


MINNESOTA **MEDICINE**

OCTOBER 2014



sleuths
BEHIND THE
scenes

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THE UNUSUAL IS THE USUAL PAGE 20

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What motivates doctors to specialize in
RARE DISEASES? PAGE 16

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physicians and medical students PAGE 36



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Charles R. Meyer, M.D., Editor in Chief

They provide
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monotonous diet
that can be daily
practice.

Learning from fascinomas

His family said he just wasn't right. An 83-year-old retired CEO of a large company, he had kept up a full schedule of board meetings and stayed in touch with his business friends. But then he started missing things—forgetting names, shirking appointments, showing no interest in any of his normal activities—all within a matter of weeks. And when he started talking gibberish, his family knew it was time to take him to the doctor.

His first stop was the local physician near his lake cabin in northern Wisconsin, who promptly admitted him to the area's small regional hospital. They did the usual work-up—blood tests, CT scan of the head and even an antibody level for Lyme disease, which was just becoming recognized as an endemic illness in that region. After all the results came back negative, he was transferred to our hospital.

When I saw him, he was truly a different person. His eyes were hazy, his speech was slurred, his responses slow. I repeated some of the tests and threw in an MRI of the brain, since the Wisconsin hospital did not have that capability. Negative results from these exams led my thinking from the mundane to the bizarre. And despite the negative Lyme blood test, I ordered a spinal fluid examination for Lyme PCR. The test came back definitely positive. Two weeks later after daily antibiotic therapy with IV Rocephin, he started to show his usual spark.

In those early days of learning about Lyme disease, this was definitely a fascinating case, a "fascinoma," for me, and I did what all physicians do with such cases, shared it with colleagues, read up on it, and stashed the lessons I learned in my memory bank.

A long-weathered concocted term in medical argot that has won its own Wikipedia entry, fascinomas spark the interest of even the most seasoned physician. They take us back to our medical school and residency days working at referral institutions where "textbook cases" and "zebras" were almost daily fare. Fascinomas occur less often in the private practice of medicine. When they do surface, they provide dessert for the sometimes monotonous diet that can be daily practice.

Of course, as a patient, you never want to be a fascinoma, the "interesting" case that no one can solve as you stew with your symptoms and wait for epiphanies to strike your physicians. It's very unsettling to see your doctor do too much head-scratching. Many fascinomas don't have the favorable outcome that my patient experienced, and many end up in the lab where a pathologist may render the final "aha" in the tangled journey toward a diagnosis. As a patient, mundane and easily diagnosable sound better than rare and puzzling.

Our invited unusual cases this month come from radiologists, pathologists, pediatricians and family physicians. Though rare, fascinomas are in all fields of medicine, and the brisk response to our call for interesting cases shows that practicing physicians still harbor stashes of cases they want to share with their colleagues.

My patient lived for years without residual from his Lyme encephalitis. He's gone now, but he and his fascinoma permanently reside in my stash.

Charles Meyer can be reached at charles.073@gmail.com.

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^cIn the 8 clinical trials of at least 26 weeks' duration, hypoglycemia requiring the assistance of another person for treatment occurred in 11 Victoza®-treated patients.

A 52-week, double-blind, double-dummy, active-controlled, parallel-group, multicenter study. Patients with type 2 diabetes (N=745) were randomized to receive once-daily Victoza® 1.2 mg (n=251), Victoza® 1.8 mg (n=246), or glimepiride 8 mg (n=248). The primary outcome was change in A1C after 52 weeks.



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Liraglutide causes dose-dependent and treatment-duration-dependent thyroid C-cell tumors at clinically relevant exposures in both genders of rats and mice. It is unknown whether Victoza® causes thyroid C-cell tumors, including medullary thyroid carcinoma (MTC), in humans, as human relevance could not be ruled out by clinical or nonclinical studies. Victoza® is contraindicated in patients with a personal or family history of MTC and in patients with Multiple Endocrine Neoplasia syndrome type 2 (MEN 2). Based on the findings in rodents, monitoring with serum calcitonin or thyroid ultrasound was performed during clinical trials, but this may have increased the number of unnecessary thyroid surgeries. It is unknown whether monitoring with serum calcitonin or thyroid ultrasound will mitigate human risk of thyroid C-cell tumors. Patients should be counseled regarding the risk and symptoms of thyroid tumors.

Do not use in patients with a prior serious hypersensitivity reaction to Victoza® or to any of the product components.

Postmarketing reports, including fatal and non-fatal hemorrhagic or necrotizing pancreatitis. Discontinue promptly if pancreatitis is suspected. Do not restart if

pancreatitis is confirmed. Consider other antidiabetic therapies in patients with a history of pancreatitis.

When Victoza® is used with an insulin secretagogue (e.g. a sulfonylurea) or insulin serious hypoglycemia can occur. Consider lowering the dose of the insulin secretagogue or insulin to reduce the risk of hypoglycemia.

Renal impairment has been reported postmarketing, usually in association with nausea, vomiting, diarrhea, or dehydration which may sometimes require hemodialysis. Use caution when initiating or escalating doses of Victoza® in patients with renal impairment.

Serious hypersensitivity reactions (e.g. anaphylaxis and angioedema) have been reported during postmarketing use of Victoza®. If symptoms of hypersensitivity reactions occur, patients must stop taking Victoza® and seek medical advice promptly.

There have been no studies establishing conclusive evidence of macrovascular risk reduction with Victoza® or any other antidiabetic drug.

The most common adverse reactions, reported in ≥5% of patients treated with Victoza® and more commonly than in patients treated with placebo, are headache, nausea, diarrhea, dyspepsia, constipation and anti-liraglutide antibody formation. Immunogenicity-related events, including urticaria, were more common among Victoza®-treated patients (0.8%) than among comparator-treated patients (0.4%) in clinical trials.

Victoza® has not been studied in type 2 diabetes patients below 18 years of age and is not recommended for use in pediatric patients.

There is limited data in patients with renal or hepatic impairment.

In a 52-week monotherapy study (n=745) with a 52-week extension, the adverse reactions reported in ≥ 5% of patients treated with Victoza® 1.8 mg, Victoza® 1.2 mg, or glimepiride were constipation (11.8%, 8.4%, and 4.8%), diarrhea (19.5%, 17.5%, and 9.3%), flatulence (5.3%, 1.6%, and 2.0%), nausea (30.5%, 28.7%, and 8.5%), vomiting (10.2%, 13.1%, and 4.0%), fatigue (5.3%, 3.2%, and 3.6%), bronchitis (3.7%, 6.0%, and 4.4%), influenza (11.0%, 9.2%, and 8.5%), nasopharyngitis (6.5%, 9.2%, and 7.3%), sinusitis (7.3%, 8.4%, and 7.3%), upper respiratory tract infection (13.4%, 14.3%, and 8.9%), urinary tract infection (6.1%, 10.4%, and 5.2%), arthralgia (2.4%, 4.4%, and 6.0%), back pain (7.3%, 7.2%, and 6.9%), pain in extremity (6.1%, 3.6%, and 3.2%), dizziness (7.7%, 5.2%, and 5.2%), headache (7.3%, 11.2%, and 9.3%), depression (5.7%, 3.2%, and 2.0%), cough (5.7%, 2.0%, and 4.4%), and hypertension (4.5%, 5.6%, and 6.9%).

Please see brief summary of Prescribing Information on adjacent page.



The power of the agenda

The governance and direction of the “new” MMA were reviewed nicely in the September issue of *Minnesota Medicine*. The bitter controversy over the suspension of the House of Delegates (HOD) was described fairly. I was one who argued vociferously against its suspension. I acknowledge that all parties

on both sides of the governance debate have their own vision of what’s best, and that there were defects that needed new thinking. The MMA Board and staff have new power that used to belong to the member-physicians through the HOD. The *power of the agenda* is no small thing, and it is now theirs. Organizational priorities are foundational. I know they tell us that the policy council and forums provide opportunities for input, but I’ve thought that the agendas have been ideologically slanted mostly by what they *haven’t* included. They’ve avoided the controversial stuff.

Meanwhile, the staff has largely failed to implement the ideas generated by the Task Force on Independent Practice of Medicine on which I served. What are some priorities that deserve more attention?

- Advocating for pricing transparency (critically important!)
- Fighting the insanity of ICD-10
- Studying the effects on our profession, and on patient care, of the huge increase in physician employment
- Addressing the largely unspoken frustrations of employed physicians
- Reducing bureaucratic burdens including prior authorization, the explosion of “quality” measurements and government regulations
- Studying the effects on patient care of less-trained providers doing the work of physicians
- Highlighting the distressing realities of EMRs and the failed promises despite ruinous costs
- Advocating for legislated malpractice relief
- Addressing physician manpower (lots of debate needed here)
- Addressing medical graduate debt
- Educating our younger physicians about the downward trajectory of our influence over patient care
- And yes, fighting against the inequities that disproportionately affect members in independent practices (contracts, pricing).

The common theme in many of these is that physicians are under unprecedented outside attack. Younger physicians probably don’t feel that way, but we “old heads” are the keepers of our professional memory. To paraphrase Ronald Reagan, ask yourself if the physician-patient relationship is better off today than it was 10 years ago. We need the MMA to advocate, not placate and tolerate. MMA staff and the Board of Trustees need our input on priorities. Although the HOD is suspended for two more years, we will have to work harder to have our voices heard from the

trenches. Bring back the House of Delegates in 2016! But don’t wait until then to demand more.

Richard Morris, M.D.

Response: The MMA is working on many projects to make Minnesota a better place to practice medicine. The report of the Independent Practice Task Force was accepted by our Board and many of the recommendations have been implemented. One outcome in particular is that we are putting more resources toward solving the problem of administrative burdens, which affects all physicians regardless of practice size or type. In addition, we have made steady progress in implementing the governance changes adopted by the House of Delegates (HOD). These changes are already increasing member participation and input to MMA policy decisions. Annual Conference attendance was higher than last year’s HOD meeting by nearly 50 percent, and there were many first-time attendees. We will continue our efforts to increase physician engagement and activity through listening sessions and forums, and by encouraging emails and online comments and ideas with the ultimate goal of making Minnesota the healthiest state and the best place to practice medicine.

Donald Jacobs, M.D., MMA president
Doug Wood, M.D., MMA board chair

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Medical students on preparing for a disaster

The first 72 hours following a disaster are critical.¹ During this time, all health care providers need to be prepared to be first responders.

In May 2013 for the first time, a group of students and faculty from Mayo Medical School collaborated with community members in Rochester on an event designed to prepare us to respond to disasters. It was inspired by the Centers for Disease Control and Prevention's "zombie apocalypse" campaign, which has sought to raise awareness of the importance of disaster preparedness. In our simulated situation, there was an outbreak of hemorrhagic acral dermatitis and analgesic delirium (HADAD), a fictitious disease causing progressive zombie-like behavior and dermatologic lesions.

The event was a critical learning experience for the medical students who participated. It furthered our understanding of the importance of teamwork in disaster situations and pandemic outbreaks and gave us an opportunity to apply our leadership skills. We learned when it is appropriate to consult someone with more experience and about the importance of communication in an environment where there is controlled chaos—skills that are essential to providing safe, effective and timely health care.

In preparation for the event, experienced health care professionals taught us such skills as intubation, IV placement, cricothyroidotomy, thoracentesis and tourniquet application. We

revisited concepts such as Team STEPPs, VOMIT (an algorithm used in patient hand-off), and the ABCDEs of primary trauma survey. Those of us who helped plan the event saw how health care providers, public health workers and others in the community interact.

In a recent study, it was found that first-year residents on average only had 2.18 hours of disaster preparedness training in medical school.² John's Hopkins University researchers found that of 29 medical schools, only 20.7% required disaster coursework.³

We would like to encourage other educational institutions to participate in disaster-preparedness training, as it provides medical students with a tremendous opportunity to learn and will improve their community's ability to respond in case of a true disaster.

Janice Cho and Heather Talley
Mayo Medical School, Rochester

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ENSURING QUALITY: Promoting measures that improve patient outcomes

The MMA is hosting a half-day quality summit to examine health care measurement in Minnesota. Experts will describe ways to translate evidence-based research into improved approaches to practice. Participants will learn how quality measures are developed in the state and have the opportunity to discuss important issues that affect the practice of medicine. CME is available.



Saturday, October 25 | 8 to 11:30 am
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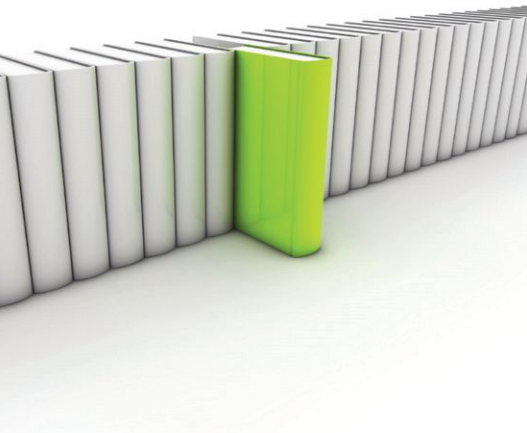
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The MMA wishes to thank MN Community Measurement for sponsorship support.



Diagnosing rare diseases

Here are some facts about rare diseases and physicians' ability to diagnose and treat them:

- 7.6** Number of years it takes the average patient with a rare disease to receive a proper diagnosis
- 8** Average number of physicians seen before a patient receives a diagnosis
- 2 to 3** Average number of misdiagnoses received before a correct one is made
- 43.6** Percentage of patients with a rare disease who believe that because of a slow diagnosis, treatment was delayed, which may have had a negative impact on their condition
- 40** Percentage of specialists who rate their training on rare diseases as neutral, ineffective or very ineffective
- 56.7** Percentage of primary care physicians who rate their training on rare diseases as neutral, ineffective or very ineffective
- 53** Percentage of patients who rated the rare disease knowledge of the physician first seen at symptom onset as poor
- 92** Percentage of physicians who feel it's difficult to address the needs of a rare disease patient in a typical office visit
- 60** Percentage of physicians who said they've received conflicting information about treatment of a patient with a rare disease
- 67** Percentage of patients and caregivers who said they have to educate their health care providers about a rare disease

The Orphan Drug Act, passed in 1983, defined rare diseases as those affecting fewer than 200,000 people in the United States. Fitting that definition are nearly 7,000 different conditions. That presents challenges for medical educators, who know it's not feasible to teach about each one. "The approach that we've taken is we have to teach our students the foundations of critical thinking. How do you think about clinical medicine and go beyond just pattern recognition? When do things not make sense?" said Mark Rosenberg, M.D., the University of Minnesota's vice dean for medical education, at the Rare Disease Day event held on campus February 28. "What that does is help lay the foundations of discovery in these students, so they can start realizing when something doesn't add up."

Sources: Shire. Rare Disease Impact Report: Insights from Patients and the Medical Community, April 2013. Available at: www.shire.com/shireplc/dlibrary/documents/RareDiseaseImpactReportforWeb.pdf. Accessed September 16, 2014. Engel PA, Bagal S, Broback M, Boice N. Physician and patient perceptions regarding physician training in rare disease: the need for stronger educational initiatives for physicians. *J Rare Disorders*. 2013;1(2). Available at: www.journalofrareorders.com/pub/IssuePDFs/Engel.pdf. Accessed September 16, 2014.

Awareness aids orphan drug development

One aspect of getting funding for orphan drug development—convincing funders of the need—is easier than it used to be. At least that's the impression of James Cloyd, Pharm.D., director of the Center for Orphan Drug Research at the University of Minnesota. The cost of doing the requisite basic science, animal studies and phase I, II and III trials hasn't come down and investigators still must compete with those working on treatments for more common conditions. But now there's more awareness of rare diseases than in the past and that's having a positive impact. "Ten years ago, you may not have heard

the phrase 'orphan drug.' Now, even in the popular media, the term shows up," Cloyd says, pointing to recent articles in publications such as the *Wall Street Journal* as evidence.

That awareness is in part because of an international campaign to draw public attention to rare conditions launched in Europe in 2008. Now Rare Disease Day is observed around the world on the last day of February.

For the last three years, the University of Minnesota's College of Pharmacy has organized Minnesota's version of

the event. Last year, Gov. Mark Dayton proclaimed February 28 Rare Disease Day, and the U hosted speakers who addressed improving care of those living with such conditions.

Cloyd says the campaign has increased awareness. "You don't have to start out by stating, 'I think we need to address therapies for rare disorders,'" he says. "There's now an understanding that we should."

PUTTING ALS ON ICE

Local researchers take up a challenge in order to fund work that may have broader implications.

BY KIM KISER

On a warm August afternoon, Ezgi Tiryaki, M.D., did what so many others did over the summer: got doused with a bucket of ice water to raise awareness of amyotrophic lateral sclerosis (ALS), a disease that affects two to four out of every 100,000 people.

Wearing a red T-shirt with the words “ALS Sucks” on it, Tiryaki, who is medical director of Hennepin County Medical Center’s (HCMC) ALS Center for Excellence, was part of a group from the center that answered a challenge issued by the local chapter of the ALS Association. After tipping their buckets and making a donation to the association, they went on to challenge others, including their colleagues at the Minneapolis VA Medical Center, a group from the University of St. Thomas, Minnesota Public Radio’s Cathy Wurzer and the Hennepin Health Systems Foundation Board.

Tiryaki and her colleagues became part of the biggest social media event of the year: the ALS Ice Bucket Challenge. Although it’s uncertain exactly how it began, some credit the friends and family of 29-year-old Pete Frates, a former Boston College baseball star who was diagnosed at age 27 and is now paralyzed by the motor neuron disease (also called Lou Gehrig’s



HCMC’s Ezgi Tiryaki, M.D., takes one for the team during a challenge from the local chapter of the ALS Association.

disease), with making it go viral over the summer.

According to the national ALS Association’s website, the challenge raised more than \$100 million in the month of August alone. “From a dollar perspective, it shattered everyone’s expectations,” says Jennifer Hjelle, executive director for the ALS Association’s Minnesota/North Dakota/South Dakota chapter.

Hjelle says the local office received about 10 online donations in July and

more than 1,500 in August. “We’ve seen a tremendous influx of support,” she says.

Now comes the question of how to use that money. Hjelle says the national organization has convened representatives from the local chapters to help decide. She says support at the local level will help fund programs that loan durable medical equipment and assistive devices to people with the disease. “Both programs have waiting lists,” she says. Hjelle also would like to see more go toward research.



An orphan disease

About 30,000 people in the United States and 350 in Minnesota are living with ALS at any one time. “The number doesn’t change,” Hjelle says, “because every week two people are diagnosed and two people die.”

Because it affects so few people, ALS is considered a rare or “orphan” disease. “Research has been underfunded,” Tiryaki says. So far, only one drug is approved for its treatment, riluzole. Riluzole



Ezgi Tiryaki, M.D.

delays the disease’s progression by about three months, on average.

Tiryaki is involved in the Northeast ALS consortium, which includes researchers from the United States, Ireland and Israel. Faculty from HCMC, the Minneapolis VA Medical Center and the University of Minnesota have joined forces as the Twin Cities ALS Research Group.

“ALS is a disease where people have to work together,” she says. “We can’t compete.”

Local researchers are currently taking part in a trial of Nuedexta, an FDA-approved drug that’s used to treat pseudobulbar affect, pathological laughing and crying that can occur in conjunction with a number of neurological conditions. She says they are testing it to see if it also helps stabilize speech and swallowing function in people with ALS.

They’re also doing imaging trials. “We’re trying to see if we can find a signature of ALS on imaging,” Tiryaki says. Diagnosing ALS is difficult because there is no specific test for it. “One of the theories around ALS is that people lose about 70 to 80 percent of their motor neurons before they have their first symptom. We’re wired in a way that we can make up for losses for a long period of time, so it stays under the radar for quite a while. One of the frustrations is we don’t recognize the disease and start treating it until it’s quite progressed.”

Tiryaki explains that when people do start noticing symptoms, it usually takes about a year for them to be diagnosed, as those symptoms are often first mistaken for other conditions.

Greater good

Tiryaki believes that ALS research could help people with other neurodegenerative diseases including Parkinson’s and Alzheimer’s disease. “What’s happened over the last five to 10 years is that people have started to realize that the last frontier in medicine is keeping dying cells alive.” She says the money raised by the ice bucket challenge could support research into understanding how to preserve—and even reverse—the death of motor neurons and other nerve cells.

“The biggest thing this has done is offer hope,” Hjelle says. “You can’t put a price tag on that.” MM

Kim Kiser is an editor of *Minnesota Medicine*.

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Staying SAFE Overseas

When you volunteer abroad, you often face the unexpected. But there are ways to protect yourself.

BY JEANNE METTNER

News reports about the Ebola virus have been hard to ignore. By late September, we had learned that more than 180 of the 2,800 people who had died from the virus in West Africa were health care workers. The four Americans who had been infected, including two physicians, were evacuated to the United States to receive intensive care under quarantine. All are recovering.

Ebola is the latest threat to physicians doing medical missions overseas. Those who go abroad have always faced health risks ranging from the routine to the exotic.

“The risks that a physician faces are dependent on several variables,” says William Stauffer, M.D., associate professor of medicine and tropical and travel medicine at the University of Minnesota Medical School. “It depends on where you go, how long you go, and what type of infrastructure you have in place when you are providing care.” Infrastructure issues, including poor infection control, are one reason why Ebola, which is transmitted through

human-to-human contact, has been so difficult to contain.

So how can physicians planning medical missions stay safe? What should they beware of, and how can they avoid problems? Here’s some advice from physicians who have confronted the common, the exotic and the unexpected while abroad.

DIARRHEA

Physicians are no different from anyone when it comes to their digestive tracts, so they are at risk for the same intestinal upsets other travelers face. “Of all the things that are liable to get a person sick on a medical mission, traveler’s diarrhea is going to be the most common,” says Brett Hendel-Paterson, M.D., who practices at HealthPartners’ Travel and Tropical Medicine Center in St. Paul and is an assistant professor of medicine at the University of Minnesota. According to the Centers for Disease Control and Prevention, traveler’s diarrhea will affect anywhere from 30 to 70 percent of travelers, depending on their destination.

Although it may be routine, it can cause problems even for the most vigilant. Hendel-Paterson himself can vouch for that. While on a medical mission to Haiti in 2010, he suffered a bout of diarrhea so severe he needed IV fluids.

He says health care providers sometimes joke about the stomach problems they’ve had while providing clinical care in austere or low-resource settings. “But if you are not prepared, you not only become unable to serve patients, you end up being a resource draw because other people need to now take care of you,” he says. “If you are a physician and you become sick to the extent that a member of the medical team has to sit with you ... well, then you are taking two people out just like that.”

He says the best way to prevent traveler’s diarrhea is to drink bottled water and make sure food is prepared safely. If you do get sick, stay as hydrated as possible. And before you go overseas, have a physician prescribe antibiotics you can take with you in the event you do get sick.

TUBERCULOSIS

According to the World Health Organization, about a third of the world's population has been exposed to tuberculosis, a bacterial disease that is spread through droplets in the air. Of those who have active disease, 95 percent live in developing countries. The parts of the world where physicians and other health care workers are at highest risk are Sub-Saharan Africa, Southeast Asia and India.

David Boulware, M.D., M.P.H., associate director of Global Health Programs at the University of Minnesota, has traveled to Uganda every few months for the past decade. Although he has diagnosed tuberculosis countless times in the patients he sees there, he has never contracted the disease himself. He attributes his track record to two common-sense strategies:

1. *Looking at the chest X-ray before examining the patient.* If the X-ray reveals a massive cavitory lung lesion that looks like TB, then he proceeds with the diagnostics—such as GeneXpert testing of

sputum. “If a chest X-ray has already been performed, then the utility of listening to a patient’s lungs is less,” he says.

2. *Examining the patient from behind.* In developing nations, personal protective equipment (eg, masks) can be at a premium. If such equipment is not readily available, additional precautions are necessary. “Oftentimes, when doing a lung exam, a standard instruction to ‘Breathe deeply’ will make the patient start coughing,” he says. “When I listen to a patient’s lungs, I stand behind the patient to listen, so that when the patient does start coughing, it’s not directly in my face.”

MOSQUITOS (AND THE DISEASES THEY CARRY)

When pediatric emergency medicine physician Jennifer Halverson, M.D., traveled to Haiti at the end of April, she knew that the mosquito-borne illness chikungunya was inching its way toward the country, but she wasn’t prepared for how quickly

COURTESY OF JENNIFER HALVERSON



Jennifer Halverson, M.D., who contracted chikungunya during a recent mission to Haiti, advises colleagues to “be vigilant with the insect repellent.”

it would arrive and the extent to which it would take hold.

Two days after her arrival, patients at the Port-au-Prince clinic where she volunteered began presenting with characteristic symptoms of the disease. Then two weeks

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PREPARE FOR THE WORST

later, Halverson herself awoke at 3 a.m. with the same symptoms: fever; excruciating shoulder, hip and knee pain; mouth sores; nausea; rash; enlarged lymph nodes. On May 19, when she was finally well enough to take a commercial flight back to Minnesota, blood work confirmed her well-educated suspicion: she had chikungunya.

"I had read a lot about chikungunya because I knew I would see it in Haiti eventually, but didn't think I would become infected with it so soon after it showed up in country, which in retrospect was a pretty naïve thought," recalls Halverson, who has been volunteering in Haiti since the late 1990s and has spent a total of about two years living in the country since then. "The official case count in Haiti of 50,000 is the worst underestimate I have ever encountered. Of all the people I know who live there, only a handful don't have it. It's just exploded," she says.

Chikungunya is just one illness transmitted by mosquitoes. Malaria and dengue are others that are common to the places medical missions take physicians.

To reduce the risk of mosquito-borne illnesses, Boulware advises his traveling colleagues to do what the U.S. Army does: Spray your clothes with permethrin or purchase permethrin-impregnated clothing at a local sporting goods store. Permethrin-treated bed nets are also available.

He also recommends using a DEET-containing insect repellent on exposed skin and reapplying it every four hours. According to results of a field trial conducted in Alaska published in *Annals of Internal Medicine* in 1998, people wearing permethrin-treated clothing along with an insect repellent containing 35 percent DEET had a 99.9 percent protection rate against mosquitoes. Halverson admits she might have avoided chikungunya had she been better about using repellent. "I was not good at applying it. It felt sticky, and the dirt would cling to my skin when I had it on. Now, I tell my colleagues who are going to go to Haiti, 'Be vigilant with the insect repellent.'"

ACCIDENTS AND INJURIES

Being in a serious car accident while overseas is much more likely than contracting

The physicians interviewed for this story offered two final pieces of advice:

Get pre-travel care. Physicians are notoriously bad when it comes to getting travel medicine care before taking a trip overseas, says William Stauffer, M.D., of the University of Minnesota's Division of Infectious Disease and International Medicine. But like anyone traveling to a resource-poor area, they need the recommended vaccines, stand-by treatment for diarrhea, malaria chemoprophylaxis (anyone going to work in an area now affected by Ebola needs this, as those places are malaria endemic) and other location-specific advice (such as for altitude or HIV exposure).

Purchase a travel insurance policy that covers medical

evacuation. Most large corporations and academic institutions sponsoring a medical mission trip will provide medical evacuation insurance for their employees (or require that it be purchased), but smaller agencies may not.

If the University of Minnesota's Brett Hendel-Paterson, M.D., who developed severe hemolytic anemia while working in Thailand, hadn't had it, he would have had to pay \$100,000 out-of-pocket and up front to be airlifted home. "It covered my hospitalization and my evacuation home," he says. "I can't say enough about how important it was in my case."—J.M.

a serious illness. According to the Centers for Disease Control and Prevention, injuries cause 23 percent of the deaths that occur among U.S. citizens traveling abroad, whereas infectious diseases account for only 2 percent.

"There are things that people do abroad that they wouldn't do in the United States—they may hop on a motorcycle taxi, ride around in a car without a seatbelt," Boulware says. "And some things are just riskier there than here—like traveling at night." (The lack of center lines and seat belts, poor-quality roads and cars without headlights present the perfect storm for an accident.)

PRE-EXISTING CONDITIONS

Among people 50 years of age and older, the biggest concern is complications from conditions they already have such as heart disease or diabetes. "Travel is inherently stressful; you don't want to necessarily forego travel just because of these pre-existing conditions, but you should be managing those conditions, and you should make sure you are in reasonable shape before you travel," Boulware says.

Hendel-Paterson, who was diagnosed with chronic lymphocytic leukemia in June 2013, traveled to Thailand this past July to teach a 10-day tropical medicine course. He and his family planned to spend another two weeks traveling throughout the country. But within days

of finishing teaching, he developed severe hemolytic anemia. He was hospitalized in northern Thailand for two weeks before being medically evacuated back to the United States. "I was actually flown home via air ambulance accompanied by a doctor and a nurse part way, and the rest of the way on a commercial flight accompanied by a doctor," he says.

Hendel-Paterson is back to work but still recovering from his illness. "It's true that there are certain diseases that we can acquire while working abroad as physicians. But really, it is far more common for someone to get ill from what they are bringing with them," he says. "For me, that was a complication of a cancer that I already knew about, even though it was stable when I left."

Halverson is also back home. She continues to experience joint pain in her upper body, but she knows it could be much worse. "In Haiti, you have whole populations who cannot afford to lose a week's worth of income because they need to eat, and most of them have had chikungunya, so they are walking around pushing carts, walking over bumpy roads, carrying five-gallon buckets of water on their head, doing manual labor every day while they have all this chronic pain," she says. "When I have bad days, I think of them." MM

Jeanne Mettner is a frequent contributor to *Minnesota Medicine*.



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Focused interests

What motivates doctors to specialize in diseases that affect only a few?

BY CARMEN PEOTA

Margaret MacMillan, M.D., thought she'd be in Minnesota for only a few months when she arrived in 1997. Having completed a fellowship in hematology-oncology/bone marrow transplantation at the Hospital for Sick Children in Toronto, she simply wanted to do another six-month fellowship at the University of Minnesota. "I had no intention of staying," she says. "I knew no one. I just drove my car, loaded with my big old-fashioned computer and my bike," she says, "and one thing led to another and 17 years have passed."

One of those things was taking care of patients who had Fanconi anemia. John Wagner, M.D., now division director of the University of Minnesota's Pediatric Bone Marrow Transplant Program, was performing transplants in children who had the inherited disorder; but in those days,

three out of four patients didn't leave the hospital alive following the procedure.

MacMillan saw both a tremendous need and a challenge. To her, the children were dying because physicians like herself weren't doing a good enough job. "The need was there for somebody else to be interested," she says. "I couldn't turn my back on them; they so desperately needed help."

MacMillan is one of the rare physicians who specialize in rare diseases, defined in the United States as conditions that affect fewer than 200,000 people. According to the National Institutes of Health's Office of Rare Diseases Research, 6,800 rare diseases affect nearly 30 million people in this country. Physicians who develop expertise in one often join a small group who share their interest, and they're sought out by patients coming from near and far. MacMillan's come from all parts of the world.

Meeting a need

Fanconi anemia affects one in 150,000 people. Those who have the disorder are unable to repair DNA well. Thus, it manifests in a host of ways including congenital abnormalities such as missing limbs and defects in organs, heart and gastrointestinal problems, diabetes and even deafness. People who have the disorder also have a high risk of head and neck, gynecological and skin cancers. Eventually, they develop bone marrow failure, which leads them to MacMillan and her colleagues. The average age at which their patients undergo transplantation is 9 years, but MacMillan says they've done transplants in babies and adults as well.

Although bone marrow transplantation cures the hematological manifestations of Fanconi anemia, the procedure is risky for several reasons. Among them, people with the disease can tolerate only small doses (about a fifth of what others can) of the chemotherapy and radiation given prior to transplant. And their siblings may also have the disorder, making it more difficult for them to find a suitable donor.

About 15 years ago, MacMillan and other researchers at the university concluded that if they were going to improve upon the way they and others were doing bone marrow transplantation for Fanconi anemia patients, they needed to be ex-

tremely systematic and learn from every patient. Each year, the university performs transplants in 10 to 12 patients with Fanconi anemia, which is more than are done in all other U.S. hospitals combined. About 200 patients are followed in the U's Fanconi Anemia Comprehensive Care Clinic.

Over the years, MacMillan and Wagner have inched forward in their understanding of how to do bone marrow transplants in patients with Fanconi anemia. "The first step was, we wanted the transplant to take and grow," MacMillan says. "We just added one drug." When it was shown Fanconi patients could tolerate fludarabine and that it allowed the grafts to grow, they worked on a way to prevent graft vs. host disease, a potential lethal transplant complication, by manipulating the donor cells before giving them to the patients. Because of their work, survival rates five years after transplant are up from 25 percent to greater than 90 percent.

For MacMillan, staying focused on Fanconi anemia hasn't been difficult. "Scientifically, it's a very fascinating disease," she says, adding that that's a good thing because it's of interest to other scientists. Most recently, it attracted the attention of researchers working on breast cancer. About a dozen years ago, it was discovered that some patients with Fanconi anemia have two copies of the BRCA2 gene. "Now all of a sudden the breast cancer community is fascinated with Fanconi anemia," she says.

MacMillan notes that discoveries made while studying a rare disease often have applications for other branches of medicine, and that's been true of Fanconi anemia research. The first successful cord blood transplant was performed in a Fanconi patient, and fludarabine is now routinely given to anyone needing reduced-intensity preparation for bone marrow transplantation.



Margaret MacMillan, M.D.

Part of what keeps her interested in Fanconi anemia research is that new questions continue to arise. For example, because of increased survival, they're now asking, What are the long-term side effects of a transplant? and How can they make bone marrow transplantation less difficult for patients? "Truly, until 100 percent of the kids are cured, almost without effort, my job isn't done," she says.

A mentor's gift

Like MacMillan, Mayo Clinic nephrologist Dawn Milliner, M.D., stumbled onto rather than sought out her interest in a rare disease. When Milliner started at Mayo nearly 30 years ago, her office was next to that of Lynwood Smith, M.D.,

whom she describes as "legendary" among kidney stone physicians and who had an interest in hyperoxalurias. As she tells it, he kept coming over and telling her about interesting patients. "He'd say, 'What do you think we should do about this? What's causing this problem?' So I started seeing the patients with him," she says. "After his retirement, he transferred all those patients to me, and the program just grew."

Today, Milliner directs Mayo Clinic's Hyperoxaluria Center and the Rare Kidney Stone Consortium. Although she sees patients with all kinds of kidney disorders, she's especially known for her work in primary hyperoxaluria. "There's hardly a week that goes by that I don't see a few patients with this disease, and it's a rare disease," she says, adding that they receive inquiries daily from patients, family members and physicians from all over the world.

Hyperoxaluria is a condition in which there's a high concentration of oxalate in the urine. It can be caused by multiple factors. Primary hyperoxalurias (there are three types) are caused by mutations

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in the genes that encode for specific liver enzymes. When the activity of one of these enzymes is deficient, the liver overproduces oxalate, and urinary concentrations can be as much as eight times higher than normal. Kidney stones are often the first clue that a patient has the disease. Untreated, hyperoxaluria can lead to kidney failure and deposition of oxalate in other organs. The incidence of type 1 primary hyperoxaluria is estimated at 1 to 3 per million people. Types 2 and 3 are even less common.

Milliner says part of her fascination with primary hyperoxaluria is that its effects are seen in people of all ages and are variable. The disease can become very severe in



Dawn Milliner, M.D.

infancy, or it may not cause serious problems until a person is well into adulthood. And it's challenging to treat. By the time people get to the point of needing dialysis, they have multi-system disease. "It's the heart, the eyes, the bones. Many organs can be involved," she says, adding that managing the life cycle of the disease calls on every skill she has as a physician.

"When it presents in its severe form, it's devastating to the individual involved," Milliner says, "or at least it has been historically."

She has had a hand in altering that history. "What we've learned over the years is that we can do much better," she says. Patients do better if they are diagnosed and treated early. If they still have good kidney

function, they can be put on a treatment program to prevent formation of kidney stones and help preserve that function. If a patient is in kidney failure, he or she can be put on an intensive dialysis program and receive a transplant before serious complications develop.

Although Milliner plans to continue to do research on and see patients with primary hyperoxaluria, she sees her role shifting. She says at this stage in her career, she considers it her responsibility to engage younger physicians and scientists in the work. To them, she'd say there's really one reason to devote a career to a rare disease: "By learning about it, you can do so much more to help patients. That's really what's driven my interest in a focused area. It's that ability to make a difference for someone whose disease is poorly understood."

Intentional choice

Unlike Milliner and MacMillan, pediatric neurologist Timothy Feyma, M.D., was intentional about developing expertise in a

Rare funding challenges

In a world where funding for medical research is tight, dollars for research into diseases that affect only a few people are even harder to come by. Thus, researchers interested in rare diseases often find themselves working with patients' families and advocacy organizations to secure support.

"I can't say enough about the importance of patient advocacy organizations," says Dawn Milliner, M.D., a Mayo Clinic nephrologist who's specialized in a set of rare kidney diseases that include primary hyperoxaluria. In her case, the New York-based Oxalosis and Hyperoxaluria Foundation enabled her to establish the Mayo Clinic Hyperoxaluria Center and start a patient registry. With those in place, she and her colleagues have been able to secure National Institutes of Health (NIH) funding to establish a Rare Kidney Stone Consortium for the study of primary hyperoxaluria and three other rare kidney diseases.

Milliner says for many years, research funding, including most NIH grants, was directed toward common health concerns such as heart disease and cancer. About a decade ago, that began to change, and the NIH formed the Rare Disease Clinical Research Network, which funded 17 consortia, including the Rare Kidney Stone Consortium, which Milliner directs.

The University of Minnesota's Margaret MacMillan, M.D., says it's still very difficult to get funding for research into rare diseases. "The NIH asks, How many people will this impact?" she says. "Even when you try to show that

what we've learned has an effect on hundreds of thousands of people, they often look at, What's your disease population?" And she points out that even though the NIH does some funding of research into rare diseases, there's a lot of competition for those dollars.

For those reasons, she's especially grateful for the support of the Kidz1stFund. Three years ago, during a four-hour initial consult about their son who has Fanconi anemia, Florida State University football coach Jimbo Fisher and his wife, Candi, proposed starting the fund. They've since raised and given more than \$2 million to the University of Minnesota. "They realized time is not on their side because their son will need a transplant in the next few years and research is going to give him a better opportunity than he has now." — C.P.



rare disease. While he was a neurology fellow at Seattle Children's Hospital about five years ago, he realized the idea of having a discreet population of patients and an area of expertise appealed to him.

So when he learned that a position that involved working in the Rett Syndrome Clinic at Gillette Children's Specialty Healthcare in St. Paul was open, he was intrigued, although he had encountered only two Rett patients at that point in his career. "I actually sought out the opportunity because it seemed like such a rare opportunity," he says.

Rett syndrome is a neurodevelopmental disorder that affects one in 10,000 people, almost exclusively girls, who develop normally until about 15 months of age, when



Timothy Feyma, M.D.

they can begin to have difficulties. Eventually, those difficulties may include problems with walking and talking, seizures, sleep problems and learning disabilities. It is believed to be caused by a spontaneous, rather than inherited, genetic mutation.

Because of Rett patients' many needs, Gillette offers access to

a team of specialists in a monthly clinic, headed by Feyma and pediatrician Art Beisang, M.D. Together, they follow more than 100 patients who come from Minnesota and other Midwestern states. Each month, they see about four or five, each of whom may present with a long list of problems.

In addition to seeing patients, Feyma has collaborated with University of Min-

nesota researchers to investigate a gaze-controlled communication device and with University of Alabama and Baylor researchers on a trial of a drug to promote neurogenesis. "We hooked our dingy onto their main boat," he says, noting that Alabama has been involved in Rett research for 40 years. "I thought, you need study subjects, we've got 30 to 40 girls to work with up here."

Feyma's own research interests are more clinical and fundamental. "We don't have baseline data on what Rett girls' sleep is like, what are normal Rett girls' abilities, are these girls in pain," he says. "We're trying to document some very basic data."

Feyma says the families of his patients motivate him to continue his work. Yet he knows others scratch their heads when they learn he's focusing on this disease. "A lot of people say, 'How can you do that? It's so depressing.' ... I think it would be more tragic if I let these girls flounder." MM

Carmen Peota is an editor of *Minnesota Medicine*.

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sleuths BEHIND THE scenes

FOR PATHOLOGISTS,
THE UNUSUAL IS THE USUAL.

BY HOWARD BELL

Jennifer Boland's path to pathology began during her second year of medical school at Washington University in St. Louis. Boland would take study breaks by looking at specimen slides and images, learning to identify them. "Pathology is a visual science. I found it more enjoyable than memorizing notes," she recalls. After a surgical pathology elective during her clinical rotations, she was hooked.

"In medicine it can be hard to find the field you love," says Boland, who is now a pathologist at Mayo Clinic. "I was lucky enough to find it."

Boland began practicing at Mayo three years ago, after completing a pathology residency as well as pulmonary and surgical pathology fellowships there. She specializes in pulmonary and bone and soft-tissue pathology. Her particular expertise is in lung and chest sarcomas. "They're a rare and interesting set of tumors," she says. "Very few are diagnosed in this country each year."

Like many Mayo pathologists, she spends about half her time evaluating specimens from around the world for Mayo Medical Laboratories and the other half evaluating specimens from Mayo patients. Depending on case complexity, she evaluates around 25 to 50 specimens each day. "I like the mystery-solving of pathology," she says.

Boland is one of 332 pathologists who practice in Minnesota, according to the Minnesota Board of Medical Practice.

Often thought of as either white-coated geeks hunched over microscopes or sexy swashbucklers who spend more time solving crimes than analyzing specimens (thanks to TV), pathologists





are sleuths working behind the scenes to diagnose both the common and the uncommon.

“Every case is a question—What is it? And what are the questions I must ask myself to arrive at the correct diagnosis?” Boland says. “We’re in the unique position of combining what we learn in the lab with what’s learned in the clinic and in radiology to arrive at a diagnosis. Pathology is really a foundation of medicine.”

An underexposed field

Pathology isn’t an area medical students get much exposure to during clinical rotations. Although most medical schools require a classroom-based pathology course, medical students need to go out of their way to get clinical practice in pathol-

ogy, Boland says, adding that many don’t because they went into medicine to treat people, not to work in a laboratory.

The field has two major branches—anatomic and clinical. Anatomic pathology is further divided into forensic pathology, cytopathology and surgical pathology. Clinical pathologists evaluate lymph, blood and urine. They also do toxicology studies, infectious disease tests, and blood banking and transfusion.

Pathologists complete a three-year residency if they want to become board-certified in either anatomic pathology or clinical pathology. They do a four-year residency if they want to be double-boarded, which many are. Many pathologists also complete one or more subspecialty fellowships, which usually take one year (two

years for neuropathology). Forensic pathology, for example, requires a four-year residency plus a one-year fellowship.

The American Board of Pathology issues board certifications in anatomic and clinical pathology and subspecialty certifications in blood banking/transfusion medicine, chemical pathology, clinical informatics, cytopathology, hematology, dermatopathology, forensic pathology, medical microbiology, neuropathology, pediatric pathology and molecular genetic pathology. Nonboarded subspecialties in anatomic pathology include pulmonary, gastrointestinal, gynecologic, genitourinary, cardiac, bone and soft tissue, head and neck, infectious disease and general surgical.



Laboratory FOR THE World

Two years ago, Gary Keeney, M.D., an anatomic pathology consultant for Mayo Medical Laboratories, identified an immature teratoma in the thyroid gland of a pediatric patient. These usually occur in the ovaries. “I didn’t even know they could occur as a primary tumor in a thyroid,” he says. “This was a once-in-a-lifetime case.”

Then three months later, he saw another one just like it. “The more curve balls you see, the better you get at hitting them,” he says of such rare cases.

At Mayo Medical Laboratories (MML), which evaluates 20 million specimens a year from all over the world, the rare isn’t rare. “Things other labs may see once in a lifetime we see over and over,” says Keeney, who also chairs Mayo’s anatomic pathology department.

Mayo Clinic established MML in 1971 to provide pathology services to Rochester-area hospitals and clinics. Today, it provides services to 4,000 medical centers in 64 countries as well, performing 20 million tests each year at 64 subspecialty laboratories housed on the Mayo campus.

Most clients use MML for esoteric tests or tests for which they don’t have the equipment or expertise or that aren’t economical for them to perform. “They send us the testing that can’t be done at a community medical center laboratory,” says Andrew Tofilon, MML’s marketing administrator. Examples include next-generation sequencing for hereditary conditions, identifying viral DNA signatures and detecting molecular markers for rapid diagnosis of cancers and infections. MML also provides pathology consults and microbiology testing.

Mayo’s is the only pathology lab in the country that has a freezing microtome. This instrument freezes tissue faster and at a colder temperature than a cryostat. “It allows us to get reliable sections on tissues that are very difficult to section with a cryostat,” Keeney says. “One example is fatty breast tissue. Our breast tissue margins are analyzed while the patient is still on the operating table.”

According to Keeney’s analysis, Mayo Clinic returns 2 percent of breast lumpectomy patients for a second surgery for positive margins. The national average is 18 percent. “Freezing microtome is expensive and labor-intensive,” he says. “But in the end, you’re saving money—and it’s better for the patient.” —H.B.

In Minnesota, Mayo Clinic and the University of Minnesota have residency and fellowship programs. The University of Minnesota currently has 17 pathology residents and 12 fellows. Mayo has 20 residents and 20 fellows.

When tissue is the issue

Most pathologists who practice either clinical or anatomic pathology work in large academic health centers or large group practices where there is greater opportunity to specialize. Pathologists at community hospitals, clinics and small group practices are more likely to generalize and practice both. Most forensic pathologists work as medical examiners.

Mayo Clinic, home to the largest clinical lab in the state, Mayo Medical Laboratories, employs anatomic and clinical pathologists who can handle a wide range of cases (see “Laboratory for the World”). Most subspecialize in a specific area, for example, bone and soft tissue, endocrine, lung, neuro-oncology or skin cancer.

As director of the University of Minnesota’s anatomic pathology department, Jon Ritter, M.D., evaluates 20 to 30 specimens a day. He works with seven other anatomic pathologists who primarily evaluate biopsies and resections and take turns doing autopsies, as well as about 20 clinical pathologists who work in clinical chemistry, hematopathology, microbiology, blood bank, cytogenetics and molecular pathology.

He says he feels especially good when he can prevent unneeded treatment. That recently happened with a laryngeal biopsy that was initially thought to be a high-grade tumor but turned out to be benign. “We had the patient all queued up for surgery or chemotherapy because everyone was convinced there was malignancy, but there wasn’t,” he says.

In another such case, a woman thought to have a lung tumor and told she had one year to live turned out to have benign inflammatory changes in her lung. “Five

years later,” Ritter says, “she was playing 18 holes of golf and carrying her bag.”

Sometimes, he says, clinical findings alone aren’t enough to determine cause of death, which is why it took an autopsy to determine why a deceased young man had unusual infiltrates in his lungs. “He’d injected ground up oxycontin that obstructed the vessels in his lungs. Sometimes there’s no substitute for putting organs in hand and having a look.”

“

A lot of clinicians think telling us what they know about the patient biases our opinion. Nothing could be further from the truth. —STEVEN EASTEP, M.D.

Steven Eastep, M.D., an anatomic and clinical pathologist and medical director for St. Luke’s Hospital and Clinics in Duluth, most appreciates the service aspect of what he does. “I like working in the background providing the crucial information clinicians need to properly care for their patients.” He says that in addition to the truly unusual cases, the ones he remembers most are the ones where his diagnosis made a difference in a patient’s life and outcome. “We make life-changing decisions that determine whether a patient gets radical surgery, chemotherapy or radiation therapy.”

Sometimes those decisions are straightforward, but just as often, they’re complicated. “You put yourself through various mental gymnastics,” he says. When he or his three partners encounter a difficult case, they often gather around a multi-

headed microscope. “Pathology is a process of internal and external peer review and continuing education,” he explains.

Eastep says one of the most important principles in practicing pathology is to make sure your diagnosis fits with what’s going on with the patient clinically. For example, grading lymphomas is often difficult and the criteria are not perfect. “When you are making decisions about the type and grade of a lymphoma, it’s vital to know

if the patient has bulky disease and constitutional symptoms or is asymptomatic,” he says. Eastep recalls how during his fellowship, one of his mentors at Stanford University wouldn’t look at a consult case until he had all the relevant clinical information about the patient along with the slides.

He tells referring physicians to share what they know about the patient and their differential diagnosis with him and his team. “A lot of clinicians think telling us what they know about the patient biases our opinion. Nothing could be further from the truth. ... Clinical information is vital to helping us rule things out, narrow things down and make the best possible diagnosis.”



For example, knowing whether soft tissue from a biopsy is superficial or deep is critical. If the tumor is superficial, it may be atypical fibroxanthoma, which is likely to be benign. If it is deep, it may be malignant fibrous histiocytoma. The two look the same under the microscope. “The same is true with an atypical fatty tumor. If it’s present in the retro-peritoneum, it can eventually kill you. If it’s superficial, it’s predicted to be benign,” Eastep says.

Learning from the dead to help the living

As chief medical examiner for Midwest Medical Examiners in Anoka County, Angelique Quinn Strobl, M.D., serves 15 counties in Minnesota. “We do about 600 autopsies per year, and fewer than 20 of those are homicides.”

Autopsies are legally required in an unexpected death involving fire because fire can conceal gunshot wounds, stabbings or other contributing factors. Otherwise, it’s up to Strobl and her colleagues to decide whether to do one for such things as motor vehicle accidents, drug overdoses or sudden infant deaths.

She says most of the mysteries forensic pathologists help solve involve people who died unexpectedly of natural causes. And it’s those unexpected natural deaths Strobl finds most interesting—the heart attack that fells a healthy 20-something marathon runner or the colloid cyst in the brain’s third ventricle that suddenly kills a young child.

She says what she learns from the dead can help the living if the autopsy reveals an inheritable cause of death, such as the undiagnosed hypertrophic cardiomyopathy she found that recently killed a 45-year-old man, or the severe atherosclerosis she discovered in a very young man. “I encourage the families to talk to their doctor about monitoring their own health and making lifestyle changes to reduce their risks,” she says.

A changing profession

Since starting his career 25 years ago, Stephen Bologna, M.D., one of seven pathologists at St. Cloud Pathologists, an independent group that primarily serves CentraCare’s clinics and hospital, has watched his field go through considerable changes.

One was the move to the electronic medical record. At first, he says, “the EMR was of little help and was a fairly huge nuisance.” Now, he considers it invaluable. He says they often use it to look up results from an earlier biopsy to compare with the current material they are viewing (often a larger surgical specimen).

Advances in molecular testing technology have enabled more precise identification of tumor types and bacterial organisms. Improved immunohistochemical staining techniques help distinguish between tumors that appear histologically similar; they also can be used to direct treatment. “As drugs become more targeted, our analysis must become more targeted in order to determine whether a particular drug will be effective for a patient,” Bologna says.

One negative change has been the growing number of checklists and the coding requirements necessary to complete a pathology report. “Checklists have had a positive effect on quality,” he says, “but they’re growing increasingly long and at times are burdensome.” Coding requirements are about to become more complex with ICD-10, as it will require even more specificity.

Another change has been the hit to compensation. Pathologists were once among the highest paid specialties, according to Ritter. Changes in billing practices in the 1970s and the start of diagnostic-related groups (DRGs) in the early 1980s reduced their compensation (they did so for other specialties as well). Today, pathologists in the United States earn on average \$239,000, according to Medscape’s 2013 compensation report.

Ritter says uncertainty over compensation and the role of pathologists in the world of accountable care organizations may have contributed to a recent decrease

in applications to pathology residency programs.

A needed field in need

Ritter notes that as labs offer increasingly sophisticated tests, primary care physicians will need to rely on pathologists more than ever to treat patients appropriately. In addition, many of the quality measures for health care outcomes are based partially or entirely on laboratory diagnostic testing. But a report on the state of the pathologist workforce in the United States published in the December 2013 *Archives of Pathology Lab Medicine* projects a shortage in the near future. As of 2010, there were approximately 18,000 practicing pathologists in the United States (5.7 per 100,000 population). The authors of the study projected that only 14,000 full-time pathologists (3.7 per 100,000) will be practicing by 2030, even though 20,000 will be needed. They also noted that starting in 2015, the number of pathologists retiring will increase precipitously, and they argue that the Council on Graduate Medical Education needs to make pathology a high-priority specialty by increasing the number of residency positions as well as funding for those positions.

“Pathologists drive medicine’s engine to do the right thing at the right time by providing a complete, accurate diagnosis that helps determine the right treatment and even if treatment is necessary,” Ritter says. “People get sick. Lab testing helps make the diagnosis, and we’re the people who know how to do that.” ■■■

Howard Bell is a medical writer and frequent contributor to *Minnesota Medicine*.

MY MOST MEMORABLE CASES

**Stephen Bologna, M.D.**

Although Stephen Bologna, M.D., has been a pathologist for 25 years, he still sees surprising, unusual, even confounding cases daily. As one of seven pathologists at St. Cloud Pathologists, he says tumors, especially brain tumors and lymphomas, can be

difficult to diagnose. So can unusual fungal infections that may mimic tumors. "Most pathologists come out of training with a pretty good-sized ego that quickly shrinks," he says. "You can't get a fat head in our work."

Bologna recalls a couple of once-in-a-lifetime cases—one of choriocarcinoma, a rare quick-growing uterine cancer that usually develops during or shortly after pregnancy; and another involving a type of mastocytosis more commonly found in dogs.

Another one that challenged the pathologists at St. Cloud Hospital involved two dozen patients who developed unexplained septicemia with fever, chills and shaking while recovering from surgery. *Ochrobactrum anthropi*, a bacteria commonly found in the environment, was found in the patients' bloodstreams. Staff checked every possible source for the bacteria, but found nothing.

They consulted with experts from the CDC who suggested the possibility of drug diversion. It turned out that all of the patients who tested positive for the organism had received IV hydromorphone. Unopened IV bags were found to be sterile. Bags that had been used were contaminated. A surgical unit nurse eventually admitted to siphoning hydromorphone from IV bags and injecting contaminated saline into them to make it appear nothing had been removed.

**Steven Eastep, M.D.**

When Steven Eastep, M.D., was a surgical pathology fellow at Stanford University 20 years ago, his mentor, Ronald Dorfman, M.D., told him he would rarely see Hodgkins lymphoma during his career. That hasn't been the

case. Eastep, who works at St. Luke's Hospital in Duluth, says he's diagnosed most of the variants of this lymphoma many times. "We see rare cases all the time," he explains.

Eastep recalls a case of follicular dendritic cell sarcoma, a rare lymph node tumor that he's seen only once since his fellowship. And he's identified two cases of rare sinus histiocytosis with massive lymphadenopathy, otherwise known as Rosai-Dorfman disease, named after his mentor and Juan Rosai, M.D., former head of the University of Minnesota surgical pathology department. One of those cases included extranodal skin presentation, which Eastep says "is a rarity within a rarity."

**Jon Ritter, M.D.**

Jon Ritter, M.D., director of the University of Minnesota's anatomical pathology department, recalls his most unusual case. It involved an older patient who'd had a thymoma removed and four years later developed lung infiltrates that Ritter and his colleagues determined to be a benign inflammatory condition.

"The surgeon didn't believe us and took out the right lower lobe of the lung, which I examined and determined there was *Pneumocystis* pneumonia, which generally occurs in patients with AIDS or some other immunodeficiency. The infectious disease team came by and told me I was crazy because his HIV test was negative, and he wasn't on immunosuppressants."

Ritter suggested it was Good syndrome, an immunodeficiency in patients with thymoma or who have had thymoma. Additional testing showed a CD4 count that was almost zero, which confirmed Ritter's diagnosis.

**Jennifer Boland, M.D.**

A case doesn't have to be exotic to be memorable. Mayo Clinic's Jennifer Boland, M.D., recalls two such instances when she diagnosed an invasive fungal infection based on frozen section examination of tissue. Both patients were being treated for lymphoma and, therefore, had suppressed immune systems.

One patient had a facial/orbital lesion that was thought to be related to the lymphoma. The other had a segment of bowel resected, which was thought to be ischemic from vascular insufficiency.

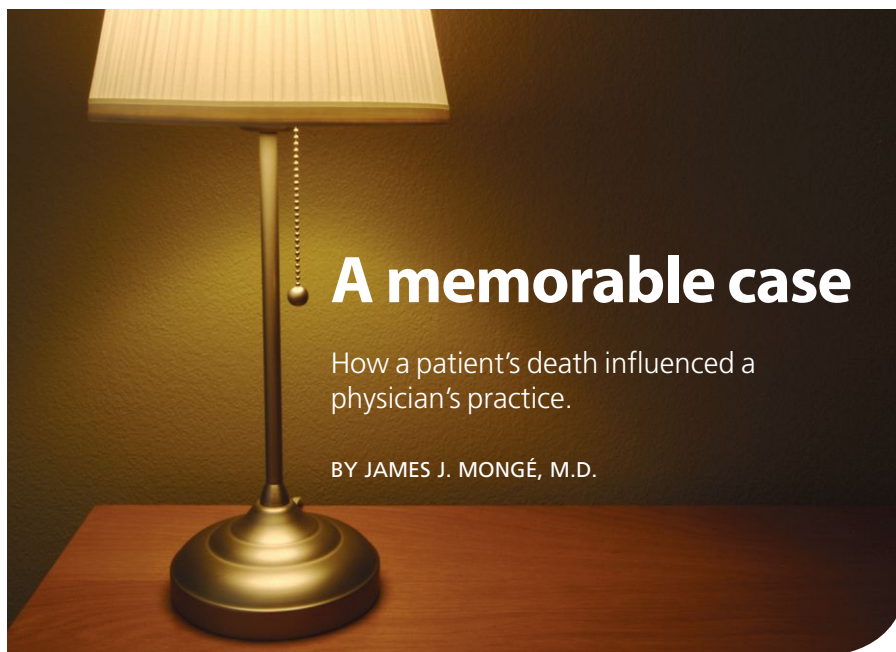
"Invasive fungal infections typically occur in patients with suppressed immune systems," she says. "They're hard to treat, progress rapidly, and are often deadly—so time is of the essence."

Frozen section evaluation allowed both patients to start therapy at least a day earlier than would have been possible if such analysis had not been available. "What's memorable is the 'jaw drop' reaction you get when you deliver an unexpected diagnosis and you know you've made an immediate and positive impact on patient care."

**Angelique Quinn Strobl, M.D.**

A case that is memorable to forensic pathologist Angelique Quinn Strobl is one that occurred early in her career. A young man contacted her office to review the autopsy report on his brother, who died unexpectedly in his 20s while on a family vacation. The autopsy revealed no cause for his death.

"I reviewed the findings and could find little that the original pathologist did not," she says. So she referred the man to a genetic arrhythmia center. A year later, he called Strobl to tell her that the center found a genetic mutation that predisposes him to a lethal cardiac arrhythmia—likely what killed his brother. "He had a defibrillator placed, and he became my one life saved."



A memorable case

How a patient's death influenced a physician's practice.

BY JAMES J. MONGÉ, M.D.

The green glow from the desk lamp dimly lit the hospital corridor and outlined the student's features. He appeared uncharacteristically pensive and subdued that afternoon. Through the window, he noted the early December snow falling softly, the holiday lights and the bright glow of the city center to the south. He took a deep breath and completed his progress note, which was not optimistic.

The patient had been admitted more than a week ago. She was young and cheerful and appeared deceptively healthy. She was in the hospital because her blood pressure was rising because of chronic nephritis. She was pleasant and intelligent; taking her history had been easy. During visits with her, he learned she attended the university on the other side of the city, his alma mater.

Since she felt well, there was time to talk of other things, books and courses, experiences and plans. His conversations with her were a respite from those he had with his older and more acutely ill patients. Under different circumstances he might have asked her out—there was less than three years' difference in their ages.

It was the mid-1950s, and medical and technical advances were on the horizon. Trials of new medications were taking place. A promising new drug for hypertension had just become available. The resident on the service was excited about it. "It

may well be the first effective medicine for high blood pressure," he said.

The student, thinking about the girl, asked, "If, because of nephritis, the blood pressure is elevated to maintain circulation through the renal glomeruli, what will happen to the filtration rate?"

The resident, most likely tired, was irritable. Why, with the blood pressure so high and needing to be controlled, question trying something new?

The girl was given the medication, which caused a prompt and amazing drop in her blood pressure. However, over the next 24 hours, her urine output fell, only to finally cease altogether. The medicine was stopped, and her blood pressure was allowed to rise. But a week later, she still was not producing urine. The student's visits became shorter and quieter, the patient was more withdrawn and reticent each day. All were expecting her kidney function to resume. There was nothing else they could do.

The student closed the chart. Thinking about the case troubled him. He was usually not disturbed by encounters with elderly ill patients. But this one was so young. He rose and looked out the window, past the decorated trees and toward the downtown. A half-formed prayer crossed his mind (it was the holiday sea-

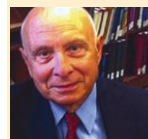
son after all). He left the hospital. When he returned several days later, he found that the young woman had died. He felt confused and regretful. Her talent and education were wasted, her plans never to be achieved. Where was the good in all this? he asked himself. Finally, he told himself it was best to just forget.

Years later, a return to the medical campus had him reminiscing. He had gone on to residency, teaching and a busy practice. Newer antihypertensive drugs had been developed, and dialysis and transplantation were available. On occasion, while doing a vascular access, he would think of the young woman. He would always think of her as young.

Some good had come of this patient's death. The memory of caring for her had affected him. It had made him cautious about trying new medications and techniques. It had tempered and restrained him, taught him to be more careful, more thoughtful, more caring. Along with remembering the many good outcomes, he also remembered the unhappy ones. He tried to learn from them, to measure and judge the risks.

No, he had not been able to forget the girl. MM

2014 Writing Contest HONORABLE MENTION



James Mongé is a retired general surgeon from Duluth.

On what inspired this piece:

I wanted to express my long-standing feelings regarding this case and the patient and how it influenced my practice over the years.

I hope the story encourages young physicians to consider, empathetically, their complex patients and their patients to come—how to best care for them, to better judge and thoughtfully employ new medications and procedures.



On Friday morning, members from the MMA, Minnesota Hospital Association and LeadingAge Minnesota gathered to hear ABC News analyst John Nance discuss patient-centric care.

A NEW DIRECTION:

MMA debuts new Annual Conference

PHOTOGRAPHY BY KATHRYN FORSS

More than 140 physicians gathered in Brainerd in September to attend the MMA's reinvigorated Annual Conference. The number is significant because it's more than have attended the annual get-together in several years.

Organizers were hopeful but cautious about their ability to attract members to the reinvigorated event. For one thing, it was being held more than two hours outside of the metro area. In addition,

it did not include the House of Delegates, which has been a mainstay of the event for more than 100 years.

"We weren't sure what to ex-

Lynne Fiscus, M.D., a presenter on Saturday, took in the Friday morning general session on leadership.

pect in terms of attendance, given the changes we've made," says Donald Jacobs, M.D., FACS, who was ushered in as the MMA's 148th president during the conference. "But at the same time, we were confident that these changes would attract a more diverse group of members." Jacobs is chief of clinical operations for the Hennepin Healthcare System in Minneapolis.

At last year's meeting, the House of Delegates voted to suspend its activities for three years to allow the MMA time to experiment with other methods to attract a larger, more diverse membership.

The changes this year included partnering with the Minnesota Hospital Association and LeadingAge Minnesota for the first morning's keynote addresses by national speakers.

On Friday afternoon, the MMA hosted policy forums on telehealth expansion, the future of Minnesota's health care workforce and an



The Annual Conference attracted more than 140 physicians from across Minnesota for two days of networking, education and policy discussions at Madden's on Gull Lake in Brainerd.

open-issues discussion featuring topics ranging from creating pain management standards to fighting prescription opioid abuse to prohibiting tobacco and e-cigarette sales to those under 21 years of age.

Saturday morning featured educational programming. Tracks covered digital innovations in medicine, effective leadership, and enhancing physician wellness and preventing burnout.

“It was a great mix of programming,” Jacobs said. “We combined some of the old such as the inaugural dinner with a lot of the new. I think everyone was pleased with the result.”



ABOVE: Dike Drummond, M.D., discussed physician wellness as part of the Saturday morning breakfast session. RIGHT: ABC News analyst John Nance combined wit, insight and empathy in his Friday address.



President’s Award

The President’s Award went to **Beth Baker, M.D.**, a staff physician at Specialists in O-E-M of St. Paul. Baker is also president of Medical and Toxicology Consulting Services, associate medical director for the Canadian Pacific Railroad and a physician advisor for State Fund Mutual Insurance.

Baker has been a member of the MMA for nearly 30 years, the last nine of which she has served on the Board of Trustees. Baker also has served on the MMA’s public health committee, the environmental health committee, the governance committee, the board effectiveness committee and the opioid management task force.

In addition to working with the MMA, she has been a longtime member of the board of Northland Occupational Medicine and of the Board of Directors of the American College of Occupational Medicine.

Community Service Award

The MMA honored two brothers—Ken Carter, M.D., and Darrell Carter, M.D., family physicians based in Granite Falls—with the



Paul Matson, M.D., spoke after receiving the Distinguished Service Award.

MMA Foundation Awards presented

At the inaugural dinner, the MMA and its members recognized a handful of special individuals with MMA Foundation Awards. They included:

Distinguished Service Award

The MMA’s highest honor is awarded annually to a physician who has made outstanding contributions to medicine and the MMA during his or her career. This year, the MMA’s Distinguished Service Award went to **Paul Matson, M.D.**, an orthopedic surgeon with The Orthopaedic and Fracture Clinic in Mankato.

Matson has been an active member of the MMA for more than 30 years. During that time, he has shared his time, wisdom and energy on several committees and held leadership positions with the MMA, MEDPAC, AMA and his component medical society.



New Board Chair Doug Wood, M.D., (right) visits with Rep. Tom Huntley, who received the James H. Sova Award for his work at the Legislature.



ABOVE: Nearly 30 vendors displayed at the conference. RIGHT: Medical student Alexander Feng listens intently at a policy forum.



The conference attracted many students including Thomas Baron and Courtney Moors, both from the University of Minnesota Medical School, Duluth campus.

Community Service Award. Together, they have more than 80 years of medical experience.

Darrell played a crucial part in the development of CALS training for the Minnesota

Academy of Family Physicians back in 1996. CALS (comprehensive advanced life support) is an educational program designed for the emergency medical training needs of rural health care teams. Darrell was named Minnesota Rural Health Hero in 2001, Physician of the Year in 2001 by the Minnesota Academy of Family Physicians, and Physician of the Year in 2003 by the American Academy of Family Physicians.

Ken played a key role in initiating Home Health Care through Granite Falls Municipal Hospital and Manor. He has also served as a lab director, a hospice director and the Yellow Medicine County coroner. He developed a telestroke protocol, in which physicians at a rural hospital connect in real time with a tertiary care center in the Twin Cities when dealing with a stroke patient. The protocol has improved the care of stroke patients in rural areas. He has also taken on the role of physician champion for Stratis Health's Rural Palliative Care Community Development Project.

James H. Sova Memorial Award

Rep. Tom Huntley received the James H. Sova Memorial Award, which honors a nonmedical professional who has made a significant contribution to the advancement of medicine. This is the second time the lawmaker has received the award, which is named after a long-time lobbyist for the MMA who died in 1981.

During his 22 years in the state Legislature, Huntley has been a champion of health care legislation including the Freedom to Breathe Act that outlawed smoking in public places such as



restaurants and bars. More recently, he had a hand in expanding Medical Assistance, which led to more Minnesotans getting access to health care. MM



David Matson, a student at the University of Minnesota Medical School, took the "People's Choice Award" for his poster on "Thoracic Volume Modeling of Growing Spine Interventions in Early Onset Scoliosis."

News Briefs



Dave Dvorak, M.D. (center) addresses an audience member's question during the single-payer forum.

Forum explores single payer in Minnesota

More than 60 physicians and medical students gathered on the University of Minnesota St. Paul campus in mid-August to learn about single payer and whether it's viable in Minnesota.

Following the forum, the MMA polled the group to gauge its view of single payer. Three-fourths of the attendees said that the single greatest potential of a single-payer system is to provide guaranteed/universal coverage. Thirty-one percent said the single biggest limitation was obtaining sustainable financing.

"As family physicians, knowing that our patients have coverage and can afford care is important," said Christopher Reif, M.D., a family physician with Community University Health Care Center and member of a Minnesota Academy of Family Physicians (MAFP) task force that studied the single-payer concept last year. "We see this as a dialogue that will go on for years and wanted to be part of the conversation, and to do that we felt we needed to be educated more."

MMA member Dave Dvorak, M.D., M.P.H., an emergency physician at Fairview Southdale Hospital and a member of the Minnesota chapter of Physicians for a National Health Program (PNHP), presented the case for single payer. "We have a complicated system of insurance coverage," he said. "It's disorganized and highly inefficient, and the ACA doesn't change this mish-mash. It just adds layers." He noted that when he went on MNsure, the state's health insurance exchange, he was presented with 66 different potential health plan choices.

Some of the benefits, he noted, are that single payer:

- Offers potential for cost control (currently, 31 percent of health care dollars go toward administration)
- Would reduce administrative burden (In the United States, physicians spend 21 hours a week on paperwork and prior authorization; in Canada they spend 2.5 hours a week.)
- Offers an opportunity to negotiate prices for drugs and services
- Would ensure a larger percentage of the population is insured (Dvorak said that even with implementation of the ACA, 30

million Americans are still uninsured and many more are underinsured.)

Downsides discussed included the political infeasibility of such a system, the perception that single payer would raise taxes, its vulnerability during times of recession, and the fact that thousands of insurance and administrative jobs would be lost as a result.

Lynn Blewett, Ph.D., professor of health policy at the University of Minnesota, provided an overview of single payer and described the experiences of four countries—the United Kingdom, Canada, Norway and Germany. She also described Vermont's plan to build a single-payer system by 2017.

The event was co-sponsored by the MMA, MAFP and the Minnesota Chapter of PHNP.

MMA debuts live stream service for members

For the past few years, MMA members in greater Minnesota have asked that metro-based events be broadcast so they, too, could



take part. The MMA used live streaming technology to do just that for its recent single-payer forum.

Nearly 50 members outside the Twin Cities

metro area were able to "attend" the event and submit questions via the Internet. For a fee, they could watch the forum online either individually or as a group. Twenty-five people watched at a gathering in Duluth, and 12 watched together in Detroit Lakes. Eleven members watched individually.

"I'd say it was a great success," says Cindy Firkins Smith, M.D., MMA president who moderated the live forum that took place at the University of Minnesota Continuing Education and Conference Center in St. Paul. "It's our goal to engage all Minnesota physicians at the MMA. So to have that many docs watching online and submitting all of their questions and comments was awesome."

Upcoming MMA Events

Event	Date	Location
"Care Where it Counts" MMA Foundation Fundraiser	October 9	University of Minnesota McNamara Center
Choosing Wisely Guthrie Workshop	October 11 or October 30	Guthrie Theater
Quality Measurement Summit	October 25	Double Tree by Hilton, Bloomington

Check the MMA's website (www.mnmed.org/events) for more information and to register.



Robert Bösl, M.D.



Brian Sick, M.D.



Dionne Hart, M.D.

New “Inspiring Physicians” page debuts on MMA website

The MMA has launched a new section on its website highlighting Minnesota physicians who go above and beyond the call of duty.

“The Inspiring Physicians site is focused on promoting the image of physicians in the state and supporting our strategy of advancing the role of professionalism in medicine by promoting our members,” says Robert Meiches, M.D., MMA CEO. “It’s a nice way to spotlight the great work by our members.”

The first group of members to be featured include:

Robert Bösl, M.D.

The lone physician in Starbuck, Minnesota, was named the 2013 Country Doctor of the Year by Staff Care. He used his retirement savings to open a clinic after the town’s only hospital closed in 2005.

Brian Sick, M.D.

Since 2007, Sick has served as the volunteer medical director for the Phillips Neighborhood Clinic, a free clinic that sees more than 1,100 patients annually. Sick received an MMA Community Service Award for his work with the clinic.

Dionne Hart, M.D.

This spring, the Minnesota Psychiatric Society named Hart its Psychiatrist of the Year for 2014. Last November, she received the MMA Foundation’s 2013 Minority Affairs Meritorious Service Award.

Know an inspiring physician who deserves recognition? Send your suggestions to dhauser@mnmed.org.

2014-2015 officers elected electronically

In the first-ever electronic election for the MMA, members have selected the 2014-2015 president-elect, three new board members and AMA delegates.

Last fall, the House of Delegates voted to establish member-wide electronic elections in order to allow all members the opportunity to vote. Nominations came in from component medi-

cal societies, specialty societies and individual members. These choices were vetted by the MMA Nominating Committee.

Ballots were mailed in late July to all members with email addresses on file with the MMA. A total of 486 members voted, which is 5.6 percent of those who were eligible.

The following members were voted into office:

- **President-elect** – Dave Thorson, M.D.
- **North Central Trustee District board member** – Marilyn Peitso, M.D.
- **At-large board positions** – Edwin Bogonko, M.D., and Doug Wood, M.D.
- **AMA delegates** – David Estrin, M.D., and Benjamin Whitten, M.D.
- **AMA alternate delegates** – David Luehr, M.D., Will Nicholson, M.D., and Cindy Firkins Smith, M.D.



MMA, TCMS Host Clinic Leaders

The Clinic Leadership Luncheon Series continued in August as the MMA and the Twin Cities Medical Society co-hosted a dozen clinic administrators and key clinic staff at MMA headquarters.

The session, “Five ways to get the most out of your mandated quality measurement and patient experience data,” was led by Barbara Daiker, Ph.D., FACMPE, the MMA’s quality manager. Clinic leaders shared ideas and learned about trends in measurement, current mandated measurements, managing quality and improving patient satisfaction.

Check the MMA’s website (www.mnmed.org/events) for more information about upcoming sessions and to register.



Dennis Kelly



Barbara Daiker



Cindy Firkins Smith



Brian Strub



Evelyn Clark, J.D.



Janet Silversmith

MMA in Action

In August, **Dennis Kelly**, MMA Foundation chief executive, addressed incoming medical students at White Coat ceremonies at the University of Minnesota Medical School's Twin Cities and Duluth campuses. Kelly has also been named to serve on the Minnesota Department of Health's Program Sustainability Committee of the Student Parent Support Initiative. The initiative works with selected Minnesota colleges and universities to provide a range of support for students who are the parents of young children. The committee will meet monthly through January 2015.

Barbara Daiker, MMA director of quality, and **Robert Meiches**, M.D., MMA CEO, attended the Minnesota Community Measurement board of directors' retreat in August as well as the Minnesota Alliance for Patient Safety (MAPS) board of directors' retreat in September.

In August, **Cindy Firkins Smith**, M.D., MMA president, attended the first meeting of Gov. Mark Dayton's blue ribbon commission tasked with raising the national prominence of the University of Minnesota's medical school. She also took part in the American Academy of Dermatology Association's skin cancer screening held at the National Conference of State Legislatures in Minneapolis. In September, she spoke on Minnesota's success passing its Tan-Free Teen legislation at the American Academy of Dermatology Association's Legislative Advocacy Conference in Washington, D.C.

Brian Strub, MMA manager of physician outreach, and **Evelyn Clark**, MMA manager of grassroots and political engagement, traveled to the University of Minnesota Medical School, Duluth campus in late August for a lunch-and-learn on ways medical students can have an impact on organized medicine through involvement in the Lake Superior Medical Society and the MMA. Medical students **Toy McGee** and **Kellen Albrecht** shared their experiences and encouraged other UMD medical students to represent Duluth, the medical school and Minne-

sota by attending state and national physician meetings and conferences.

Clark and Strub also joined Zumbro Valley Medical Society's (ZVMS) **John Shonyo** in addressing medical students at Mayo Medical School in Rochester. The lunch lecture covered ways medical students can have an impact on organized medicine through involvement in ZVMS and the MMA.

Janet Silversmith, MMA director of health policy, presented an ACA primer to family medicine residents at Park Nicollet in late August. She also held a webinar in September on how the MMA's Choosing Wisely project and collaboration with the Guthrie Theater is working to change physicians' attitudes and the culture about unnecessary care for the ABIM Foundation Choosing Wisely grantee learning network.

Juliana Milhofer, MMA policy analyst, is taking part in a work group at the University of Minnesota Medical School that will look at how to integrate education about public policy and public health into the medical school curriculum.

Mandy Rubenstein, MMA manager of physician outreach, attended the Stearns Benton Medical Society Circle of Health meeting in August to discuss a communitywide opioid prescribing program.

Kathleen Baumbach, MMA manager of physician outreach, and **Teresa Knoedler**, MMA policy counsel, appeared before 60 residents at the Transition to Practice program in September at the University of Minnesota. **Thomas Flynn**, M.D., an MMA member who practices at Minnesota Hematology and Oncology, and **Anne Valaas-Turner**, M.D., from Allina Medical Clinic Woodlake, presented on practice opportunities with large organizations and independent groups. Claire Topp, an attorney with Dorsey & Whitney, presented on contracting.

VIEWPOINT

New beginnings

When we first set out on the path of examining and ultimately changing how we govern the MMA, no one really knew how things would turn out. We had our hunches. We talked with other state associations to see what they've experienced. And we consulted with change-management experts. But there was always the question "What if this doesn't work?" hanging over us.

We have now returned from the first annual get-together without the House of Delegates and I'd have to say, based on the turnout and the diversity of attendees, the prognosis for our future looks pretty good. This year's Annual Conference was open to all physicians, not just MMA members who are delegates. We filled the schedule with interesting national and local speakers, spirited policy discussions and informative educational programming. And our members reacted positively to the changes. We had a nearly 50 percent increase in attendance this year. I saw a lot of new, smiling faces.

"The main reason we wanted to change was to create something that would light a fire under the physicians in this state, to find a way to get more people involved," Cindy Firkins Smith, M.D., our outgoing MMA president was quoted as saying in a *Minnesota Medicine* article in the September issue, which examined organized med-

icine in-depth. "The system we had before wasn't conducive to easy participation."

"Easy participation" is key because, as you know, physicians are swamped. It is often difficult to fit in MMA involvement with work and home life.

But we have to get involved if we want to make a difference. We can't let nonphysicians make decisions for us.

We need to be part of a larger whole and go above and beyond our daily work. That means getting involved in groups like the MMA, your local component medical society and your specialty society.

The MMA will continue to adapt in order to better serve the physicians of Minnesota. We will create tactics that allow us to reach our diverse membership where they work and live. We will continue to hold policy forums and listening sessions throughout the year and throughout the state. These events, along with the reinvigorated Annual Conference, are attracting physicians who have shied away from the MMA in the past.

We believe our new strategy for engaging more physicians is off to a great start. But we have a long way to go before we're satisfied.



Dave Thorson, M.D.
MMA Board Chair

PHOTO BY STEVE WEWERKA

The MMA will continue to
adapt in order to better
serve the physicians of
Minnesota.



A prescription for literacy

Reading to children is important to their success and their health.

BY NATHAN CHOMILO, M.D.

A child's first word is one of the developmental milestones parents celebrate. For a long time, the speed with which a child arrived at this accomplishment was thought to be solely attributable to innate intelligence or ability. We now know that the first 1,000 days are a time in a child's life when immense physical, social and cognitive growth takes place and that active participation by parents during this time can have lifelong effects. However, too few parents are engaging in one of the most important activities to foster this development: reading aloud to their children. The 2011-2012 National Survey of Children's Health

found that only 60 percent of children in the United States up to 5 years of age who come from families with incomes at or above 400 percent of poverty were read to daily. For children from families whose incomes were below 100 percent of poverty, the news was even worse: only 34 percent were read to daily.¹ Hart and Risley illustrated this disparity in a landmark study. They concluded that by age 3, children from families with low socioeconomic status hear 30 million fewer words than their peers who come from families with a high socioeconomic status.²

This exposure gap is directly related to the achievement gap. More than one-third of children in the United States enter kindergarten without the basic language skills they need to learn to read. Eighty-eight percent of first graders who are reading below grade level will continue to read below grade level in the fourth grade. Most troubling of all, two-thirds of children who cannot read proficiently by the end of the fourth grade will end up in jail or on welfare.³

A role for the medical profession

The American Academy of Pediatrics (AAP) recently released a policy statement that calls for pediatric providers to promote early literacy development for children beginning in infancy and lasting at least until the child starts kindergarten.⁴ This includes advising all parents to read aloud to their young children, counseling them about developmentally appropriate shared-reading activities, and providing developmentally appropriate books for all high-risk, low-income young children during well-child visits.

The AAP's Council on Early Childhood has recognized for some time the importance of promoting early brain development and its impact on school readiness. During the last 20 years, a substantial amount of evidence has emerged demonstrating not only the benefit of early reading on school readiness but also the important role health care providers can play in empowering and engaging families. In Minnesota, more than 90 percent of children see a physician annually, making us an almost-universal point of access to those children (the next best is child care, in which approximately 76 percent of young children are enrolled).⁵ These facts, coupled with the unique and respected relationship physicians have with families, provides us with an opportunity to effect substantial change.

This was clear to the physicians in Boston who in 1989 started Reach Out and Read, a program in which pediatricians and other clinicians share books with and promote reading to children. The goal is to stimulate a love of reading, enhance parent-child relationships and prepare children for success in school. At every checkup, starting in infancy and continuing until a child is at least school-aged, pediatric providers give each child a brand-new, developmentally, culturally and language-appropriate book.

They discuss early literacy practices and shared reading in the home, model behavior and assess for potential barriers. Fifteen studies have demonstrated that Reach Out and Read is associated with markedly more positive attitudes toward reading aloud, more frequent reading aloud by parents, improved parent-child interactions, improvements in the home literacy environment, and significant increases in expressive and receptive language in early childhood, particularly in families that are at risk or have low socioeconomic status.⁴ In Minnesota, Reach Out and Read got a foothold in 1997 when it was implemented at two clinics in Minneapolis. Today, it reaches more than 92,500 children annually through 154 clinics statewide; more than 1,300 clinicians participate in the program. One out of three low income children (one in four children overall) in Minnesota receive at least one of the 157,000 books Reach Out and Read Minnesota distributes annually, along with a prescription for their parents to read to them daily.

Even if clinicians haven't yet had the opportunity to integrate Reach Out and Read into their practice, they can take the vital first step of talking to parents about the importance of reading aloud every day.

Literacy, health and well-being

The AAP's statement also urges state and federal policy makers to fund initiatives aimed at addressing early childhood literacy. Data support such efforts. The U.S. Department of Health and Human Services has estimated that more than \$2 billion is spent each year on students who repeat a grade because they have reading problems. The annual cost of illiteracy to businesses and taxpayers is estimated at \$20 billion.⁶ Nobel Prize-winning economist James J. Heckman found that the economic return on investment in early education is as high as 15 to 17 percent per year—higher than that of other economic development strategies.

Poor literacy can affect a person's health as well. Health illiteracy—the inability to understand basic health information—is becoming recognized as a critical barrier to care. The 2003 National Adult Assessment of Literacy estimated that only 13 percent of U.S. adults had proficient health literacy and 43 percent had only basic or less than basic health literacy. Consequently, more than 90 million adults in this country may be unable to follow directions on a medication bottle, understand the importance of a follow-up appointment or comprehend instructions for providing care for a loved one. They also may struggle to negotiate the health care system and, as a result, have higher hospitalization and readmission rates, poorer compliance with recommendations, higher no-show rates, diminished disease knowledge, decreased utilization of preventive services, poorer overall health

status, poorer control of chronic illnesses, and higher mortality than their more literate counterparts.

Because research has shown that screening patients for limited

health literacy can actually have a deleterious effect on the patient-provider relationship, taking a universal precautions approach is recommended. Clinicians should communicate with all patients in simple terms. Methods such as teach-back should be used to elicit understanding in a nonjudgmental way. All handouts should be written at a fifth-grade reading level or lower. These interventions have been shown to improve patient

comprehension and retention of information.

Conclusion

Children who aren't read to in the first 1,000 days of life have an increased risk of growing into adults who are illiterate. These adults inevitably have poor economic potential and as a result, the cycle of poverty, poor health and dependency continues. As clinicians, we have an opportunity to empower parents and families by encouraging them to read together and to help those patients who were once left behind navigate an increasingly complex health care system. Literacy truly is one of the most powerful prescriptions we can provide. **MM**

Nathan Chomilo, a pediatrician and internist at Park Nicollet Health Services, is medical director of Reach Out and Read Minnesota.

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For more information on Reach Out and Read Minnesota go to:

www.reachoutandread.org/cgi-bin/mn.pl
www.facebook.com/ReachOutandReadMN
www.youtube.com/watch?feature=player_embedded&v=jLBknlwEG9A

Minnesota Medicine is highlighting unusual cases this month. Earlier this summer, we invited readers to submit case studies about patients with illnesses rarely seen in Minnesota, challenging diagnoses or encounters that they felt were noteworthy for another reason.

We were pleased to receive nearly a dozen reports from medical students, residents and practicing physicians. They were reviewed by Charles Meyer, M.D., and Barbara Yawn, M.D.

Thanks to all who answered our call for sharing their stories and helping educate Minnesota's medical community about what they learned from these experiences.

Ectopic Pancreatitis

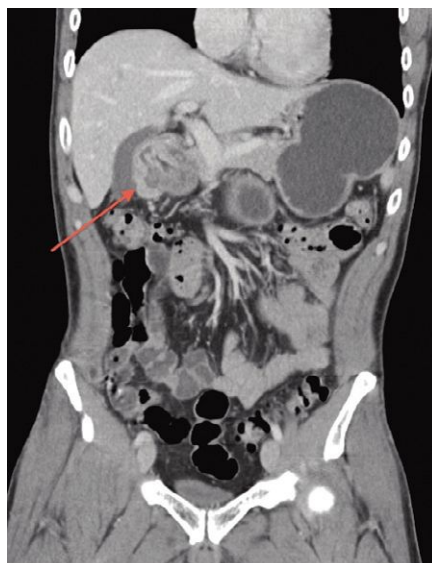
BY NOELLE HOVEN, M.D., AND BENJAMIN SPILSETH, M.D.

A 36-year-old, otherwise healthy male presented to the hospital with a three-month history of nausea and vomit-

ing, decreased appetite and weight loss. He had a history of tobacco and alcohol use. Barrett's esophagitis, gastric antrum edema and elevated lipase were observed during his initial hospital evaluation. A right upper-quadrant ultrasound at that time showed gallstones without evidence of acute cholecystitis; it was otherwise unremarkable. A contrast-enhanced CT revealed thickening and enhancement in the gastric pylorus and proximal duodenum. Multiple EGD biopsies of the pylorus and duodenum revealed mild acute and chronic inflammation and were negative for malignancy or *H. pylori*. An endoscopic ultrasound-guided biopsy eventually revealed ectopic pancreatic tissue in the pylorus, specifically bland pancreatic acinar tissue. Approximately one month later, the patient presented to the emer-

FIGURES 1 AND 2

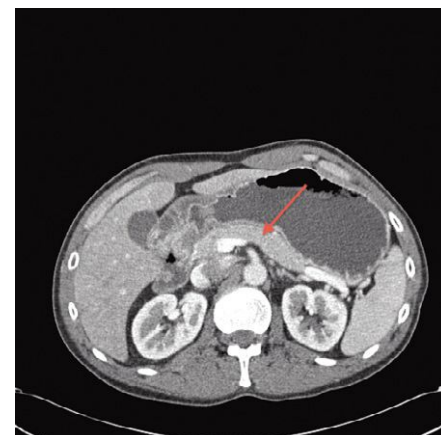
Ectopic Pancreatitis



CT images demonstrate wall thickening and enhancement in the pylorus and gastric antrum with tissue of equal density to the pancreas in the submucosal gastric antrum.

FIGURE 3

Normal Pancreas



gency department with gastric outlet obstruction, abdominal pain and acute pancreatitis secondary to the ectopic pancreatic tissue in his pylorus. He underwent an open distal gastrectomy and Roux-en-Y gastrojejunostomy. Gross pathology of the gastric resection tissue demonstrated changes related to moderate chronic pancreatitis and pancreatic intraepithelial neoplasia type I. There were no immediate postoperative complications, and the patient was discharged to home on postoperative day 5.

Discussion

Heterotopic or ectopic pancreas is a congenital condition defined as pancreatic tissue outside of its normal location. It is a relatively uncommon condition with a reported incidence of 0.5% to 13%.¹ Heterotopic pancreatic tissue typically affects the upper GI tract, particularly the stomach and duodenum, although cases of mediastinal and Meckel's diverticulum ectopic pancreatic tissue have been reported.^{1,2} There are two main theories as to what causes embryologic development of ectopic pancreatic tissue. One is that buds of embryonic pancreatic tissue penetrate into the wall of the developing gut, separating from the main pancreas. The other is an inappropriate expression of embryonic pluripotent mesenchymal tissue of the gastrointestinal tract leading to pancreatic metaplasia.³

Although the majority of cases are asymptomatic, and more often are an incidental finding, pathology affecting the pancreas can occur in ectopic tissue. These complications include ulceration, bleeding, pancreatitis and pancreatic cancer.^{1,4} Presenting symptoms in patients with ectopic pancreatic tissue documented in the literature include abdominal pain, intestinal/gastric obstruction, hematemesis,

vomiting and weight loss. The histopathologic appearance can include pancreatic acini, ducts and a mixture of the two.⁵

Ectopic pancreatic tissue may demonstrate characteristics on CT suggesting a submucosal mass in the stomach or duodenum and be mistaken for more common submucosal tumors including a gastrointestinal stromal tumor (GIST) or leiomyoma. Endoscopic ultrasound, CT and barium studies can be used to detect submucosal tumors. Although a preoperative diagnosis of ectopic pancreas is challenging and the imaging characteristics are nonspecific, certain characteristics on CT improve the ability to differentiate ectopic pancreatic tissue from other submucosal tumors. These include a prepyloric antral or duodenal location, endoluminal growth pattern, an ill-defined border, prominent enhancement of overlying mucosa and a long-diameter-to-short-diameter ratio greater than 1.4.⁵ **MM**

Noelle Hoven is a resident and Benjamin Spilseth is a staff radiologist in the department of diagnostic radiology at the University of Minnesota.

Learning points

- Any pathology affecting the pancreas can be found in ectopic pancreatic tissue, including ulceration, pancreatitis, bleeding and pancreatic cancer.
- Certain characteristics on CT improve the ability to differentiate ectopic pancreatic tissue from other submucosal tumors. These include a prepyloric antral or duodenal location, endoluminal growth pattern, an ill-defined border, prominent enhancement of overlying mucosa and a long-diameter-to-short-diameter ratio greater than 1.4.
- Surgical resection is the main treatment, as medical management is ineffective. Resection also allows for a more definitive diagnosis, as endoscopic biopsies can be nondiagnostic.

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Another Routine Exam

BY ROBERT H. BÖSL, M.D., FAAFP

A 50-something-year-old woman presented for a routine annual exam. She complained of aches and pains typical of a perimenopausal woman with a BMI in the high 30s and hypertension, but otherwise appeared healthy. There was no chief complaint other than some fatigue.

Because of her hypertension, and per her request, labs including TSH and U/A were obtained, the results of which were normal. Health maintenance issues were reviewed with the patient: The results of a colonoscopy done a year earlier were normal. Pap smears, which had been done annually, had all been normal.

Adhering to preventive care guidelines of the time, a pelvic exam was performed. The exam itself was complicated by adiposity but clearly demonstrated a moderate-size left pelvic mass. The patient was set up for pelvic ultrasound, which revealed nothing abnormal. The pelvic exam was repeated to make sure the mass was not stool that might have passed. The mass was still present during the repeat exam. Abdominal and pelvic computed tomography (CT) was performed. The scans revealed no evidence of the left pelvic mass but did show a right renal carcinoma.

The patient was evaluated by urology, and arrangements were made for right nephrectomy. Prior to surgery, another pelvic exam confirmed the left pelvic mass was still present, so a request was made to

have this surgically evaluated at the time of her nephrectomy. The surgeons found an 8-cm diverticular abscess and surgically drained it.

Discussion

This patient underwent a routine exam, at which time a mass was found, ultimately resulting in the fortuitous finding of an unrelated renal carcinoma, and with ultimate characterization of the mass being a diverticular abscess.

In recent years, we have begun to question the value of annual pelvic exams. This case illustrates their importance, as they may yield unexpected findings. The fascinating part of this case was that neither ultrasound nor CT identified or characterized the mass. This case emphasizes physicians' continuing need to rely on clinical acumen as well as technology. ■■■

Robert Bösl is a family physician in Starbuck, Minnesota.

Learning points

- Annual pelvic exams may have value.
- Imaging may not be helpful in all cases.
- Sometimes the most interesting or unusual cases don't start that way.

Anophthalmia in a Newborn

BY MEG SCHAEFER, M.D., AND TARA ZAMORA, M.D.

Neonatology was called to evaluate a 1-day-old male who had not yet opened his eyes. The infant was born by normal spontaneous vaginal delivery to a 21-year-old primigravida mother following a full-term pregnancy complicated by gestational diabetes that was well-controlled with insulin. Delivery was uncomplicated. The infant had received erythromycin ointment to his eyes after birth and had been circumcised without event. Physical exam was significant for mild periorbital edema, deeply set orbits and small palpebral fissures that were difficult to separate (Figure 1). The infant also had a high arched palate and micropenis.

MRI showed complete absence of the globes, optic nerves and optic chiasm (Figure 2). The remainder of the brain was anatomically normal. Comparative genomic hybridization demonstrated deletion of the SOX 2 gene, a known mutation associated with anophthalmia. A three-generation pedigree was unremarkable, which was not surprising given that most SOX 2 gene mutations occur *de novo*. Abnormalities in this gene may be associated with pituitary dysfunction, commonly presenting as micropenis in males. Markers of pituitary function including LH, FSH, T4, TSH and cortisol were normal. Testosterone was mildly low.

After discharge, the infant was to be followed closely by endocrinology. Additional referrals were made to oculoplastic surgery because of the effect the absent optic globes may have on facial growth, and to early intervention services for developmental monitoring.

Discussion

Anophthalmia is a rare ocular defect resulting from abnormal development of the primary optic vesicle. There is complete

absence of all eye tissue with no chance for vision. Anophthalmia is associated with central nervous system abnormalities, skeletal defects, genitourinary malformations and metabolic disturbances in more than half of affected individuals.^{1,2}

Anophthalmia should be considered in a newborn with delay in eye opening. Physical exam may be suggestive of this disorder, but findings can be subtle and initially may be missed. Neuroimaging is necessary for diagnosis, and to screen for other brain abnormalities. Further screening for associated endocrine, skeletal and genitourinary conditions should be considered. Genetic counseling and testing for SOX 2 gene mutations may be useful in understanding the risk for recurrence in some families. Other subspecialty referrals may be appropriate as well. **MM**

Meg Schaefer is a pediatrics resident at the University of Minnesota. Tara Zamora is a neonatologist at Children's Hospitals and Clinics of Minnesota in St. Paul.

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Learning points

- Anophthalmia should be considered in a newborn with delay in eye opening.
- Early diagnosis, screening for associated conditions and appropriate referrals are key to the ongoing care of children with this rare disorder.

FIGURE 1

Male Infant with Anophthalmia



FIGURE 2

MRI Image of Brain of Child with Anophthalmia



Zinner's Syndrome

Like Sitting on a Tennis Ball for 20 Years

BY SEAN MCADAMS, M.D., JOHN SCHOMBURG, M.D., AND ROBERT M. SWEET, M.D., FACS

A healthy 54-year-old male was referred to the kidney stone clinic for a mildly symptomatic left kidney stone. His history was significant for right renal agenesis, making the stone in his left kidney a more pressing issue. Notably, he also had a 20-year history of intermittent prostatitis with symptoms of dysuria, frequent urination and pelvic pain. The patient experienced these symptoms four to five times a year, and they typically improved with antibiotic therapy. However, he maintained a sensation of constant perineal pressure. His right renal agenesis had been diagnosed on CT five years earlier while he was undergoing workup for irritative voiding symptoms. At that time, it also was noted that he had a 3 cm right seminal vesicle cyst. On digital rectal exam, he had a palpable mass posterior to the right prostatic base, and CT imaging confirmed the persistence of a 3.3 cm right seminal vesicle cyst exhibiting mild compression on the rectum (Figure).

After successful treatment of his left kidney stone, focus shifted to his urinary and pelvic symptoms. He was offered options of transrectal ultrasound-guided

drainage or robot-assisted or open excision of the cyst. The patient had excellent baseline sexual function and was concerned that the nerves connected with erections and urinary continence could be affected by surgical excision, so he initially elected for transrectal drainage.

The cyst contained gelatinous, hemorrhagic fluid that was negative for organisms on gram stain. Cytology was negative for malignancy, and bacterial culture of this fluid was negative.

The patient's irritative symptoms and pain resolved for the next six months. But the sensation of "sitting on a tennis ball" returned within one month of drainage. Ultrasound imaging confirmed the recurrence of the cyst. Over the next two years, the patient required several courses of antibiotic therapy for his symptoms. He eventually elected to undergo surgical excision of the cyst, which was done using the da Vinci robot. During dissection, it was noted that the right vas deferens demonstrated some atresia and appeared to insert directly into the cyst. Surprisingly, a second tubular structure in the cyst had the appearance of an ectopic insertion of

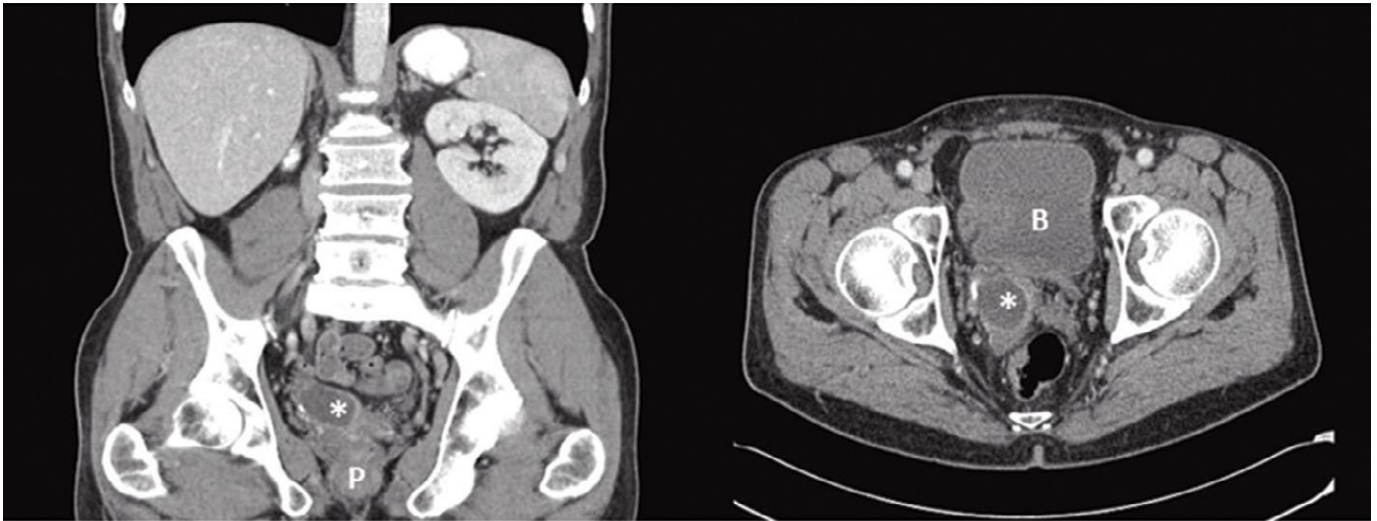
his right ureter. Pathologic review confirmed this to be a dysplastic ureter. The patient was without symptoms at initial postoperative follow up.

Discussion

Zinner's syndrome is a triad of müllerian duct abnormalities—unilateral renal agenesis, ipsilateral seminal vesicle cyst and ejaculatory duct obstruction.¹ An obstruction at the level of the ejaculatory duct leads to gradual accumulation of secretions in the seminal vesicle with consequent cyst formation. Patients with this malformation present with nonspecific pelvic or perineal pain, dysuria, painful ejaculation, chronic recurrent epididymitis/prostatitis and occasionally infertility. Diagnosis is usually made in the third or fourth decade of life, but there are reports of patients being diagnosed in their teenage years.

Approximately 10% to 15% of males with unilateral renal agenesis will have an associated congenital abnormality of the reproductive tract, as both originate from the mesonephric (Wolfian) duct. During embryogenesis, the mesonephric duct de-

FIGURE

CT Coronal and Axial Images

Left: CT coronal image showing absent right kidney, right seminal vesicle cyst (*) and prostate (P). Right: Axial imaging demonstrating compression of rectum by cyst (*) and bladder (B).

velops into the hemitrigone of the bladder, bladder neck, the proximal urethra, seminal vesicle, vas deferens and epididymis under the influence of testosterone and anti-mullerian hormone.²

Fewer than 100 cases of Zinner's syndrome are reported in literature.³ Although uncommon, it is an important diagnostic consideration when patients present with recurrent urinary symptoms or pelvic discomfort, especially if coupled with infertility. Diagnosis is confirmed with modern-day imaging, with MRI being the most accurate in differentiating seminal vesicle cysts from other pelvic cystic malformations. **MM**

Sean McAdams and John Schomburg are residents and Robert Sweet is an associate professor in the department of urology at the University of Minnesota.

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Learning points

- Although uncommon, Zinner's syndrome is an important diagnostic consideration when patients present with recurrent urinary symptoms or pelvic discomfort, especially if coupled with infertility.
- Up to 15% of males with unilateral renal agenesis will have an associated congenital abnormality of the reproductive tract.

A Case of Immunization-Seeking Behavior and its Public Health Significance

BY ZEKE J. MCKINNEY, M.D., M.H.I., MICHELE BLOM, R.N., AND NEAL HOLTAN, M.D., M.P.H., PH.D.

A 31-year-old woman with a history of anxiety disorder presented to our county public health immunization clinic eight times over a nine-month period requesting immunizations. During the first five visits, the patient was immunized per her request. At three subsequent visits, her immunization requests were denied after staff noted her vaccination history in the state's immunization information system, the Minnesota Immunization Information Connection (MIIC). Further investigation found that the patient had been receiving vaccinations inappropriately from multiple clinics in the metropolitan area over several years. She had received a total of 65 immunizations, 56 of them as an adult during the previous eight years. The immunizations were given at 11 different locations, including our public health immunization clinic. Only 24 of those immunizations may have been appropriate. The other 41 seemed to lack indications or were premature, repetitious or otherwise inappropriate (Table 1). Among those she received were Haemophilus influenzae type b (Hib) vaccine (even though she lacked a history of splenic dysfunction or asplenia); vaccines for international travel or specific exposure including one for yellow fever and a

series of Japanese encephalitis B and rabies vaccines (she had no plans to leave the United States, and her history of exposure

to rabies was unknown but exposure was plausible); several childhood/school vaccines outside of the appropriate schedules

TABLE 1

Frequency of Appropriate and Inappropriate Vaccination, by Vaccine Type

VACCINE TYPE	ADMINISTERED INAPPROPRIATELY	ADMINISTERED APPROPRIATELY	TOTAL
Anthrax	2		2
DTP/DTaP		1	1
Encephalitis	3		3
HepA	1	3	4
HepB	3	3	6
Hib	1		1
HPV	3		3
Influenza	5	5	10
Meningococcal conjugate		1	1
Meningococcal polyvalent	1		1
MMR	3	2	5
Pneumococcal polyvalent	2	1	3
Polio	5	1	6
Rabies		3	3
Td/Tdap	4	2	6
Typhoid	3		3
Varicella	4	2	6
Yellow Fever	1		1
Total	41	24	65

and without the appropriate indications; two or three influenza immunizations each season; and a partial series of anthrax vaccine that is only recommended for rare potential occupational or military exposures (she had no exposures).

Anecdotal review with public health staff revealed that the patient provided vague or false history when attempting to receive vaccines. She argued repeatedly that the MIIC was incorrect and that the record was not hers, even though her name and birthdate matched.

Discussion

In reviewing the patient's history, we considered an immunization appropriate if she had a plausible, valid indication and the vaccine was administered according to the Centers for Disease Control and Prevention's (CDC) guidelines.¹ Of significance is that the patient has publicly-funded medical insurance. We estimated the total cost to public and private organizations of the inappropriate immunizations using local public health figures as well as information published by the CDC (Table 2). These are likely underestimates of the true cost of the vaccines and do not include the cost of the clinic visits.²

We may have underestimated the number of inappropriate vaccines and their cost, as we did not have access to the full medical and social history of the patient. She may have received additional vaccines that were not recorded in the MIIC.

Even though the patient did receive some vaccines that were appropriate, the great majority clearly were not, which is concerning not only in the context of increased medical risks (particularly from live attenuated vaccines), but also in terms of wasted money and resources.

Given the patient's history of anxiety, her inappropriate immunization-seeking behavior is consistent with health anxiety or what is commonly known as hypochondriasis in an extreme case.³ The cost of overuse of medical resources other than immunizations has been previously reported in cases of health anxiety.^{4,5}

This case highlights the value of having a public health immunization information system in ensuring the appropriate administration of immunizations. It illustrates the need for staff at clinics—both public and private—to check the system before giving immunizations and to record those given. It also suggests that enhancements to the MIIC might be made in order to detect and prevent the occurrence of similar vaccine-seeking behavior. **MM**

Zeke McKinney is in the HealthPartners/ University of Minnesota occupational and environmental medicine residency program. Michele Blom is a registered nurse and Neal Holtan is medical director at St. Paul-Ramsey County Department of Public Health.

Learning points

- This is an unusual case of health anxiety and it shows the public health effect of misuse of clinical services.
- Clinic staff need to check the MIIC before giving immunizations and to record those given.

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TABLE 2

Frequency and Cost of Inappropriate Vaccines

INAPPROPRIATE VACCINATION	NUMBER	ESTIMATED PUBLIC HEALTH COST (\$)	ESTIMATED PRIVATE COST (\$)
Already completed series	13	452.60	470.54
No exposure	14	12.46	1,279.76
No indication	5	539.35	0.00
Too early for booster	9	31.65	181.08
Total	41	1,036.06	1,931.38

A Surprising Finding in a Screening Colonoscopy

BY THEODORE FAGRELIUS AND ISAAC FELEMOVICIUS, M.D., FACS, FASCRS

An asymptomatic 74-year-old man was seen for a routine screening colonoscopy. Upon entering the cecum, an unknown sharp metal object was seen lying on the floor of the cecum near the appendiceal lumen. It was nonobstructive and resting freely in the unremarkable bowel lumen (Figure 1). It was carefully removed with cold biopsy forceps. The object was kept under direct visualization at all times, so as not to puncture or tear the colonic wall. The procedure was completed without complications. The patient had no knowledge of the object, nor did he have any insight as to likely occasions for ingestion.

Question: Into which aspect of the patient's history would you want to direct further questions to determine what the object is or where it came from?

Answer: Dental history.

The object was eventually identified as the tip of a dental instrument, and the patient confirmed that he had visited his dentist two weeks prior to the colonoscopy. (Note the size of the instrument tip in Figure 2.) The dentist had made no mention of the missing tip to the patient.

Discussion

Dental instruments, dentures and toothbrushes are commonly ingested foreign objects.¹⁻³ The majority of objects that are ingested pass harmlessly through the GI tract and exit the body with the feces. In approximately 10% to 20% of these events, nonsurgical intervention is required. Only 1% require surgery.¹ Of particular concern are cases in which a sharp, pointed object

is ingested. These have a complication rate as high as 35%.¹ Sharp objects may require emergent endoscopic or surgical removal. Objects such as bones, toothpicks, toothbrushes, pins, needles and dental instruments should all be removed endoscopically after radiography has been performed to avoid bowel injury, perforation and obstruction.¹⁻³ **MM**

Theodore Fagrelus is a medical student at the University of Minnesota. Isaac Felemovicius is a colorectal surgeon at North Clinic Colon and Rectal Surgery in Maple Grove.

Learning point

- Don't overlook the patient's dental history when considering the source of an ingested object.

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FIGURE 1

Endoscopic Image Showing Foreign Object in Colon

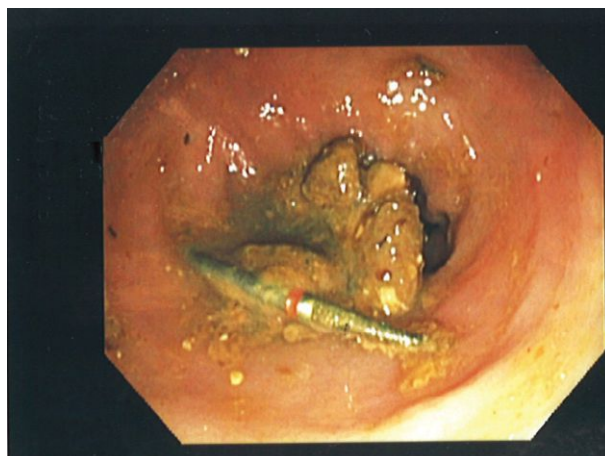


FIGURE 2

Dental Instrument Tip



The Boy with the “Snake” in his Chest

BY CHARLES OBERG, M.D., M.P.H.

A 9-year-old Cambodian boy was brought by his mother to our pediatric clinic at Hennepin County Medical Center for evaluation. The chief complaint, as described through an interpreter, was that in the evening, a “snake” came out of the skin on his chest only to retreat into his body by morning. He was otherwise well with no other complaints. History indicated that this had been happening for several weeks. The boy had no other symptoms except for some burning in an area of the chest where the “snake” had emerged.

One week earlier, his mother had brought the child to the emergency department (ED), and a 1-cm eschar with a slightly inflamed ridge was observed on his chest. It appeared to be an impetigo rash. A topical antibiotic was prescribed and the mother was instructed to wash the area and then apply the ointment twice a day. No “snake” was present. Review of systems done in the ED revealed that all other organ systems were normal. The family and social history revealed that the mother and her son had fled the Khmer Rouge and that all other family members had died in the “Killing Fields” prior to their coming to the United States. They had been in the United States and Minnesota for slightly less than a year. During the ED visit, the treating physician had thought it might be a case of post-traumatic stress disorder (PTSD) triggered by the loss of family members. In addition to giving the mother the topical treatment for the child’s skin lesion, she also received a mental health referral.

Examination in the clinic revealed a well-nourished child in no distress. His vital signs were normal. The only positive

sign on examination was the 1-cm lesion on his anterior chest. The mother was adamant that if left untreated, the “snake” would return that evening. The mother was encouraged to continue with the topical treatment and to follow up with the mental health referral. She also was told to return to the clinic or emergency room if the “snake” re-emerged.

The mother did return with the child later that evening. Examination showed a “snake” was indeed protruding from the eschar. In reality, it was a nematode worm that protruded about 3 cm from the boy’s anterior chest wall. It was light in color and only 3 mm in diameter. Using a small forceps and gentle pressure, the worm was removed; it measured about 18 cm in length. The specimen was placed in a sterile container and sent to the laboratory, where it was identified as guinea worm or *Dracunculus medinensis*.

Discussion

Dracunculiasis is an example of the typical infectious triad of agent, vector and host. The infectious agent is the nematode, the vector is a copepod (a small crustacean water flea) and the host is the human. The mature worm typically emerges from the human and releases immature larva into a water supply. The water flea consumes the larva where it goes through several molts. The water flea is then ingested by a human. The gastric acid in the stomach destroys the water flea releasing the guinea worm larva, which penetrates the stomach and intestinal wall. The larva mature and reproduce, and the female nematode migrates through to the surface of the skin to emerge once again. There is no treatment besides slow extraction of the mature worm. Dracunculiasis can only be pre-

vented through the filtration of the water supply to remove the water fleas, thus breaking the life cycle of the guinea worm.

At the time of this episode (about 30 years ago), there were estimated to be more than 35 million cases of dracunculiasis in 20 endemic nations predominantly in Asia and Africa. Since 1986, the Carter Center, the World Health Organization (WHO), UNICEF and the Gates Foundation have been involved in an eradication campaign involving village-based surveillance and filtration of the drinking water supply in endemic areas. By the turn of this century, the WHO declared that it had been eradicated in India and Southeast Asia. According to the WHO, there were 148 cases in 2013. As of June 30, 2014, the WHO had received reports of 27 cases compared with 92 cases for the same period in 2013, representing a decrease of 70% in the number of reported cases.¹ ■■■

Charles Oberg is professor and chair of Augsburg College’s Physician Assistant Studies Program.

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Learning point

- With the continued influx of refugees and immigrants from all over the world, it’s possible to see conditions that wouldn’t normally occur in the U.S.-born population.

Contralateral Recurrence of Idiopathic Orbital Inflammatory Syndrome in a Pediatric Patient

BY KELLY R. BERGMANN, D.O., M.S., SUSAN SCHLOFF, M.D., AND JEFFREY SCHIFF, M.D.

An 11-year-old African American male presented to our emergency department (ED) with complaints of progressive headache and vomiting. His symptoms included right eye swelling and pain with eye movement, conjunctival injection and decreased visual acuity. Review of systems was negative for diplopia, trauma, fevers, neck stiffness, weight loss, joint pain and rashes. Past medical history was notable for steroid-responsive orbital pseudotumor in the left eye, which was diagnosed by CT two years earlier (Figure 1). Physical examination revealed a vitally stable patient with right-sided periorbital edema, proptosis and ptosis with conjunctival injection over the lateral orbit. Extraocular movements showed limitation of right upgaze compared with the left and pain with eye movement in all directions (Figure 2). Pupils were equally reactive and fundus examination was normal. Visual acuity without the patient's eye glasses was 10/25 in the right and 20/100 in the left.

Laboratory evaluation included normal electrolytes, renal function, transaminases and complete blood count. C-reactive protein was elevated (3.64 mg/dL) as was sedimentation rate (59 mm/hr). Total IgG was normal (1,480 mg/dL), and IgG

subclasses revealed an elevated IgG1 (981 mg/dL, normal 456-952) and IgG4 (175 mg/dL, normal 1-168). Angiotensin-converting enzyme was normal (32 U/L). FANA screen, perinuclear and cytoplasmic ANCA, Quantiferon Gold and Lyme serology were negative. MRI was consistent with idiopathic orbital inflammation (IOI), demonstrating edema of the right periorbital tissues, retroconal fat and extraocular muscles (Figure 3).

The patient was started on methylprednisolone with dramatic clinical improvement (Figure 4). He was discharged on a steroid taper with prostaglandin eye drops. On follow-up with rheumatology, he was noted to have recurrent pain and was started on mycophenolate mofetil with subsequent resolution of symptoms.

Discussion

Idiopathic orbital inflammation, also known as orbital pseudotumor, is a benign condition characterized by orbital inflammation without evidence of systemic disorders.¹ Although an underlying autoimmune cause is suspected, the etiology remains elusive.^{1,2} It is characterized by ophthalmoplegia, conjunctival injection, pain, proptosis, and/or ptosis.³ Although IOI is the third most common cause of

orbital inflammation in adults following Grave's disease and lymphoproliferative disorders,² pediatric cases are much less common.³⁻⁵ Systemic corticosteroids are first-line treatment, and an abrupt clinical response is thought to be pathognomonic. Disease recurrence occurs in up to 37% of adults.⁶ However, the rate of recurrence among children is unknown.

This patient was diagnosed with IOI and subsequent recurrence in the contralateral orbit two years after initial diagnosis. To our knowledge, there are only three reports in the literature describing IOI recurrence among children.^{3,4,7} Yan et al. described one case of recurrence in a series involving 24 children. That patient was treated with corticosteroids but required radiotherapy to achieve complete recovery.³ Belanger et al. described 12 children with IOI, three of whom had recurrence after corticosteroid therapy.⁴ The site of recurrence was not described in either report. Finally, Avni-Zauberman et al. described two pediatric cases (a 17- and an 18-year-old) of IOI with recurrence in the contralateral orbit, termed "migratory" disease.⁷ To our knowledge, our patient is the youngest described case of disease recurrence in the contralateral orbit. Interestingly, our patient had an elevated IgG4,

which has been described in two pediatric case reports.^{8,9} The role of IgG4 in disease pathogenesis is currently unclear. **MM**

Kelly Bergmann is with the department of pediatric emergency medicine at Children's Hospitals and Clinics of Minnesota in Minneapolis. Susan Schloff is in pediatric ophthalmology at Children's Hospitals and Clinics of Minnesota in St. Paul and Associated Eye Care. Jeffrey Schiff is in the department of pediatric emergency medicine at Children's Hospitals and Clinics of Minnesota and the Minnesota Department of Human Services.

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Learning points

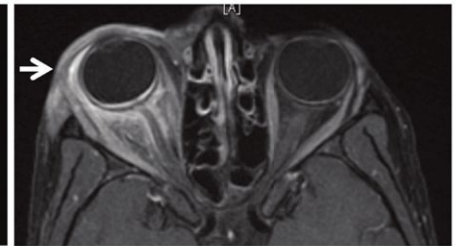
- IOI is a rare disease in children.
- Diagnostic work-up includes MRI or CT and laboratory studies to rule out thyroid disorders, oncologic disease (rhabdomyosarcoma) or autoimmune diseases (sarcoidosis, Wegener's).
- Treatment includes systemic corticosteroids but may involve radiotherapy or immunosuppressive agents in refractory cases. Biopsy is rarely needed and typically based on treatment response.

FIGURE 1



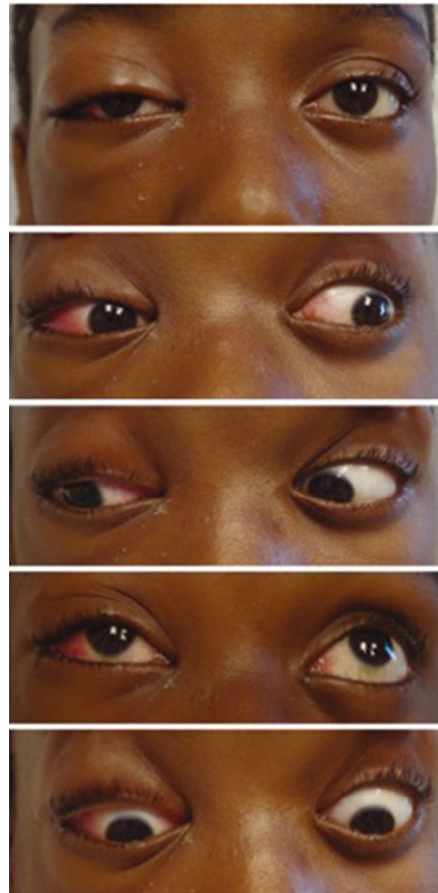
Computed tomography showing proptosis and postseptal inflammatory changes involving the retroconal fat and lateral rectus muscle of the left orbit.

FIGURE 3



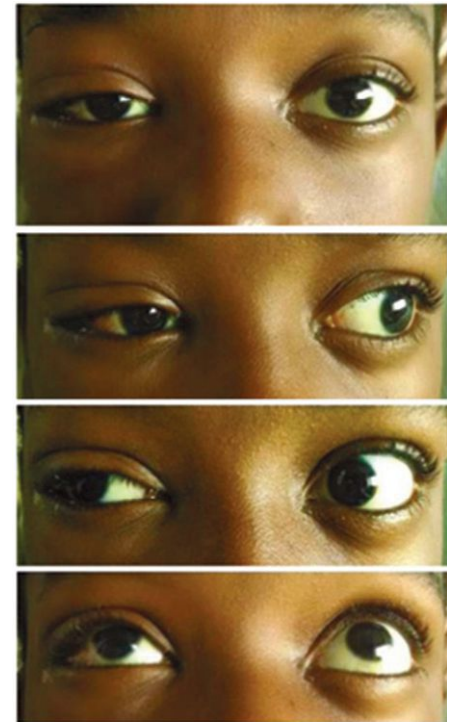
Magnetic resonance image of the right orbit demonstrating proptosis and marked edema of the retroconal fat and lateral rectus muscle.

FIGURE 2



Initial exam showing periorbital edema of the right eye, with proptosis, ptosis and conjunctival injection over the lateral aspect of the orbit. There was limitation of upgaze on the right.

FIGURE 4



Subsequent examination (12 hours later) after a single dose of methylprednisolone showing dramatic improvement in periorbital edema, ptosis and improving upgaze.

Profound Thrombocytopenia Caused by Abciximab Infusion following Percutaneous Coronary Intervention

BY BLAKE DALEY, D.O., DAVID MIRANDA, M.D., ANKUR KALRA, M.D., AND DANIEL PEASE, M.D.

A 63-year-old male presented to the emergency department (ED) following a witnessed out-of-hospital cardiac arrest at a local sporting venue. Prior to arriving in the ED, the patient had received multiple defibrillation shocks for ventricular fibrillation (v-fib) without achieving a perfusing rhythm or return of spontaneous circulation (ROSC). Vitals on arrival in the ED were notable for no attainable blood pressure, no heart rate and 90% O₂ saturation following rapid sequence intubation. Physical examination was remarkable for no carotid or femoral

pulses, no respiratory effort and no withdrawal to painful stimulation. Laboratory data revealed a venous pH of 7.06, lactate of 2.6 mmol/L, troponin I of .192 ng/mL, hemoglobin of 14.1 g/dL, and platelet count of 228,000/mm³. Initial 12-lead electrocardiogram, following ROSC, demonstrated ST-segment-elevation in anterior and precordial leads V1-V5 with a right bundle branch block (Figure 1). Prompt catheterization laboratory activation and subsequent coronary arteriography revealed a culprit lesion in the mid-left an-

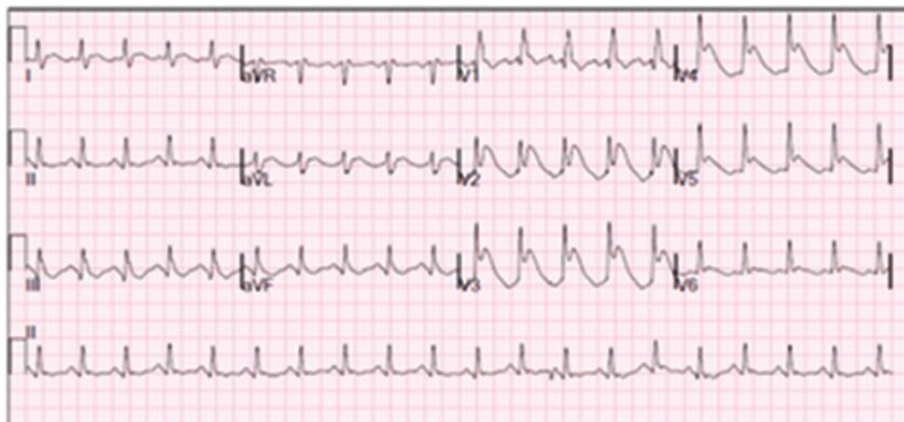
terior descending (LAD) coronary artery (Figure 2).

A drug-eluting stent was placed in the mid-LAD via percutaneous coronary intervention (PCI). The glycoprotein IIb/IIIa inhibitor abciximab was added to the anti-platelet armamentarium,¹ which included aspirin and clopidogrel. The patient had received a loading-dose of intravenous unfractionated heparin as part of upstream therapy.

Subsequent laboratory examination revealed profound thrombocytopenia. Testing at three-hour intervals revealed a baseline platelet count of 228,000/mm³ followed by counts of 76,000/mm³, 13,000/mm³ and 9,000/mm³ (Figure 3). Physical findings included bleeding from the oral mucosa and epistaxis. Abciximab infusion was stopped and a hematology consultation was obtained. Given the significant risk of bleeding associated with such severe thrombocytopenia, platelets and fresh frozen plasma were transfused, despite the attendant risk of occluding the freshly inserted stent.² The patient's platelet count continued to rise steadily following these interventions, and there were no significant bleeding events. A peripheral smear did not demonstrate evidence of disseminated intravascular coagulation

FIGURE 1

Presenting 12-Lead ECG Demonstrating ST-Elevation in Precordial Leads V1-V5



Learning points

- Patients receiving abciximab are at risk of severe thrombocytopenia.
- Abciximab-induced thrombocytopenia develops very rapidly.
- All clinicians involved in a patient's care following PCI should be vigilant about checking platelet counts.

or pseudothrombocytopenia. The patient made a full recovery and was discharged nine days after presenting in cardiac arrest. At the time of his discharge, his platelet count was noted to be 303,000/mm³.

Discussion

Post-PCI thrombocytopenia represents an infrequent but clinically challenging complication of anti-platelet intravenous glycoprotein IIb/IIIa administration.³ Abciximab-induced thrombocytopenia has been shown to occur in up to 2.9% of patients.⁴ In contrast to type II heparin-induced thrombocytopenia, which may develop over several days, abciximab-induced thrombocytopenia develops rapidly. Because of this, platelet counts should be checked at 2 and 4 hours after initial infusion of abciximab. In the event of significant thrombocytopenia following PCI with abciximab, consultation with cardiology prior to discontinuation of antiplatelet therapy or administration of any blood products is absolutely necessary to balance the risk of stent thrombosis versus life-threatening bleeding in this high-risk situation. **MM**

Blake Daley, David Miranda and Daniel Pease are residents and Ankur Kalra is a fellow in the Division of Cardiology and department of medicine at Hennepin County Medical Center.

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FIGURE 2

Coronary Angiogram Demonstrating Culprit Lesion in the Mid-Left Anterior Descending Coronary Artery

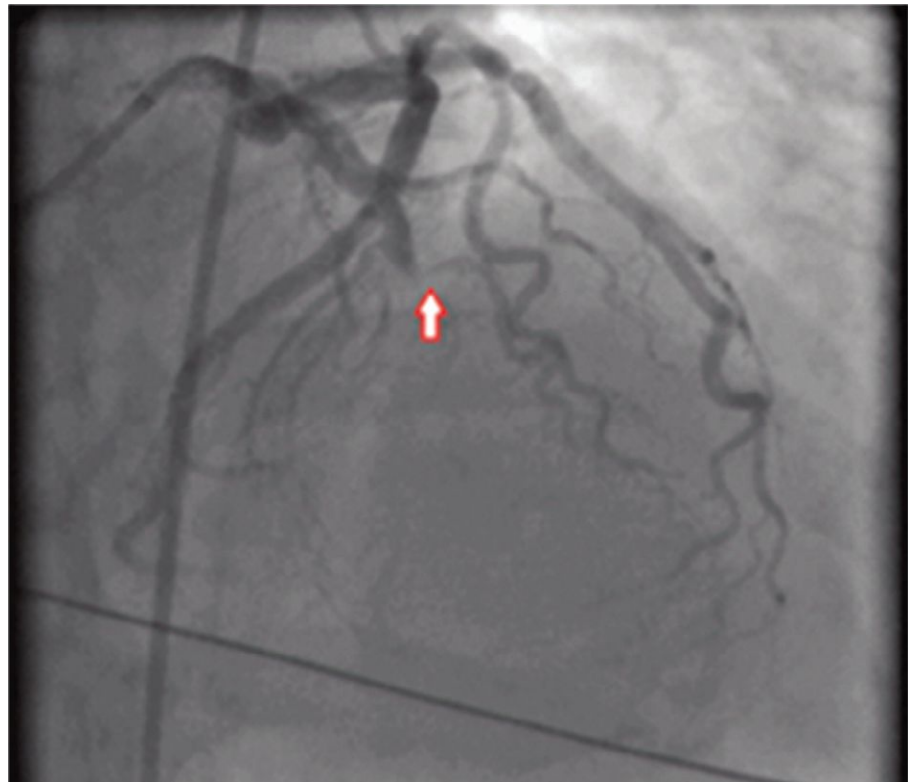
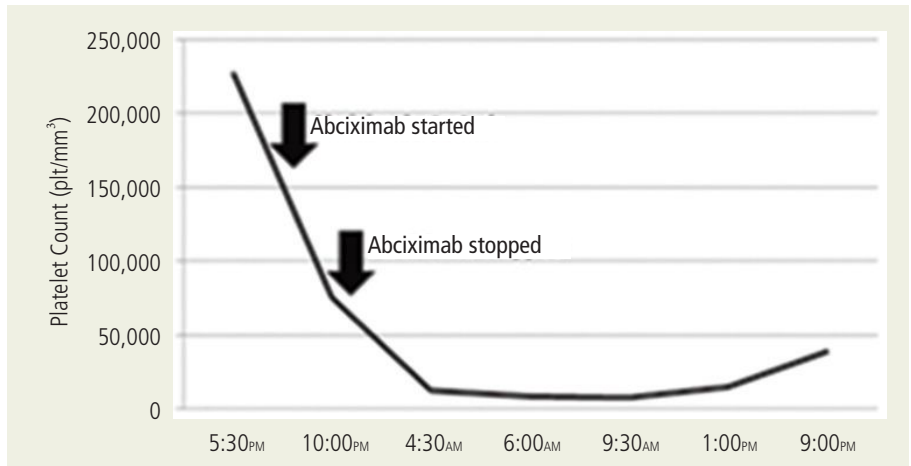


FIGURE 3

Thrombocytopenia Development

Timeline of abciximab infusion and resulting thrombocytopenia



With Kawasaki Disease, Time is Coronary Health

BY CLAIRE JANSSON-KNODELL AND RHAMY MAGID, M.D.

A previously healthy 3-year-old Hmong boy presented to Children's Hospitals and Clinics of Minnesota with a history of fever that was unremitting despite antipyretics. Two weeks prior to admission at Children's, he presented to an outside hospital with a fever accompanied by left-sided neck swelling. A neck ultrasound showed a lymph node measuring 3.5 x 2.7 x 2.2 cm, without abscess or fluid collection. He was treated for acute cervical lymphadenitis with antibiotics (ceftriaxone initially, then ampicillin-sulbactam). His undulating fevers continued, but he was discharged after two days with oral antibiotics (amoxicillin-clavulanate). At home, his family discontinued this medication after his mother noticed a spotted rash on

his shins believed to be an allergic reaction. During a follow-up visit to his pediatrician, the boy had a low-grade fever, swelling in his legs, and an erythematous rash. He was referred to the hospital, but his mother chose to keep him home because she assumed he had improved. He was "playful and interactive" at home and the neck swelling had lessened. A week later, the child returned to the clinic with persistent fever and pain in his foot that caused him to limp. The child also had red eyes, which his mother attributed to frequent crying. The pediatrician sent the boy directly to Children's Hospital for admission.

On exam, the boy had a fever of 103.1° F and was tachycardic (161 beats

per minute). His blood pressure was 110/66 mm Hg, and he was irritable. He weighed 15.2 kg. His sclerae were injected bilaterally without exudate. His lips appeared bright pink with cheilosis without frank cracking. His oropharynx was erythematous. He did not have cervical lymphadenopathy. His hands and feet were edematous bilaterally. He had no rash, petechiae or ecchymosis. He had nonbleeding desquamation of his hands circumferentially around his thumbs.

The boy had a WBC of 25,000/mm³ with a neutrophil predominance, hemoglobin level of 8.1g/dL and a platelet count of 895,000/mm³. He had a mild transaminitis with an alanine aminotransferase level of 60 U/L. His C-reactive protein was 9.48 mg/dL and his erythrocyte sedimentation rate was >140 mm/hour.

This boy's history, physical exam and lab values were suggestive of Kawasaki disease (Table).¹ Because of his late presentation, there was concern for coronary aneurysm. He was immediately started on intravenous immune globulin therapy (IVIG) and high-dose aspirin.

Transthoracic echocardiogram showed three aneurysms—one in each of his coronary arteries. The aneurysm in the left circumflex artery measured 5.6 mm, a saccular aneurysm in the right coronary artery was 6.5 mm in size, and the giant

TABLE

Clinical Criteria for Diagnosis of Kawasaki Disease

Fever of at least five days

Presence of four or more of the following clinical features:

- Conjunctival injection: bilateral, painless, without exudate
- Cervical lymphadenopathy: >1.5 cm, usually unilateral
- Oral mucosal changes: erythema and cracking of lips, strawberry tongue, diffuse injection of oral and pharyngeal mucosa
- Polymorphous rash
- Changes in extremities: acute stage — erythema and edema of hands and feet, convalescent stage — membranous desquamation of fingertips

Exclusion of alternative diagnosis

Source: Dajani AS, Taubert KA, Gerber MA, et al. Diagnosis and therapy of Kawasaki disease in children. *Circulation*. 1993;87:1776–80.

aneurysm in the left anterior descending artery measured 8.2 mm.² (A giant aneurysm is defined as >8mm and is a prognostically poor indicator.) Aggressive anticoagulation was started to prevent coronary thrombosis and subsequent myocardial infarction.

Discussion

This case illustrates the potential for severe consequences when there is late diagnosis of Kawasaki disease. Without IVIG treatment, about 25% of children with Kawasaki disease develop an aneurysm; with IVIG administration that number is reduced to 4%.³ Recognition of this constellation of findings as Kawasaki disease is crucial to the administration of appropriate IVIG therapy for prevention of aneurysms in coronary arteries. Additionally, this case highlights the value of culturally appropriate care. Perhaps if the gravity of the situation was communicated to the family in a way that was clearly understood, this poor outcome could have been avoided. **MM**

Claire Jansson-Knodell is a medical student at the University of Minnesota and Rhamy Magid is a pediatrician at Children's Hospitals and Clinics of Minnesota.

Learning points

- Early recognition is key to preventing cardiovascular sequelae.
- Treatment within the first 10 days of illness is critical to the prevention of coronary aneurysms, reducing the risk five-fold.
- If there is concern regarding patient compliance in cases where the index of suspicion for Kawasaki disease is high, the seriousness should be clearly communicated to the family and close follow up may be beneficial.

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“Barium Stool Ball” Retained by Obstipation with Overflow Incontinence

BY SHERRY-ANN BROWN, M.D., PH.D., AND FURMAN MCDONALD, M.D., M.P.H.

An 84-year-old man was admitted to the hospital with chronic diarrhea, nausea, vomiting, failure to thrive and 30-lb. weight loss in the last six months. His past medical history was significant for musculoskeletal back pain after a fall six months prior, for which he was prescribed narcotic medication upon discharge from a brief hospitalization. Despite limited effect, the narcotics continued to be renewed in subsequent health care visits as “carry forward” from the discharge summary dismissal medication list. An upper gastrointestinal (GI) series with thin barium swallow performed 17 days prior to this admission was normal. Rectal exam at the time of admission demonstrated only scant watery stool. An admission computed tomography (CT) of the abdomen and pelvis showed a large volume of stool throughout the colon and residual barium within a markedly distended rectum with a “barium stool ball” in the upper rectum. He was diagnosed with overflow diarrhea in the context of opiate-induced obstipation. He was treated with enemas and polyethylene glycol (colonoscopy preparation dosage), which resulted in multiple large bowel movements and resolution of his nausea and anorexia. In order to prevent future constipation, narcotics were discontinued; he was discharged on

Metamucil and Senokot and continued to do well. This case illustrates a complication of narcotic medications in the elderly as well as the need for careful reconciliation of medications before and after hospitalizations. **MM**

Sherry-Ann Brown is a resident and Furman McDonald is a professor of medicine at Mayo Clinic College of Medicine.

Learning points

- Careful reconciliation of medications (particularly opiates) should be pursued in the elderly before and after hospitalizations.
- Obstipation is a complication of chronic use of narcotic medications.
- Transition from chronic constipation to chronic diarrhea should raise suspicion for obstipation with overflow diarrhea.

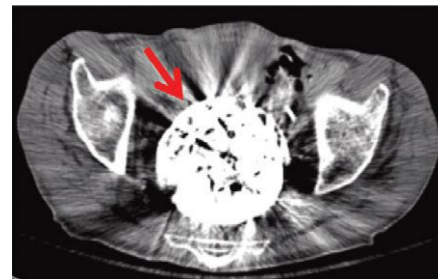
FIGURE 1

Scout Film from Abdomen and Pelvis CT Scan Showing the “Barium Ball”



FIGURE 2

“Barium Ball” Shown on Cross-Section View of Abdomen and Pelvis CT



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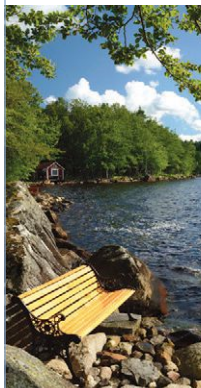
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Morning glory

A portrait of strength

BY SHERRY-ANN BROWN, M.D., PH.D.

Mrs. C sits in a wheelchair next to her hospital bed. We ask her if she is going to need a wheelchair at home. She smiles and tells us, “No, I only sat here so you ladies could have the chairs.”

Wow, I think. How nice of her! I am struck by her warm demeanor and positive attitude even as she tells us about her chronic low back pain and the new groin pain that flares whenever she tries to lift her leg. My colleague and I take a look at her lower back and see a central incision, a mark left from the surgery she had four days ago. The surgeon removed a bone spur that was causing lumbrosacral spinal stenosis. Mrs. C tells us she is looking forward to being able to walk without pain, a luxury she has not experienced for about a year.

I recently saw an image of a morning glory and it reminded me of Mrs. C. The flower closes at night, then reopens each morning, greeting the world afresh. Regardless of what Mrs. C faces each day, she greets the world afresh and is able to funnel only the experiences and feelings that enable her to go on with life.

Like a morning glory, which grows from a vine that twines around objects and climbs walls, Mrs. C has the support of an array of individuals including her six children, two of whom live within five minutes of her condo, and her many friends. Each week, her card group meets to enjoy a scrumptious meal and a game. Mrs. C tells us she is confident that if she ever needs anything, she could call on any of her family or friends.

Throughout removal of her gallbladder, a bout with appendicitis, knee replacements, bilateral ankle fusion, fusion of her cervical vertebrae, rotator cuff surgeries and the death of her husband, Mrs. C has maintained her physical and emotional composure. It seems that the twining vine through which she is nurtured is strong enough to uphold her, despite the challenge posed by her physical struggles.

As a result, Mrs. C thrives and caring for her is a beautiful experience. **MM**

Sherry-Ann Brown is in the department of internal medicine at Mayo Clinic.

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