavioral Health & Wellness Center was intentionally planned to create a therapeutic environment where the physical space itself supports healing. The center embraces technology and innovation to enhance wellbeing and build resilience. Tools such as virtual and augmented reality therapeutics, therapeutic gaming and in-room sensory controls help patients develop healthy coping strategies and manage their environment.

"The entire building was designed with healing in mind," explains Renee. "We've integrated light, color, nature and design to reduce stress and support emotional regulation. Sensory-responsive elements ease distress and help children and families feel safe from the moment they enter the door. We will walk alongside you every step of the journey."

A Vision Made Possible by Community

The opening of the Behavioral Health & Wellness Center is a testament to community partnership and shared vision. It represents the culmination of immense effort, generosity and a belief in a better future for children's mental health.

"This facility and this space reflect the compassion and generosity of our community," says Renee. "We are so grateful for donors and partners who believed in a more hopeful vision and a brighter future."

Member News

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American Medical Association Delegate Report – 2025 Interim Meeting

The 2025 Interim Meeting of the AMA House of Delegates was attended by South Dakota's delegation – Rob Allison, MD; Mary Carpenter, MD; Robert Summerer, DO; and SDSMA CEO Tammy Hatting – in National Harbor, Maryland, November 13-17. USD SSOM medical students who attended were Olivia Heinecke, Tiffany Knecht, Christina Lusk, Jaelyn Morehead, and Sarah Schweitzer.

The meeting was convened with a "call to action" speech by the AMA's current President, Dr. Bobby Mukkamala, an ENT physician from Flint, Michigan. His personal story was well known to this audience: he is the son of immigrant physicians from India; he and his wife own a private practice providing care to a downtrodden blue collar community. One year ago, he underwent surgery to remove a tumor from his brain. He introduced the audience to several topics of interest to the House of Medicine that would be addressed in one way or another during the meeting. These included the following:

1. AMA's ramped up social media presence.
2. Concern regarding vaccinations.
3. Ongoing need for prior authorization reform.
4. The rapidly rising advancement of artificial intelligence.
5. Continuing need for preventative health care.
6. Affordable medications like the GLP-1 medications for obesity and diabetes.
7. Concern over physician burnout with slow EMR improvements.
8. Physician shortages.
9. Need for sustainable payment models for private and employed physicians.

Once again, the South Dakota delegation was active in conversations affecting rural medicine and scope of practice. The delegation participated in several meetings with the North Central Medical Conference states. Dr. Allison has taken a leadership role in the Rural Medicine Caucus. Members of those caucuses were able to take action in the House of Delegates on a resolution that would have adversely affected rural emergency departments. The Scope of Practice Summit provided strategies for minimizing the impact of scope creep.

Mr. Mike Allen, a political journalist with a pulse on the current political climate was the keynote speaker at the Capital Club luncheon for AMPAC members. He gave insight into the dramatic changes being seen in the US's political landscape. These were categorized into three cosmic shifts: in government, in technology, and in media consumption. Both political parties are remaking themselves. Democrats are influenced by socialism vs. traditional policies, and Republicans must anticipate a future beyond President Trump. Regarding technology, he warned that not using AI was like having one's cell phone disconnected from the internet. Finally, he raised the alarm of fragmented media consumption resulting in fragmented realities: people are choosing to get information from their preferred sources, and that often conflicts with the reality of other's sources.

Another interesting speaker during the meeting was the Administrator of the Centers for Medicare and Medicaid Services, Dr. Mehmet Oz. He is another son of an immigrant physician. In this writer's opinion, he was mostly well received by the House. Amongst rare heckles, Dr. Oz touched on several topics that were near and dear to the AMA, including excellence in science and the profession, scope of practice, prior authorization, and providing care to disenfranchised populations. His vision was that of Hubert Humphrey in this paraphrase: "It is the moral obligation of government to take care of people in the dawn of their lives, the twilight of their lives, and those in the shadows." He recognized the challenges physicians face with the rise in corporate medicine and the move to diminish our profession. He was emphatic that doctors need to be on the front lines. Dr. Oz asked the House if MAHA (Make America Healthy Again) could be a force for good, encouraging physicians to remain curious to ask questions, courageous to act upon them, and bold enough to speak up when necessary. Some of his goals include treating CMS beneficiaries in a way that empowers them, to support physicians by incentivizing adoption of technologies and AI capabilities, and to crush waste, fraud, and abuse, e.g. use of durable medical equipment. Politically, he touched on the One Big Beautiful Bill indicating that it would save Medicaid as it "was not created for able bodied individuals," and he noted the ACA had fundamental flaws. He expressed hope in the $50 billion Rural Transformation Project. Ending on a final note of prior authorization reform, Dr. Oz was met with applause, many standing in appreciation for his words and service.

Here are some of the highlights of actions taken by the House of Delegate's during the meeting:

Boost health AI training across medical education continuum

The AMA has policies and guidance on trustworthy augmented intelligence (AI) in medicine. Now the AMA will redouble its efforts to ensure that medical students, residents, fellows and physicians in practice have access to the training and CME they need to harness the power of health AI tools while ensuring that those tools are designed, developed, and deployed ethically

and responsibly.

Peer-reviewed studies and surveys across specialties show trainees are already using AI tools and that they believe the tools will play a future role in care, according to a resolution introduced. Medical students and physicians in training also want formal training about health AI that includes ethics, bias mitigation, evaluation and safe workflow integration.

To address those needs, delegates adopted new policy to support "developing and disseminating model AI learning objectives and curricular toolkits aligned with existing AMA policy and Association of American Medical Colleges principles." The AMA will work to get medical students and physicians the health AI training they need.

Bolster physicians' workplace safety, well-being

Through its actions at the meeting, the House of Delegates has strengthened the AMA's role in physician well-being. The AMA is already reducing physician burnout by removing administrative burdens and helping doctors rediscover the Joy in Medicine.

The AMA will take further steps that will keep doctors safe in the workplace, help address physician burnout and support work-life balance.

Get rid of "red flags" that block substance-use disorder treatment

The opioid epidemic remains a significant public health emergency and buprenorphine improves treatment retention and criminal justice outcomes, cuts intravenous drug use and improves maternal-fetal health outcomes, hepatitis C treatment, social functioning and quality of life, according to a resolution introduced by the American Society of Addition Medicine.

The AMA has heard reports that patients with opioid-use disorder have struggled to have prescriptions for buprenorphine products dispensed at pharmacies. Some pharmacies are not increasing their orders for fear of triggering suspicious-order reports that would subjecting them to scrutiny.

This evidence-based, lifesaving treatment approved by the FDA is not considered a first-line sublingual formulation like buprenorphine/naloxone, but nothing specific prohibits using buprenorphine mono-product instead of buprenorphine/naloxone on a case-by-case basis when it's deemed the most suitable treatment option in the American Society of Addiction Medicine guidelines or the U.S. Substance Abuse and Mental Health Services Administration publications.

So that physicians can prescribe buprenorphine mono-product when appropriate and without bumping into roadblocks, the AMA will advocate:

- At the state and federal level to remove "red flag" or "suspicious order" designations suspecting or distinguishing between buprenorphine mono-product and buprenorphine/naloxone that are approved for treatment of opioid-use disorder.
- That Medicare, Medicaid and all commercial health plans and other payers be required to cover medications to treat opioid-use disorder in all formulations without prior authorization, step therapy, fail first requirements, or other inappropriate utilization management.

The AMA believes that science, evidence and compassion must continue to guide patient care and policy change as the nation's opioid epidemic evolves into a more dangerous and complicated illicit drug overdose epidemic. More information is available on the AMA's End the Epidemic website at https://end-overdose-epidemic.org/

Stabilize funding for mental health services in schools

Earlier this year, the U.S. Department of Education rescinded more than $1 billion in mental health grants established by the Bipartisan Safer Communities Act in 2022 that would have helped pay for the training, placement and diversification of mental health professionals in schools. Those in rural and underserved areas were particularly affected by the grants' withdrawal, says a resolution introduced by the American Academy of Child and Adolescent Psychiatry.

"The decision to end these grants will disproportionately impact rural and underserved districts, disrupting continuity of care, decreasing access to mental health care for our children, and destabilizing the workforce pipeline for counselors, psychologists, social workers and physicians engaged in school-based health services in the middle of a mental health crisis," said Melissa J. Garretson, MD, a member of the AMA Board of Trustees.

The AMA supports school-based health services, trauma-informed care, pediatric mental health screening and other evidence-based policies, and delegates took action directing the AMA to:

- Support sustained, stable and equitable state and federal funding and infrastructure for the training, placement and retention of school-based mental health professionals, with priority given to rural and underserved communities.
- Advocate federal legislation incorporating automatic continuity protections such as bridge funding or carryover authority within school-based mental health programs, to prevent disruptions in student services and workforce stability when federal appropriations are delayed or rescinded.

Ban employer indemnification in physician employment contracts

As more physicians work as employees in hospitals, health systems and corporate practice settings, the terms of their employment contracts have become more complex. Some states have banned or limited "covenants not to compete," also called noncompete clauses or restrictive covenants, out of concerns about the nationwide shortage of physicians. The AMA also opposes restrictive noncompete clauses.

Less regulatory attention has been paid, however, to indemnification clauses in tail insurance—the stopgap insurance physicians must have once they are no longer enrolled in an employer's claims-made malpractice policy.

The American College of Emergency Physicians has said indemnification clauses are "not appropriate in medical contracts" because they "unnecessarily complicate medical malpractice litigation and may result in additional liability." Most physician employment contracts do not detail which party is responsible for tail insurance, resulting in physicians being forced to shoulder the burden, says a resolution introduced by the AMA Organized Medical Staff Section.

To address this issue, delegates directed the AMA to:

- Develop model state legislation to prohibit the inclusion of clauses indemnifying employers in physician contracts.
- Actively work to increase the education and awareness of physicians on the implications of accepting employment contracts which require physicians to pay for tail insurance or indemnify their employers.

Stop scope creep

So far this year, more than 150 bills that were designed to expand the scope of practice for nurse practitioners, nurse anesthetists, physician assistants, optometrists, pharmacists, psychologists and others have been defeated.

With a series of four substantial policy actions taken, delegates have strengthened the AMA's capacity to fight scope creep and defend the practice of medicine against scope of practice expansions that threaten patient safety and undermine physician-led, team-based care.

Among the state bills put forward to expand nonphysicians' scope of practice are proposals that would allow nonphysicians such as optometrists to perform surgery, including laser surgery.

The AMA already had policy specifying that laser surgery should only be performed by individuals either licensed to practice medicine and surgery or within those categories of practitioners licensed by states to perform surgical services.

This policy should, however, be modified "to more clearly align with AMA policy on surgery, physician-led care and the definition of physician," according to an AMA Board of Trustees report whose recommendations were adopted. To that end, delegates modified existing AMA policy to say that laser surgery should only be performed by:

- Licensed physicians—defined as individuals who have a doctor of medicine, doctor of osteopathic medicine or a recognized equivalent physician degree and who would be eligible for an Accreditation Council for Graduate Medical Education residency—who meet appropriate professional standards.
- Those categories of practitioners who are appropriately trained, credentialed and currently licensed by the state to perform surgical services, and are working under the direct supervision of a physician who possesses appropriate training and privileges in performance of the procedure being supervised.

Delegates also modified existing AMA policy on surgery performed by optometrists to:

- Support legislation prohibiting optometrists from performing surgical procedures as defined by relevant AMA policies.
- Encourage state medical associations to support state legislation and rulemaking prohibiting optometrists from performing surgical procedures as defined by relevant AMA policies.

Finally, The SDSMA Delegates noted the following topics that were addressed during this HOD meeting that may be of interest to South Dakota physicians:

A. Patient care: vaccine policies, lung cancer screening, autism, standardized brain death policies, in-office dispensation of generic medications, health impacts of Indian boarding schools, and veteran specific health disparities

B. Medical education: preventing sleep deprivation among medical students, and reasonable workplace accommodations for residents/fellows during pregnancy.

C. Health care policy: laser surgery; Stark Law self-referral ban; report on evidence based medicine, public health infrastructure, and biomedical research; preservation of Medicaid; Physician Assistant and Nurse Practitioner movement between specialties; tax incentives for volunteer community preceptors; pathways to U.S. permanent residency for H-1B physicians.

D. Health care regulations: patient choice of physician, non-medical switching of medications by pharmacists/PBMs, creating public scorecard on insurance delays in care related to prior authorization, publicize insurer financial gains caused by delayed care and payment due to prior authorization, payment models to sustain rural hospitals, payment for biosimilars, protecting hospitals and patients from inappropriate denials of inpatient admissions, lack of need for prior authorization for inexpensive medications, oppose unilateral down coding of physician services by insurers, prohibiting insurance denials for payment for procedures based on site of service, oppose burdensome prior authorization in Medicare fee for service, and increasing National Immunization rates by advocating for equitable vaccine payment.

Robert L. Allison, MD
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South Dakota Medicine, the monthly peer-reviewed medical journal published by the South Dakota State Medical Association, is read by physicians, residents, medical students, hospital and clinic administrators, and other health care leaders. SDSMA members receive the journal through a mailed subscription as a member benefit and have access to full issues at sdsma.org.

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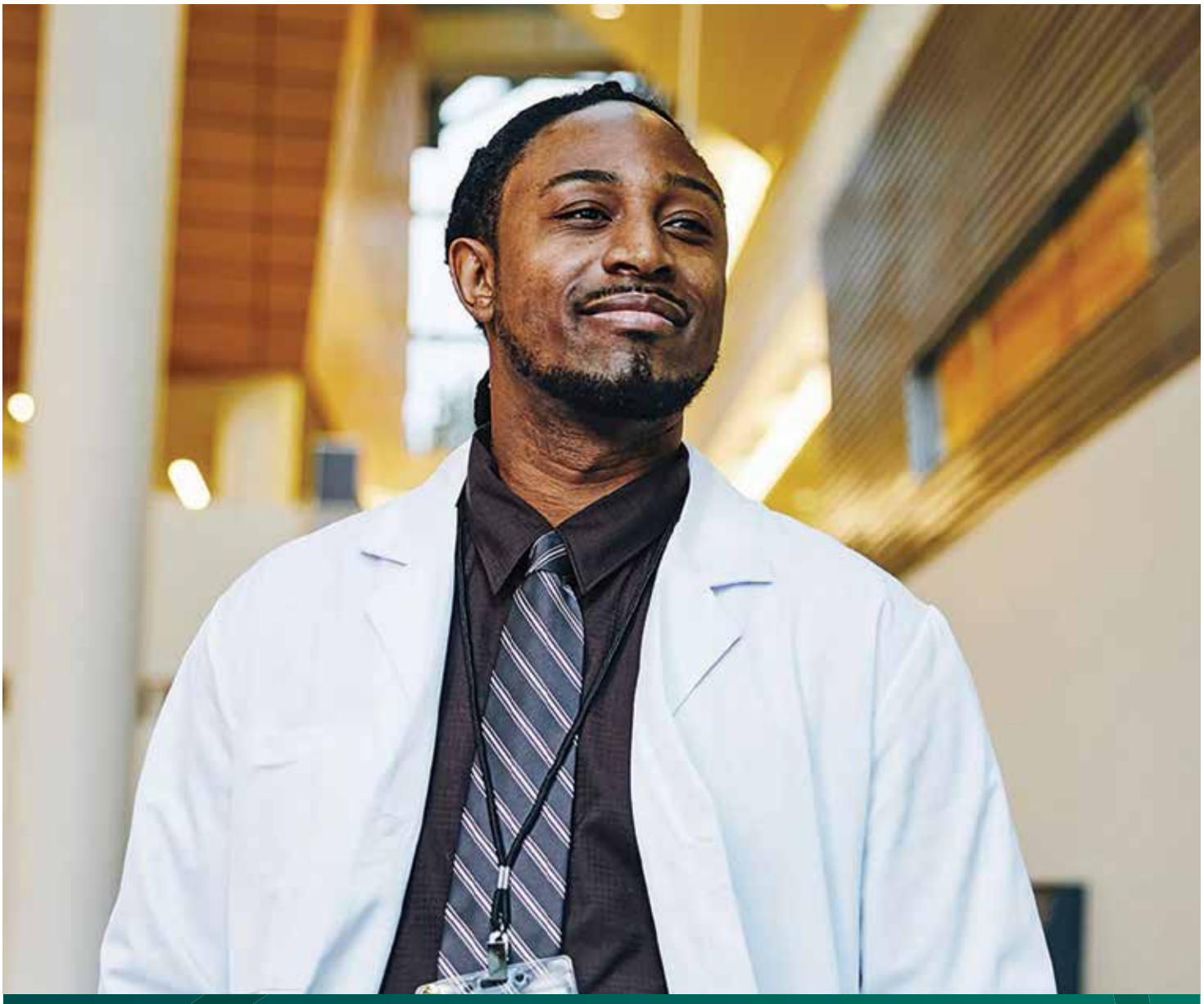

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