West Virginia Medical JOURNAL

1st Quarter 2019

West Virginia State Medical Association

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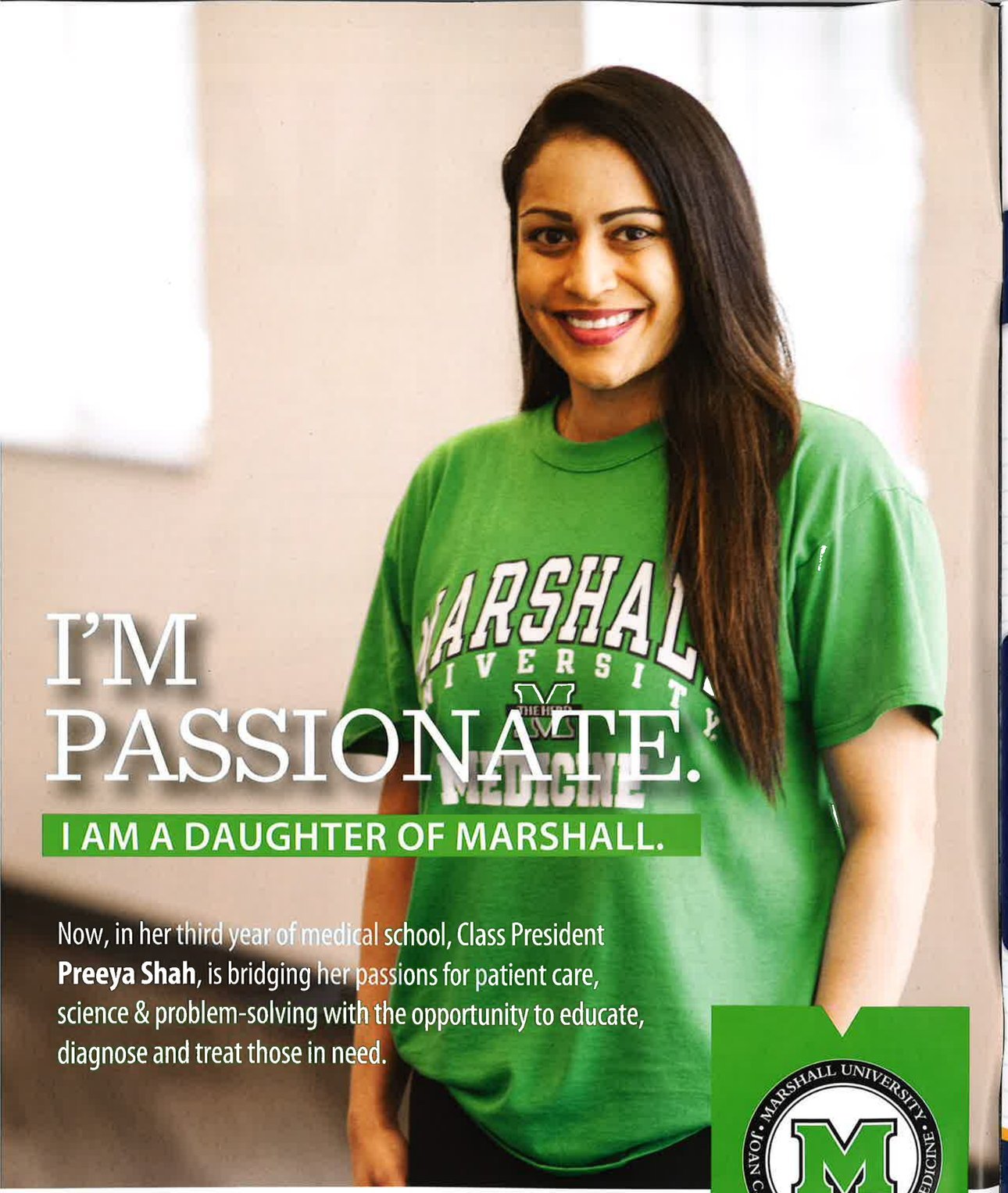
West Virginia State Medical Association



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The West Virginia State Capitol south entrance featuring the "Lincoln Walks at Midnight" statue.

Peer-Reviewed Articles

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Features

The West Virginia Medical Journal (WVMJ) is published by the WVSMA for its members. If you wish to contribute an editorial, county society news, a letter to the editor or news of special interest to our members, please contact Angie Brown, Managing Editor at 304-925-0342, ext. 200 or angie@wvsma.org.

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President's Message

Coy A. Flowers, MD, FACOG
WVSMA President, 2018-2019

Dear Colleagues,

In November, I was honored to be part of our WVSMA's AMA Delegation at the Interim meeting at National Harbor. Literally, from sun up to sun down, I and others were completely immersed in the intricacies of health care policy. In elementary school, I sure knew the dangers of misplaced modifiers and dangling participles; however, I had no earthly idea that adjectives, commas, and the ordering of phrases could mean so much to the health of a nation. But, they do. And, I also learned that those words mean nothing without advocates, standing firm behind them and educating elected officials and the public alike on why those words, grouped together into evidence-based polices, ultimately lead to a healthier country.

Over these next few months, our WVSMA Legislative Team – our Legislative Committee, Lobbyists, and Government Affairs staff – will be in constant contact with our membership to discuss in detail our goals for the coming legislative session in Charleston. Key to the success of any of these efforts is YOU – the Physician Advocate – as you hold a power stronger than most any other individual or organization in our state. Physicians are warriors on the front lines of public health and witness the impact of government's actions – and inactions - on patients' lives.

Advocacy noun
ad·vo·ca·cy | \'ad-və-kə-sē

Definition of *advocacy:* the act or process of supporting a cause or proposal : the act or process of advocating something // He was known for his *advocacy* of health care rights.

Recently, the American Medical Association (AMA), American College of Physicians (ACP), American Academy of Family Physicians (AAFP), American College of Obstetricians & Gynecologists (ACOG), American Psychiatric Association (APA), and American Academy of Pediatricians (AAP) released national joint statements calling for our "government to act on the public health epidemic of gun violence" and for "stronger state and federal gun laws that protect children, including a ban on assault weapons, as well as stronger background checks, solutions addressing firearm trafficking, and encouraging safe firearm storage." In response, the National Rifle Association (NRA) told America's physicians to "stay in our lane" and to speak out only on those issues we might actually know something about.

Then, doctors revolted all across this country. From their workplaces in emergency rooms, clinics, and even morgues, physicians told their patient's stories, detailing thousands of horrific and gruesome stories of how they take care of the countless numbers of gun violence victims every single day.

Until now, organized medicine, like our WVSMA has done the yeomen's work for our health care advocacy efforts. Now, and for the immediate future, we must be discussing how individual physicians can step into roles as activists on issues related not only to gun violence, but also health care, obesity, poverty and mental health. For the impending 60-day 2019 legislative session, WVSMA will advocate for a continued emphasis on solving the opioid crisis, correcting inefficiencies and eliminating burdens in the prior authorization process, and working toward much stronger anti-smoking and tobacco use regulations and policies. Today, however, our collective medical community - all of us who care for patients – are faced with a real and serious challenge to our core mission: protecting the public health.

The Story Behind The Worst Measles Outbreak In The European Union

Global Spike in Measles a 'Serious Concern'

Nov. 30, 2018 -- Measles cases surged in 2017, as many countries saw severe outbreaks due to gaps in vaccination coverage, according to new data from the World Health Organization (WHO) and the CDC. Since 2000, more than 21 million lives have been saved through measles immunizations, but cases reported since 2016 increased by more than 30% worldwide, the report says.

"The resurgence of measles is of serious concern, with extended outbreaks occurring across regions, and particularly in countries that had achieved, or were close to achieving, measles elimination," Soumya Swaminathan, MD, the WHO's deputy director general for programs, says in a statement. Unless more is done to vaccinate more children, "We risk losing decades of progress in protecting children and communities against this devastating, but entirely preventable, disease," she says.

Recent national headlines reflect outbreaks of vaccine-preventable diseases: measles outbreaks in New York and New Jersey and a chickenpox outbreak in North Carolina. These outbreaks have been fueled by vaccine-refusal, supported by nonmedical exemptions to school immunization requirements. In West Virginia, we do not see such headlines as our school immunization policies protect our children from vaccine-preventable diseases. Nevertheless, despite the success of our rigorous and effective school immunization requirements that protect our students and communities from vaccine-preventable diseases, legislation is frequently introduced that would allow nonmedical exemptions to school immunization requirements and, subsequently, reduce vaccination rates.

Perennially, WVSMA has fought these threats to the overall health of West Virginia and has prevailed to maintain the policies necessary to keep our people well, but you can be certain that groups who oppose vaccines have already drafted legislation for the 2019 legislative session that would allow nonmedical exemptions to immunization requirements. Their efforts are not waning which is exactly why physicians and other medical providers across this state need to speak out. YOUR VOICE – the perspective from a HEALTH EXPERT - is necessary to inform legislators, particularly newly elected

Continued on the next page

senators and delegates, about the strength and necessity of our school immunization requirements, without any weakening of our current laws.

As your President, I always want to lead by example. Over the last few days, I contacted my newly elected officials from Greenbrier County to discuss this issue. I told them that West Virginia has one of the most effective school immunization requirements in the nation, which protects our school-age children and communities from vaccine-preventable diseases, and our statutes do not allow any non-medical (personal belief, philosophical, or religious) exemptions. As a result of our school immunization requirements, our kindergarten and adolescent immunization rates have risen to among the highest in the nation and reach Healthy People 2020 goals. Speaking as a physician in their community who cares for their constituents, I asked each of them to always maintain West Virginia's immunization requirements the way they are, without nonmedical exemptions. See here what each of them said.

"As the grandson of an OB/GYN, I am aware of the dangers of politicians legislating the doctor/patient relationship. That's why I appreciate receiving the counsel of medical professionals alongside that of patients when important issues like this come before the legislature."

Senator Stephen Baldwin

There are 134 members of the WV legislature, and we need each and every one on the record supporting our current WV vaccination program. That's exactly why, I, along with the entire WVSMA Legislative Team, encourage all of our WVSMA physician and physician assistant members to engage your representatives. No one is more qualified to educate your elected officials on this particular issue of vaccines than YOU. When should you call upon your senators and delegates? NOW! The most effective time to meet with your legislators is before they head to Charleston for the start of 2019 legislative session on January 9th. While still at home, they have much more time to listen to their constituents' issues and, trust me, they will listen to you and are extremely appreciative for your expert perspective. At times, I have encountered some individual physicians who have been initially reluctant to play a role in physician advocacy – timid to take direct action to promote change to improve the public health. But I haven't met any of my colleagues who regretted becoming an advocate once they took that leap to meet with elected officials, especially when positive results came from their efforts. Think of it this way, we can help only a certain number of patients who show up in our exam rooms each week, but we can help tens of thousands or more just by changing a word or two in our state's laws. ***Doctor, YOU have that power. Today, fighting for vaccines, is the time to wield it.***

"I'm a former school teacher, and I know how fast illnesses can spread through our kids and teachers alike in our schools. I'm also a mom who wants her child to live a long, healthy life. For my kid and all of yours, I will support West Virginia's current vaccination laws that are known nationally as some of the best."

Delegate Cindy Lavender-Bowe

"As a public school teacher for nearly 20 years, student safety is our top priority. This includes the health of all students. West Virginia's current school vaccination program is among the best in America, and we need to keep it that way. The recent chickenpox outbreak at a private school in Asheville, North Carolina, highlights the importance of vaccines."

Delegate Jeff Campbell

A Checklist
for Physician Advocacy

Follow the simple seven

- ☐ **Be a WVSMA Member**

- ☐ **Get to know your legislators**

- ☐ **Attend WVSMA Advocacy Events**

- ☐ **Read "Under the Dome"** (WVSMA e-newsletter)

- ☐ **Donate to WESPAC**

- ☐ **Follow Us on Social Media**

- ☐ **Join the WVSMA Legislative Committee**

Contact Danny Scalise

West Virginia State Medical Association
&
Practice Management Institute

2018-19 Education & Training Schedule

Course Name	Location	Date	Time	Price
Medicare & Compliance Changes	Charleston, WV	1/4/2019	09:00-12:00	$199.00
CPT Code Update	Charleston, WV	1/4/2019	01:00-04:00	$199.00
Certified Medical Office Manager	Charleston, WV	1/10/2019	09:00-04:00	$999.00
Medical Front Office Skills Certificate Program	Charleston, WV	2/6 & 13/2019	09:00-04:00	$295.00
Certified Medical Office Manager—CMOM (4 days)	Charleston, WV	8/6-7/2019 8/13-14/2019	09:00-04:00	$999.00
Certified Medical Coder—CMC (5 Tuesdays)	Charleston, WV	9/3/2019	08:00-04:00	$1250.00
E/M Chart Auditing Workshop	Charleston, WV	4/9/2019	09:00-04:00	$299.00
Transform the Front Desk Staff	Charleston, WV	7/23/2019	09:00-12:00	$199.00
Transform the Front Desk Staff	Charleston, WV	7/23/2019	01:00-04:00	$199.00
Medical Office Compliance	Charleston, WV	10/1/2019	09:00-04:00	$299.00

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If your practice, group of practices or institution is interested in scheduling any PMI course for 10 or more attendees, please contact Devon Lopez at 304-925-0342, ext. 200 or devon@wvsma.org.

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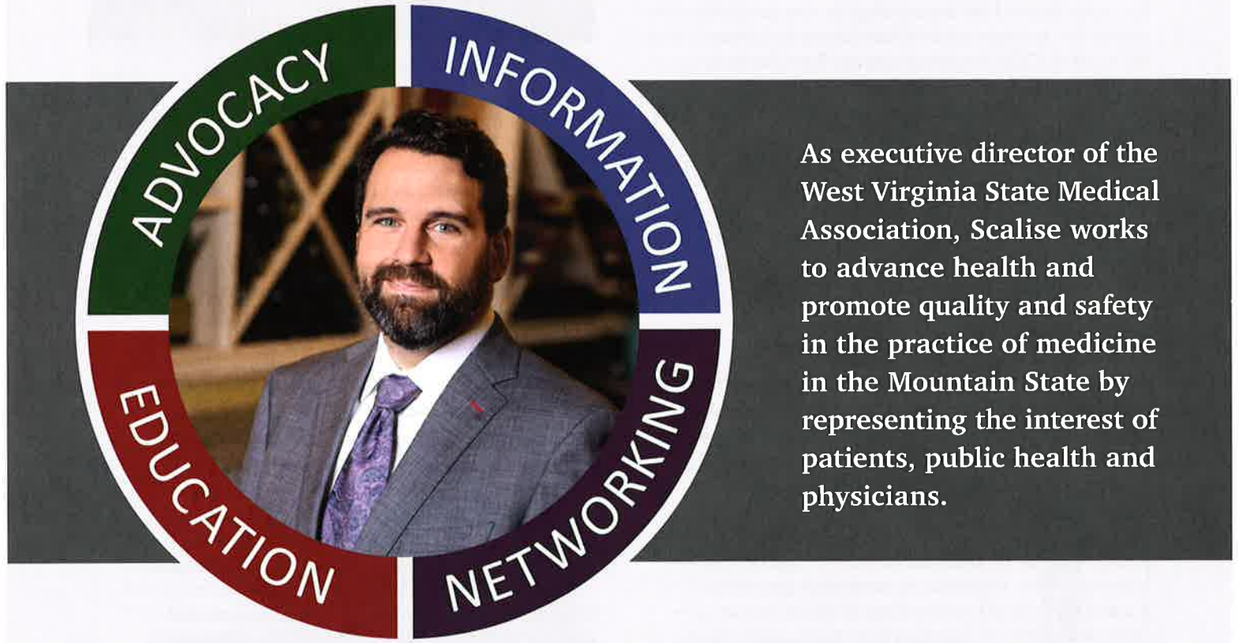
Congratulations

Danny Scalise, MBA, MPH, CPH

West Virginia Executive Young Gun 2019



As executive director of the West Virginia State Medical Association, Scalise works to advance health and promote quality and safety in the practice of medicine in the Mountain State by representing the interest of patients, public health and physicians.

Thank you, Danny, for advocating for a happier, healthier West Virginia. Congratulations on this well-deserved honor from your friends at:

Dr. Elie Gharib · Kanawha Medical Society · West Virginia State Medical Association · spilman thomas & battle · Thomas Health

2018 Interim Meeting of the American Medical Association House of Delegates

The 2018 Interim Meeting of the American Medical Association House of Delegates convened at the Gaylord National Resort and Convention Center, National Harbor, Maryland on November 10-13, 2018. The West Virginia State Medical Association was represented by Dr. Joseph B. Selby, delegate and chair; Dr. Hoyt Burdick, delegate; Dr. James Felsen; alternate delegate; and Dr. Coy Flowers, current president of the West Virginia State Medical Association. Dr. Ron Stollings, the newly elected alternate delegate, was unable to attend due to schedule conflicts. Danny F. Scalise II, MBA, MPH, CPH, the West Virginia State Medical Association Executive Director, was in attendance and coordinated the activities of the delegation.

The order of business for consideration of reference committee reports included:

- Reference Committee on Amendments to Constitution and Bylaws.
- Reference Committee (B) Legislative Advocacy
- Reference Committee (C) Medical Education
- Reference Committee (F) AMA Governance and Finance
- Reference Committee (J) Medical Service, Practice and Insurance
- Reference Committee (K) Science and Public Health

The following are highlights from the actions recommended and subsequently adopted by the House of Delegates and as such have become AMA policy.

The issue of confronting harassment within medicine was met head on with an emergency resolution that reaffirms the AMA's commitment to equity, fairness and respect for human dignity. The adoption of this resolution by the House prompted a standing ovation from the floor of the House of Delegates. This resolution strengthened measures adopted at the Annual Meeting in 2017 and 2018.

The AMA's zero-tolerance anti-harassment policy applies to employees, and all attendees of our meetings and functions. Multiple reporting options are available including an option to register complaints confidentially to an external vendor online or by way of a toll-free hotline.

Policy was adopted to urge the Centers for Medicare & Medicaid Services to assist physician practices seeking to qualify for and sustain medical home status by providing financial and other resources. The loud and clear message is, "Primary Care and Patient-Centered Medical Home (PCMH) are bedrocks of high-quality Patient Centered Care". In addition to the directive to CMS the Council on Medical Service encouraged health agencies, health systems and other

WV Delegation Caucus Meeting

stakeholders to assist and support Patient-Centered Medical Home transformation and maintenance.

To address the issue of rural health disparities, new policy was adopted to advocate for expansion of broadband and wireless connectivity to all rural areas of the United States.

The public health crisis created by "Gun Violence" prompted new AMA policy to seek stronger background-check systems for firearm purchase. Existing policy was amended to support a ban on the manufacturer, importation and sale of the 3-D printed firearms and the production and distribution of 3-D firearm digital blueprints. AMA policy encourages states to enact laws requiring the reporting of all classes of prohibited individuals, as defined by State and Federal Law, to the National Instant Criminal Background Check System (NICS).

To address the high suicide rate for medical professionals the House of Delegates directed the AMA to request that the Liaison Committee on Medical Education (LCME) and the Accreditation Council for Graduate Medical Education (ACGME) collect data on medical students, residents, and fellow suicides to Identify patterns that could predict such events and ultimately save lives.

The AMA House of Delegates sent a strong message to the FDA pronouncing the urgent public health epidemic of "Vaping". Research has shown the use of e-cigarettes and vaping products is unsafe. In an effort to help stem the popularity of vaping, delegates amended AMA policy to "encourage the FDA" to prohibit the use of flavoring agents in tobacco products which includes Electronic Nicotine Delivery Systems (ENDS).

AMA advocates against misapplication of the CDC guidelines for prescribing opioids by Pharmacist, Health Insurers, Pharmacy Benefit Managers, Legislatures, Government, and Private Regulatory Bodies in ways that prevent or limit patients' medical access to opioid analgesia. The morphine milligram equivalent threshold found in the CDC guidelines are guidelines, not absolute thresholds to signal professional discipline or loss of clinic practice.

Finally, I would like to bring to the attention of members, The Council on Medical Education Report 1, Competency of Senior Physicians. Older physicians are an essential part of our work force in the United States. Currently 26.6% of all physicians in the U.S. are 65 or older according to AMA data.

The Council on Medical Education began work on "Assuring Safe and Effective Care" for Patients by Senior/Late Career Physicians in 2015. Additional work group meetings have occurred in 2016 and 2017.

The report presented before the House of Delegates this meeting came with a list of recommendations.

There was a great deal of discussion in Reference Committee (C) on this issue. The Committee made deletions to the recommendations and additions, however, the House of Delegates chose to refer the report back to the Council for additional work. Arguments were made that health plans could use competency evaluations to limit participation. Research suggests that the effect of age on an individual physician's competency can be highly variable, and wide variations are found in cognitive performance with aging. Implied in the doctor-patient relationship is an ethical obligation for patient safety. Physicians should retain the right to modify their practice to allow them to continue to provide safe and effective care.

AMA President-Elect and WV native, Patrice Harris, MD speaking during the Southeastern Delegation breakfast. Dr. Joseph Selby seated on the far right.

For WVSMA members who are also members of the AMA, you can view the Reference Committee Reports as amended and the action taken by the House of Delegates by going to the AMA website, (www.ama-assn.org). Click American Medical Association (AMA), then menu, then House of Delegates. Next click Interim Meeting, then Business of the House of Delegates I 2018 and Reports of Reference Committee, Annotated will display. Select the individual Reference Committee to review.

Respectfully Submitted,
Joseph B. Selby, MD
West Virginia State Medical Association
Delegate and Chair

Part I. Infantile Hemangioma: Literature review of current science, classification and management

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Grants and Financial Support: none to declare.

Key Words: Infantile Hemangioma; Vascular neoplasms; Propranolol treatment for hemangiomas

Abstract

Infantile hemangioma is the most common benign tumor in infants. These vascular tumors are not usually present at birth but will begin to form within the first 12 weeks after birth, completing growth by 9-12 months of age, then entering into an involutional stage of several years. Tumors vary from very small, non-invasive to large tumors that cause disfigurement and depending upon location, functional compromise. Hemangiomas may not entirely resolve, often times leaving residual tumor or a lipo-fibrotic mass with dermal scarring. Treatment for hemangiomas is varied and may include, but not limited to, observation, surgery, corticosteroids, beta-blockers, and laser therapy. Choice of treatment is based on size, location, and stage of tumor growth. This review article is presented in two parts: Part I- a comprehensive literature review of the current science of the biology of hemangioma formation, classification schemes, and management. Part II follows with our institutional review of the management of these sometimes challenging lesions of childhood. *(Part II will be published in the 2nd Quarter edition of the WVMJ.)*

Introduction

Infantile hemangioma (IH) is the most common congenital tumor and vascular lesion of infancy, occurring in about 1:100 births.[1] Hemangiomas are benign vascular neoplasms associated with rapid growth followed by slowing or plateau of growth and eventual involution. Hemangiomas vary in size from small superficial macules to disfiguring tumors occupying large tissue areas and organs. These lesions are often mistaken for a lymphatic-venous malformation early in its manifestation, but clinical behavior will soon generally typify which vascular lesion is at hand.

Due to the possibility of rapid growth and functional impairment in infants, some require early or urgent treatment. Management has included observation, pharmacological treatment with a variety of medications and surgical modalities. Currently, the standard of care for most proliferative or threatening hemangiomas is propranolol.[1,2]

As these tumors are very common, primary care providers who care for children will see both simple and more complex IH. Therefore it is important to be well-versed in the diagnosis of and current management modalities for these lesions. This paper is in two parts- Part I is a review of the current literature, science, and management of IH, followed by Part II which is a single institution's experience in managing these vascular neoplasms in the head and neck region utilizing four management arms.

Methods

Articles from English-based journals published over the last 15 years were accessed through various search engine modalities for current research, classification schemes, and management of vascular lesions and infantile hemangiomas. Review chapters and specialty statement recommendations ("Standard of Care" statements) for diagnosis and management of hemangiomas were also reviewed for pertinent findings and recommendations for treatment. These have been summarized into the following headings.

Literature Review

Pathogenesis

Hemangioma is a tumor of the microvasculature characterized by proliferation of immature endothelial cells with angiogenic potential. Itinteang et al. and North et al. suggest a placental embolic origin during the first trimester of pregnancy due to detected presence of glucose transporter protein 1 (GLUT-1) – a marker expressed on placental endothelium and IH.[3,4] Embolic placental tissue may be distributed (cellular implantation in vascular-rich tissue beds) in similar fashion to neural crest cell migration (accounting for segmental presentation and syndromic manifestations of IH) with delayed proliferation in the post-natal period.[1,3]

Hemangioma formation may also result from placental anomalies or local tissue hypoxia in the developing fetus which in turn result in ischemic drive and increased reparative angiogenesis.[3-6] Haggstrom et al. theorize that early separation of a developing fetus from maternal and placental influence may lead to loss of angiogenic control, accounting for the higher prevalence vascular lesions in premature infants.[6] Increased incidence has also been noted to follow amniocentesis and chorionic villus sampling.[3,7,8]

Risk factors for IH include low birth weight, prematurity, multiple gestations, female sex (3:1 predilection), advanced maternal age and is more common in Caucasians.[5,6] Most occur in the head and neck region followed by the trunk and extremities.[6,9,10] Solitary lesions are generally found but approximately 20% of infants present with multiple lesions.[1,2,6] Sporadic occurrence of IH is the norm, however, there are some reports of familial inheritance.[11,12]

Classification

The International Society for the Study of Vascular Anomalies recently updated the classification of vascular anomalies and grouped them into vascular tumors and vascular malformations. Vascular malformations are divided into simple malformations, combined malformations, malformations of major named vessels, and malformations associated with other anomalies based on anatomic presentation.[13,14] The groundwork by Mulliken and co-workers was helpful in developing classification schemes which serve to recognize clinical presentation, behavior and prescribed management for various malformations, including IH.[15]

Vascular anomalies have been classified broadly into vascular neoplasms (including hemangiomas) and vascular malformations (representing lymphatic-venous, capillary, arterial and mixed manifestations) of tissue-specific entities.[13] Vascular tumors grow by cellular hyperplasia whereas malformations develop through a defect in tissue morphogenesis. These growth mechanisms are still not fully understood. Vascular malformations are present at birth, display a slow and progressive growth timeline, appear blue-violaceous in hue; they are soft and warm to touch and often extend to and involve the underlying soft tissue or bone. Malformations generally grow with the patient unless stimulated by trauma or inflammatory processes in which case rapid growth may be detected.[16] Lymphatic and venous malformations usually appear after the first month of life, they are often the same color as the surrounding skin and extend to and involve deeper tissues. Stimulation of osseous tissue may result in overgrowth phenomena of the involved craniofacial skeleton which is not characteristic of IH.[17]

Further classification of IH is based on clinical presentation and behavior. Hemangiomas are recognized by their levels of activity and grouped into phases termed proliferative, plateau (or involuting) and involutional. Depths of tissue involvement are descriptively classified as superficial, deep and compound or mixed.[1,13,18]

It is important to distinguish between congenital hemangiomas (CH) and infantile hemangiomas (IH) as their behavior will be distinct. Those hemangiomas detected in the last trimester on prenatal ultrasound or present fully developed at birth are termed CH.[19] The distinguishing immuno-phenotypic markers for IH- glucose transporter protein-1 (a specific marker for endothelial cells) is lacking in CH.[20,21] Also, involution begins earlier in CH (days to weeks after birth) with frequent ulceration, periodic bleeding, and mild anemia.

Clinical Behavior

Hemangiomas are usually recognized in the first or second week of life.[18] They develop with an initially rapid period of proliferation during early infancy, attaining about 80% of final size by 4-5 months of age. Hemangiomas demonstrate slow but persistent growth beyond 6 months with completion of growth at around one year of

Table 1: Vascular Lesion Presentation and Behavior

	History						Exam Findings			
Type of Lesion	Present at Birth	Proportional Growth	Unproportional Growth	Involution Phase	Episodes of Infection	Pulse / Bruit	Skin Color	Trans-illuminate	Deflate	Refill
Hemangioma	-	-	+	+	+ Involutional Phase	-	Blue-Red	+	rapid	-
Lymphatic	+	+	+ Episodic	-	+	-	No Color	-	slow	-
Venous	+	+	+ Episodic	-	-	-	Blue	+	slow	-
Arterial	+	+	-	-	-	+	Blue-red	+	rapid	+

Figure 1. *Superficial infantile hemangioma with extension to deeper structures or to the conjunctiva.*

Figure 2. *Mixed lymphatic-venous malformation with deep, bluish hue, doughy consistency, indistinct margins (circle) and waxes/wanes in size, often increasing with stimulation.*

age.[22-25] The proliferative phase is characterized by marked endothelial proliferation and hypercellularity.[23]

The plateau phase represents the cessation of growth and initial involution of the lesion over the next few years.[1,3,14] Many tumors resolve to some degree, and no treatment is necessary. However, 20-40% of patients have a residual tumor or changes in character or appearance of the associated soft tissue and skin.[9,24,25] Further, complicated hemangiomas may adversely affect vision, respiration, feeding, hearing (auditory canal obstruction) and cardiac status which may require intervention prior to the involutional phase.[6]

Clinical Features

For reference to a summary of clinical presentation and lesion behavior for vascular lesions, including hemangiomas, refer to Table 1. This guide will help the clinician distinguish hemangiomas from similar appearing vascular malformations, especially lymphatic-venous lesions.

Superficial IH typically present as bright red, non-compressible, elevated plaques (Figure 1) which are distinct from the bluish, compressible and indistinct margins of deeper hemangiomas or lymphatic-venous malformations (Figure 2). Deep lesions involve the deep dermis and subcutaneous tissue with or without overt involvement of the overlying skin as a "mixed" or complex lesion.[26-29] Patterns of distribution include localized, multifocal or segmental (dermatomal) occurrence.

Larger segmental distribution in the facial region has also been associated with syndromic manifestations of vascular lesions. PHACES (**P**osterior fossa, **H**emangiomas, **A**rterial abnormalities, **C**ardiac defects, **E**ye anomalies, **S**ternal cleft) and PELVIS syndrome (**P**erineal hemangioma, **E**xternal genitalia abnormalities, **L**ipomyelomeningocoele, **V**esico-renal abnormalities, **I**mperforate anus, **S**kin tags) may be associated with lower body segmental hemangiomas.[27,28] These syndromic associations and those with diffuse hemangiomatosis may be at risk for high-output cardiac failure.[30,31]

The most common complication of IH is ulceration of the superficial dermis due to sluggish flow and thromboses. These may become secondarily infected. Visual impairment may result from tumor growth in the periorbital region resulting in amblyopia by disruption of the visual axis or astigmatism from persistent compression of the globe.[1,16,26] Hemangiomas of the nasal-oral cavities present risk for airway obstruction or bleeding.[27,28,29]

Management

Observation

Simple serial assessments of a newly presenting IH may be all that is necessary. A single lesion with no functional threat or issues can be measured, photographed and periodically evaluated to determine its biologic behavior and probable clinical course.[16,19] More aggressive proliferating or threatening lesions require more frequent assessment with a view to medical intervention should behavior, symptomatology or threat to function eventuate.[20,21,22]

Medical

Treatment of IH has included irradiation, excision or ablation, corticosteroids, propranolol, alpha-interferon, imiquimod, vincristine, cyclophosphamide or laser therapy. Pharmacological therapy is targeted at cellular proliferation. However, since many children are seen later during or following the period of greatest proliferation, efficacious medical utility is minimized and often there is little difference noted in final lesion appearance between treated and untreated lesions.[9,30,31] As some of these pharmacologic agents are associated with potential serious side effects including Cushingoid appearance, growth retardation, adrenal and immune suppression and hypertension, a more benign modality is desirable, especially in infants and young children. Successful response of IH to propranolol therapy was first reported in 2008 by Léauté-Labréze et al. while treating a child with obstructive hypertrophic cardiomyopathy with propranolol. They noted significant simultaneous shrinkage of a nasal hemangioma.[30] Since this first reported case and subsequent series, propranolol has become the standard of care in many pediatric centers.[9,26,30-40]

Propranolol

Propranolol's mechanism of action is theorized to involve decreased capillary flow with an associated decrease in expression of VEGF (vascular endothelial growth factor) and FGF (fibroblast growth factor) thereby inhibiting angiogenesis.[33,34] Studies have also demonstrated triggered apoptosis of capillary endothelial cells after β blocker administration.[35]

Propranolol's non-selective beta receptor antagonism may lead to several well-known adverse effects.[31,36,37] The most commonly observed side effects of propranolol treatment include sleep disturbance, bronchospasm, and diarrhea or vomiting.[31-37] Decreased heart rate and hypoglycemia are less frequently observed and related to immediacy after administration.[33] These risks have prompted inpatient observation in many centers at the start of therapy.[29,30,31,37-39]

Pretreatment testing for possible comorbidities is indicated in a select subset of patients. A consensus statement presented in 2013 by Drolet et al. recommended pretreatment testing for patients with PHACES syndrome (cardiac anomalies) or concomitant cardiovascular disease.[40] They recommended baseline ECG, echocardiography and chemistry panel. Large volume hemangiomas may result in some degree of high cardiac output. Therefore, institution of propranolol therapy should be undertaken with pretreatment monitoring and starting at lower doses.[41-44]

To minimize the adverse effect of hypoglycemia, Drolet et al. recommended that infants be fed soon after propranolol administration.[40] This is especially true for premature infants and neonates less than two months corrected age.[43] If oral feeds are not possible, then IV dextrose solutions should be administered coupled with blood glucose levels. Nocturnal feeding should be done if propranolol is given 3x/day or just prior to sleep to prevent transient hypoglycemia which may occur 1-2 hours after administration.[45]

Recent prospective studies have demonstrated the efficacy of early propranolol therapy at the onset of proliferative growth. Leaute-Labreze et al. reported on a large multi-center randomized, controlled study and found that 88% of 188 patients randomized to receive 3 mg/kg/day of propranolol were noted to have significant improvement by five weeks of treatment compared to only 5% of patients receiving placebo.[30] It was interesting to note that there was no significant difference in adverse side effects between the propranolol and placebo groups. Other studies have reported significant responses of IH with reduced dosages of propranolol at 2mg/kg/day in divided doses.[43,45,46]

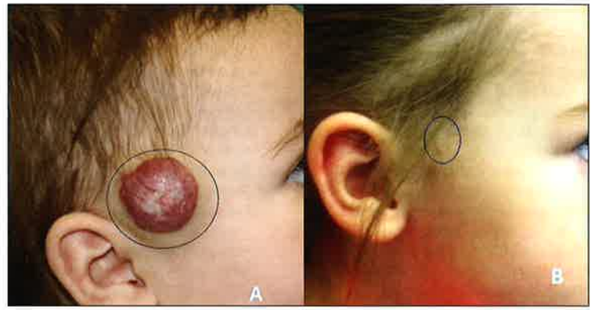

Figure 3. *Preop (A) photo of involuting hemangioma with extent of border encircled. Postop (B) scar (circle) after excision of residual hemangioma, Final review at 3 years of age.*

Duration of propranolol therapy is recommended for the entirety of the proliferative phase. Discontinuation of therapy must be weighed against the benefit of continued therapy with regression of the lesion versus possible rebound growth. Discontinuation of therapy before 9 months of age, presence of a deep component (mixed lesions), female gender and presence of segmental hemangiomas have been associated with increased risk for rebound growth.[34] After cessation of therapy, Shehata et al. noted that of the IH which rebounded (6%), all lesions successfully responded to a subsequent 3 month course of propranolol.[47]

Surgery

Surgery for removal or reduction of IHs of the head and neck region has been relegated to those lesions which require immediate attention due to functional compromise (airway, vision) and haven't responded to medical therapy, or for involuted lesions with associated soft tissue disfigurement or scar. Residual involuted tumor often resides within a mass of lipo-atrophied soft tissue with overlying dermal scar. Mulliken's extensive treatise identified those indications for early (threatening) and delayed (disfigurement) surgical management.[48] He notes that upwards of 40% of IHs leave some element of cosmetic deformity of the involved skin and soft tissue, necessitating consideration for further treatment.

Basically, surgical treatment may be considered when:[49]

- Total excision can be safely performed
- Vital organs are preserved (eye, brain, major nerves)
- Surgery affords a better or equal result to involution
- Psychosocial impact warrants timely intervention.

The aesthetic zones of the head and neck region often dictate that careful, conservative and at times,

staged excision of residual tumor is performed in order to preserve surrounding functional soft tissue. Figure 3 demonstrates a partially involuted hemangioma (a) and postop result (b) at final review.

Summary

Infantile hemangioma has undergone some recent changes in terms of its classification and our understanding of its biologic behavior and consequently, current management schemes. Although IH typically undergoes some involution, this is often incomplete or affects key functional areas – eyes, airway, oral feeding, etc, which in infancy must be more aggressively and temporally addressed during the proliferative stage. The current standard for management of such aggressive lesions is with propranolol, although corticosteroids still have a place in the medical armamentarium. Current recommendations are dosing of propranolol of 1-2 mg/kg/day in divided doses with monitoring of blood glucose, pulse and blood pressure upon commencement of therapy. Complications and adverse effects appear to be uncommon with propranolol.

Finally, surgery is generally reserved for residual tumor or involuted tumors with poor aesthetic soft tissue. It is recommended as a final stage intervention unless there is urgent clinical warrant due to functional compromise, in which case early excision is necessary.

References

1. Drolet BA, Esterly NB, Frieden IJ. Hemangiomas in children. *NEJM*. 1999; 31(3):173–81
2. Kilcline C, Frieden IJ. Infantile hemangiomas: how common are they? A systematic review of the medical literature. *Pediatr Dermatol* 2008; 25:168-73.
3. Itineang T, Withers A, Davis P, Swee T. Biology of infantile hemangioma. *Front Surg*. 2014; 1:38.
4. North PE, Waner M, Mizeracki A, Mihm MC. GLUT-1: a newly discovered marker for juvenile hemangiomas. *Human Pathol* 2000; 31(1):11-22.
5. Greco MF, Grieden IJ, Drolet, BA, Garzon MC, Mancini AJ, Chamlin SL, Metry D, Adams D, Lucky A, Wentzel MS, Horii KA, Baselga E, McCuaig CC, Powell J, Haggstrom A, Siegel D, Morel KD, Cordisco MR, Nopper AJ, Krol A. (Hemangioma Investigator Group). Infantile hemangiomas in twins: a prospective cohort study. *Pediatr Dermatol*. 2016; 33(2):178-83.
6. Haggstrom AN, Drolet BA, Baselga E, Chamlin SL, Garzon MC, Horii KA, Lucky AW, Mancini AJ, Metry DW, Newell B, Nopper AJ, Frieden IJ. (Hemangioma Investigator Group). Prospective study of infantile hemangiomas: demographic, prenatal, and perinatal characteristics. *J Pediatr* 2007; 150:291–4.
7. Burton BK, Schulz CJ, Angle B, Burd LI. An increased incidence of haemangiomas in infants born following chorionic villus sampling (CVS). *Prenat Diagn* 1995; 15:209-14.
8. Alfirevic Z,Mujezinovic F, Sundberg K. Amniocentesis and chorionic villus sampling for prenatal diagnosis. *Cochrane Database Syst Rev* (2003).
9. Solman L, Murabit A, Gnarra M, Harper JI, Syed SB, Glover M. Propranolol for infantile haemangiomas: single centre experience of 250 cases and proposed therapeutic protocol. *Arch Dis Child* 2014;99:1132–1136.
10. Haggstrom AN, Lammer EJ, Schneider RA, Marcucio R, Frieden I. Patterns of infantile hemangiomas: new clues to hemangioma pathogenesis and embryonic facial development. *Pediatrics* 2006;117:698–703.
11. Blei F, Walter J, Orlow SJ, Marchuk DA. Familial segregation of hemangiomas and vascular malformations as an autosomal dominant trait. *Arch Dermatol* 1998; 134:718-22.
12. Berg JN, Walter JW, Thisanagayam U, Evans M, Blei F, Waner M. Evidence for loss of heterozygosity of 5q in sporadic haemangiomas: are somatic mutations involved in haemangioma formation? *J Clin Pathol* 2001;54:249-52.
13. Nosher JL, Murillo PG, Liszewski M, Gendel V, Gribbin C. Vascular anomalies: a pictorial review of nomenclature, diagnosis and treatment. *World J Radiol*. 2014;28:677–692.
14. Wassef M, Blei F, Adams D, Alomari A, Baselga E, Berenstein A, Burrows P, Frieden I, Garzon M, Lopez-Cutierrez J, Lord D, Mitchel S, Powell J, Prendiville J, Vikkula M. Vascular anomalies classifications: recommendations form the international society for the study of vascular anomalies. *Pediatrics* 2015 Jun; 2014-3673.
15. Mulliken and Glowacki; Marler JJ, Mulliken JB. Vascular anomalies: Classification, diagnosis and natural history. *Facial Plast Surg Clin No Am* 2001; 9(4):495-504.
16. Yang B, Li L, Zhang L, Sun Y, Ma L. "Clinical characteristics and treatment options of infantile vascular anomalies." *Medicine* 2015;94(40):e1717. doi: 10.1097/MD.0000000000001717
17. Padwa BL, Hayward PG, Ferraro NF, Mulliken JB. Cervicofacial lymphatic malformation: clinical course, surgical intervention, and pathogenesis. *Plast Reconstr Surg* 1995; 95(6):951-60.
18. Munden A, Butschek R, Tom WL, Marshall JS, Poeltler DM, Krohne SE, Alió AB, Ritter M, Friedlander DF, Catanzarite V, Mendoza A, Smith L, Friedlander M, Friedlander SF (2014) Prospective study of infantile haemangiomas: incidence, clinical characteristics and association with placental anomalies. *Brit J Dermatol* 170:907–913
19. Krol A, MacArthur Cj. Congenital hemangioma: rapid involuting and noninvoluting congenital hemangiomas. *Arch Facial Plast Surg* 2005; 7(5):307-11.
20. North, PE, Waner M, James CA, Mizeracki A, Frieden IJ, Mihm MC Jr. Congenital nonprogressive hemangioma: a distinct clinicopathologic entity unlike infantile hemangioma. *Arch Dermatol* 2001; 137(12):1607-20.
21. Lee PW, Frieden IJ, Streicher JL, McCalmont T, Haggstrom AN. Characteristics of noninvoluting congenital hemangioma: A restrospective review. *J Am Acad Dermatol* 2014 May; 70(5):899-903.
22. Chang L, Haggstrom A, Drolet B, Baselga E, Chamlin SL, Garzon MC, Horii KA, Lucky AW, Mancini AJ, Metry DW, Nopper AJ, Frieden IJ, Hemangioma Investigator Group. Growth characteristics of infantile hemangiomas: Implications for management. *Pediatrics* 2008;122:360–367
23. Mulliken JB, Glowacki J. Hemangiomas and vascular malformations in infants and children: a classification based on endothelial characteristics. *Plast Reconstr Surg* 1982;69:412-20.
24. Nakayama H. Clinical and histological studies of the classification and the natural course of the strawberry mark. *J Dermatol* 1981; 2:277-91.
25. Marler JJ, Mulliken JB. Current management of hemangiomas and vascular malformations. *Clin Plast Surg* 2005; 32(1):99-116.
26. Missoi TG, Lueder GT, Gilbertson K, Bayliss SJ. Oral propranolol for treatment of periocular infantile hemangiomas. *Arch Ophthalmol* 2011; 129(7):899-903.
27. Orlow SJ, Isakoff MS, Blei F. Increased risk of symptomatic hemangiomas of the airway in association with cutaneous hemangiomas in a "beard" distribution. *J Pediatr* 1997;131:643-6.
28. Bent JP. Airway hemangiomas: contemporary management. *Lymphat Res Biol* 2003; 1(4):331-5.
29. Kim JS, Kwon SH. Sinonasal hemangioma: Diagnosis, treatment and followup of 37 patients at a single center. *J Oral Maxillofac Surg* 2017; Jan. doi:S0278-2391. Epub.
30. Leaute-Labreze C, Dumas de la RE, Hubiche T, Boralevi F, Thambo JB, Taieb A. Propranolol for severe hemangiomas of infancy. *NEJM* 2008; 358: 2649–51.
31. Lawley LP, Siegfried E, Todd JL. Propranolol treatment for hemangioma of infancy: risks and recommendations. *Pediatr Dermatol*. 2009; 26(5):610–14.
32. Zimmerman AP, Wiegand S, Werner JA, Eivazi B. Propranolol therapy for infantile hemangiomas: *Int J Pediatr Otorhinolaryngol*. 2010; 74(4):338-42).
33. De Graaf M, Breur JM, Raphael MF, Vos M, Breugem CC, Pasmans SG. Adverse effects of propranolol when used in the treatment of hemangiomas: a case series of 28 infants. *J Am Acad Dermatol*. 2011 Aug;65(2):320-7.
34. Shah S, Baselga E, McCuaig C, Pope E, Coulie J, Boon L, Garzon M, Haggstrom A, Adams D, Drolet B, Newell B, Powell J, Garcia-Romero M, Chute C, Roe E, Siegel D, Grimes B, Frieden I. Rebound growth of infantile hemangiomas after propranolol therapy. *Pediatrics* Volume 1 37, number 4, April 2016
35. Sommers Smith SK, Smith DM. Beta blockade induces apoptosis in cultured capillary endotheolial cells. *In Vitro Cell Dev Biol Anim* 2002; 38(5):298-304.
36. Chen TS, L. F. Eichenfield LF, Friedlander SF. Infantile hemangiomas: an update on pathogenesis and therapy. *Pediatrics* 2013; 131:99–108.
37. Léauté-Labrèze C, Prey S, Ezzedine K: Infantile hemangioma—part II: risks, complications and treatment. *J Eur Acad Dermatol Ven;* 2011;25:1254–60.
38. Holland KE, Frieden IJ, Frommelt PC, Mancini AJ, Wyatt D, Drolet BA. Hypoglycemia in children taking propranolol for the treatment of infantile hemangioma. *Arch Dermatol* 2010; 146(7):775–78.
39. Pavlaković H, Kietz S, Lauerer P, etal. Hyperkalemia complicating propranolol treatment of an infantile hemangioma. *Pediatrics*; 2010; 126(6):1589-93.
40. Drolet BA, Frommelt PC, Chamlin SL, Haggstrom A, Bauman N, Chiu Y, Chun R, Garzon M, Holland K, Liberman L, MacLellan-Tobert S, Mancini A, Metry D, Puttgen K, Seefeldt M, Sidbury R, Ward K, Blei F, Baselga E, Cassidy L, Darrow D, Joachim S, Kwon E, Martin K, Perkins J, Siegel D, Boucek R, Frieden I. Initiation and use of propranolol for infantile hemangioma: report of a consensus conference. *Pediatrics* 2013; 131:128–40.
41. Siegfried EC, Keenan WJ, Al-Jureidini S. More on propranolol for hemangiomas of infancy (letter). *NEJM*; 2008; 359(26):2846.
42. Leaute-Labreze C, hoeger P, Mazereeuq-Hautier J, Guiband L, Baselga E, Posiunas G, Philips R, Caceres H, Lopez Gutierrez JC, Ballona R, Friedlander SF, Powell J, Perek D, Metz B, Barbarot S, Maruani A, Szalai ZZ, Krol A, Boccara O, Foelster-Holst R, Bosch M, Su J, Buckova H, Torrelo A, Cambazard F, Grantzow R, Wargon O, Wyrzykowski D, Roessler J, Bernabeu-Wittel J, Valencia A, Przewratil P, Glick S, Pope E, Birchall N, Benjamin L, Mancini A, Vabres P, Souteyrand P, Frieden I, Berul C, Mehta C, Prey S, Boralevi F, Morgan C, Heritier S, Delarue A, Voisard J. A randomized, controlled trial of oral propranolol in infantile hemangioma. *NEJM* 2015; 372:735-46.
43. Sondhi V and Patnaik SK. "Propranolol for infantile hemangioma (PINCH): an open-label trial to assess the efficacy of propranolol for treating infantile hemangiomas and for determining the decline in heart rate to predict response to propranolol." *J Pediatr Hematol Oncol*. 2013 Oct;35(7):493-9.
44. Haggstrom MA, Garzon M, Baselga E, Chamlin S, Frieden I, Holland K, Maguiness S, Mancini A, McCuaig C, Metry D, Morel K, powell J, Perkins S, Siegel D, Drolet B. Risk for PHACE syndrome in infants with large facial hemangiomas. *Pediatrics* 2010; 126:e418–e426.
45. Hogeling M, Adams S, Wargon O. A Randomized Control Trial of Propranolol for Infantile Hemangioma. *Pediatrics*. 2011 Aug;128(2):e259-66.
46. Chang L, Ye X, Qiu Y, Ma G, Jin Y, Chen H, Lv D, Yu W, Yang X, Wang T, Lin X. Is Propranolol Safe and Effective for Outpatient Use for Infantile Hemangioma? A Prospective Study of 679 Cases From One Center in China. *Ann Plast Surg*. 2016 May; 76(5):559-63.
47. Shehata N, Powell J, Dubois J, Hatami A, Rousseau E, Ondrejchak S, McCuaig C. Late rebound of infantile hemangioma after cessation of oral propranolol. *Pediatr Dermatol*. 2013 Sept; 30(5): 587-91.
48. Mulliken, JB. Treatment of Cutaneous Hemangiomas. In, John B Mulliken, Patrice E Burrows, Steven J Fishman, editors. *Mulliken and Young's Vascular Anomalies: Hemangiomas and Malformations*. 2nd edition. Oxford University Press. NY. 2013. p 161.
49. Boyd VC, Bui D, Naik B, Levy M, Hicks MJ, Hollier L. Surgery: The Treatment of Choice for Hemangiomas. *Semin Plast Surg*. 2006; 20(3): 163–8.

Imaging surveillance for pneumothorax after CT-guided lung biopsy: Conclusions from a year of data at a tertiary care center

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Abstract

This study was performed to identify the minimum observational time and post-procedural imaging necessary before safely discharging a patient after CT-guided lung biopsy. Retrospective chart review was conducted on 167 CT-guided lung biopsies performed in 2015 at our institution to determine how often pneumothoraces occurred, and when they were first noted on post-procedure chest imaging. Patient age, gender, lesion laterality and size, core needle size, and background emphysema on imaging, as well as clinical history of chronic obstructive pulmonary disease were recorded. If pneumothorax occurred, its size, need for chest tube, and ultimate medical outcomes were logged. Chi squared statistical analysis was utilized. Post-biopsy pneumothorax rate was 38%, with 87% incidence at the time of the biopsy and 13% within the first hour. No new pneumothorax was detected beyond the first hour. Overall pneumothorax intervention rate was 51%. The leading risk factor for pneumothorax was concomitant radiographic evidence of emphysema, with 48% incidence versus 30% of patients without underlying emphysema. These patients were also significantly more likely to have a pneumothorax requiring intervention ($p<0.05$). We concluded that post-biopsy imaging can safely be limited to immediate post-procedure CT and one hour chest radiograph in the absence of pneumothorax. In patients with pneumothorax, further imaging, intervention, and/or discharge may be considered based on imaging results and patient's condition.

Introduction

CT-guided percutaneous core needle lung biopsy has become an invaluable method of obtaining a tissue diagnosis in patients with lung pathology varying from large pulmonary masses to numerous lesions and chronic focal infiltrates of uncertain etiology, providing a minimally invasive technique and a means to access lesions or areas of the lung that would otherwise be difficult to sample using alternative methods such as bronchoscopy and open excisional biopsies. However, along with all of the benefits of CT-guided lung biopsy there are associated risks, as with any other procedure. Among the most commonly encountered complications following CT-guided lung biopsy are pneumothorax, pulmonary hemorrhage, and hemothorax. Reported post-biopsy pneumothorax rates range from 0-60% with up to 15% of these pneumothoraces requiring chest tube placement.[1,2] Not only does this translate to increased morbidity and mortality, but also increased patient and institutional expenses with an average cost per inpatient day of $752-$1656 in the state in which our institution resides.[3,4] There are many factors that may contribute to increased risk of complications following CT-guided lung biopsy such as size of the lesion, location of the lesion, size of the needle, trajectory of the biopsy approach, and number of pleural surfaces crossed.[5,6] The purpose of our study was to evaluate incidence of pneumothorax and evaluate risk factors, such as lesion size and laterality, patient gender and age, core needle size, and presence of emphysema. Furthermore, our aim was to identify these risk factors in hopes to create an algorithm for post-biopsy follow up directed toward eliminating unnecessary imaging and decreasing length of stay.

Materials and Methods

Permission to perform this study was granted by the Institutional Review Board. A retrospective chart review was performed. All patients who had a CT-guided core needle lung biopsy performed by Interventional Radiology at our institution from January 2015 through December 2015 were analyzed. These biopsies were performed or supervised by seven different radiologists with or without resident assistance. All biopsies utilized CT-guidance only. Patient positioning was determined by lesion location. Standard coaxial techniques were applied, with use of Cook Quick-Core® Coaxial Biopsy Needle Sets (Cook Medical Inc., Bloomington, IN). The majority of biopsies, 139, were performed with an 18 gauge biopsy needle and a 16 gauge trocar needle (18G/16G). Three used the 20G/19G set, and one with the 16G/14G set. Typically, three or four core specimens were obtained to ensure adequate sample for diagnosis.

Following removal of the trocar needle, an occlusive dressing was placed, and post-biopsy CT imaging was obtained. If a pneumothorax was present, a chest tube was placed at the discretion of the operator. Indications for chest tube placement versus additional serial monitoring were based on symptoms and pneumothorax size and rate of change. Those requiring chest tubes went on to have monitoring chest radiographs at routine intervals. Patients not requiring an immediate chest tube were ordered AP chest radiographs, scheduled at one hour and two hours post-biopsy, as patients have traditionally been observed at least two hours post-biopsy. These images were reviewed for pneumothorax development, stability, or increase. (Figures 1a-c & 2a-c). Patients were discharged if no pneumothorax had developed or the pneumothorax was stable over the two-hour period and the patient was asymptomatic. Chest tubes and pneumothorax aspiration procedures following these follow up radiographs are referred to as "Delayed" for the purposes of this study.

From January through December of 2015, images from a total of 167 CT-guided lung biopsies were reviewed. Of these, 24 were excluded. Two were excluded as the procedure was canceled due to resolved or decreased lesion size following acquisition of pre-biopsy imaging. Five were cancelled due to lack of safe needle approach to the lesion. Thirteen were excluded due to chest wall location of the lesion. An additional two were excluded on the basis of a persistent pneumothorax at the start of the procedure (as a result from a recent attempted biopsy). Two biopsies were excluded due to technical/procedure discrepancies, as these were performed as an FNA only. Therefore, 143 patients were included in this study.

Four investigators (three radiology residents and a medical student) reviewed charts and recorded the date of examination, patient's age, gender, laterality of lesion, and size of core needle. The greatest dimension of the biopsied lesion was recorded as small (<1.5cm), medium (1.5-3cm) and large (>3cm), as measured on CT biopsy images. Presence or absence of a pneumothorax on immediate post-biopsy CT images was recorded, as well as at the time of follow up chest radiographs. If a pneumothorax occurred, its size was recorded as small (<25% of hemithorax), moderate (25-50% of hemithorax), or large (>50% of hemithorax), as well as whether a chest tube (immediate or delayed) was needed for treatment. The ultimate outcome of the medical encounter was also noted (same day home discharge or required hospitalization for either pneumothorax monitoring or chest tube management). Pre-existing emphysema at time of biopsy was also denoted, based on subjective observation of CT biopsy images. Presence of clinically-diagnosed COPD was also recorded based on patient histories obtained from electronic medical record.

Statistics

Statistical analysis was performed using Pearson's Chi-Squared Test, aided by Apple Numbers software, version 3 (Apple Inc., Cupertino, CA).

Results

Of the 143 patients included in this study, 70 were male and 73 were female, with an age range and mean of 22-87 years and 65 years, respectively (Table 1). Emphysema was present in 64 patients, 44% of our study population. Clinically diagnosed COPD was found in 71 patients, 50% of the study population. Eighty-three of the lesions were within the medium range, 52 were large, and 8 were small.

Overall, 55 biopsies (38%) were complicated by pneumothorax, 41 small, 9 medium, and 5 large. Of these 55 pneumothoraces, 48 (87%) were present during immediate procedural CT imaging, and the remaining 7 (13%) were found on initial one-hour post-biopsy chest radiograph. When comparing the one-hour and two-hour post biopsy radiographs, no new pneumothorax was identified after two hours that was not present after one hour.

Out of the 55 pneumothorax cases, 28 patients (50%) required chest tube placement (n=26) or pneumothorax aspiration (n=2). Seventeen (61%) procedures were performed immediately, and 11 (39%) were done in a delayed manner, ranging from three hours post-biopsy to the following day for increasing volume (Table 1).

Forty-eight pneumothoraces were present on immediate post biopsy CT imaging, seventeen of these patients (34%) underwent immediate chest tube placement or aspiration and 8 patients (17%) required delayed chest tube placement. Of the 7 pneumothoraces diagnosed on one hour imaging, 3 required interventions, including 2 chest tubes and 1 aspiration. Therefore overall intervention rate was 51%.

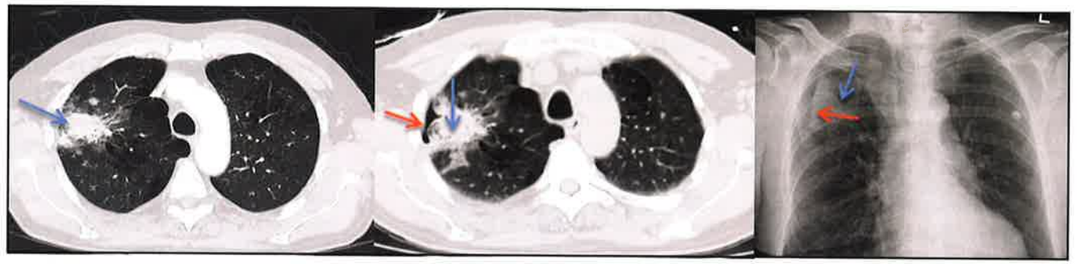
The major risk factor for development of post-biopsy

Table 1. Demographics and pneumothorax frequency

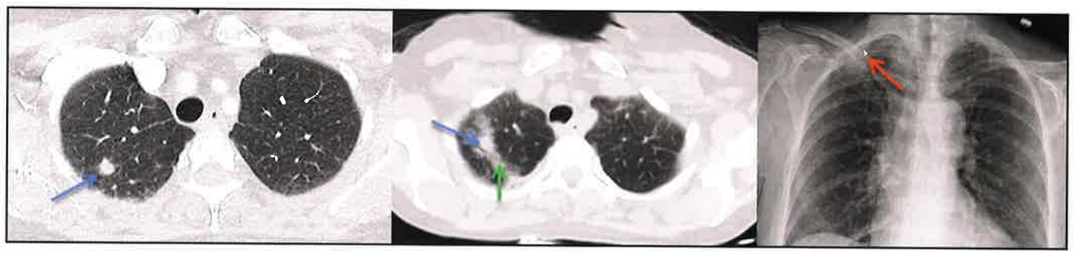
Demographics and Data

	NO PTX		IMMEDIATE		1 HR		2 HR		TOTAL	
Patient Number	88	(62%)	48	(34%)	7	(5%)	0	(%)	143	
Age										
Average	65		66		61		-		65	
Range	22-87		41-86		32-87				22-87	
Sex										
Male	37	(53%)	29	(41%)	4	(6%)	-		70	(49%)
Female	51	(70%)	19	(26%)	3	(4%)	-		73	(51%)
Laterality										
Left	39	(65%)	17	(28%)	4	(7%)	-		60	(42%)
Right	49	(59%)	31	(37%)	3	(4%)	-		83	(58%)
Lesion Size[a]										
Small	3	(38%)	4	(50%)	1	(13%)	-		8	(6%)
Medium	50	(60%)	29	(35%)	4	(5%)	-		83	(58%)
Large	35	(67%)	15	(29%)	2	(4%)	-		52	(36%)
Needle Size (Biopsy/ Trocar)										
16G/14G	1	(100%)	0	(%)	0	(%)	-		1	(1%)
18G/16G	86	(62%)	47	(34%)	6	(4%)	-		139	(97%)
20G/19G	1	(33%)	1	(33%)	1	(33%)	-		3	(2%)
Emphysema										
Present	33	(52%)	27	(42%)	4	(6%)	-		64	(45%)
Absent	55	(70%)	21	(27%)	3	(4%)	-		79	(55%)
COPD										
Present	45	(63%)	24	(34%)	2	(3%)	-		71	(50%)
Absent	43	(60%)	24	(33%)	5	(7%)	-		72	(50%)
PTX[b]										
S	-		34	(83%)	7	(17%)	-		41	(29%)
M	-		9	(100%)	0	(%)	-		9	(6%)
L	-		5	(100%)	0	(%)	-		5	(3%)
Resolved PTX	-		12	(92%)	1	(8%)			13	(9%)
Chest Tube Placed	-		25	(89%)	3	(11%)	-		28	(20%)
Immediate	-		17	(100%)	-		-		17	(12%)
Delayed	-		8	(73%)	3	(27%)	-		11	(8%)

a. Small: <1.5cm, Medium: 1.5-3cm, Large: >3cm
b. Small: <25%, Medium: 25-50%, Large: >50%



Figures 1a-c: *Axial CT pre-biopsy (Figure 1a), axial CT post-biopsy (Figure 1b), and chest x-ray post biopsy (Figure 1c), demonstrate a large right upper lobe mass (blue arrow) as well as a small pneumothorax (red arrow), seen on both post-biopsy CT and x-ray.*



Figures 2a-c: *Axial CT pre-biopsy (Figure 2a), axial CT post-biopsy (Figure 2b), and follow-up chest x-ray post-biopsy (Figure 2c), demonstrate a right upper lobe nodule (blue arrow), with post-biopsy hemorrhage identified on CT (green arrow). Small post-biopsy pneumothorax was present on follow-up chest x-ray (red arrow) that was not seen on immediate post-biopsy CT.*

pneumothorax was found to be emphysema (based on CT-imaging findings), with an incidence of 48% vs. 30% (p<.0.027). Clinically diagnosed COPD was not found to be a significant risk factor for pneumothorax with 37% of COPD patients developing pneumothoraces versus 40% of non-COPD patients (p<0.65). However, both radiographic evidence of emphysema and clinical evidence of COPD were associated with an increased likelihood of requiring chest tube placement with 34% vs. 8% (p<0.00006) and 27% vs 13% (p<0.03), respectively. Additionally, pneumothoraces were more likely to require treatment with a chest tube in the presence of radiographically diagnosed emphysema as well as clinically-diagnosed COPD, 71% vs. 25% (p<0.0007) and 73% vs 31% (p<0.002), respectively.

Other potential risk factors for development of pneumothorax were assessed, including patient age, relative lesion size, and lesion laterality; however, none of these were shown to be statistically significant. Additionally, needle size was not evaluated due to low number of alternative sizes.

Deviations from our standard imaging protocol were encountered. The most typical alternate scenario was skipping the one hour image when the immediate CT was negative. These deviations did not have any statistical or clinical significance, as no new two hour pneumothorax was found on these patients.

Discussion

Existing literature confirms that pneumothorax is a significant complication of lung biopsy. Choi et al. has reported an overall post-biopsy pneumothorax rate of 21.8% (using 18 or 22 gauge needles) with 3.3% occurring after three hours.[7]

R.P. Byrd et al. similarly reported a delayed pneumothorax (greater than 4 hours post-procedure) rate of 3.1% using a 22 gauge Chiba needle.[8] Geraghty et al. reported a significant decrease (50%) in pneumothorax rate with the use of a 19 gauge core biopsy needle compared to an 18 gauge.[9] Patients in that study underwent a three hour post-biopsy chest radiograph if initial CT was negative.

Dennie et al. reported a pneumothorax rate of 22.9% using needles smaller than 18 gauge.[10] They suggest discharge at 30 min if no pneumothorax is found. This study also attempted to quantify the morbidity of a single follow up radiograph, 30 minutes post-procedure. Out of 506 patients, only 7 pneumothoraces were missed beyond the 30 minutes. However, Stevens et al. suggested delayed monitoring (24 hour) is needed as 43% of their patients demonstrated

progression of pneumothorax.[11] Perlmutt et al. recommends follow-up radiograph at one and four hours post-biopsy.[12] Of the patients who required a chest tube, 100% were detected before or at the one hour post-biopsy imaging.

There have been several risk factors correlated to pneumothorax occurrence including needle size,[9] depth/size of lesion,[13] and emphysema.[7] Multiple studies have confirmed the association between presence of COPD/emphysema and increased risk for pneumothorax, as well as increased requirement for chest tube drainage of pneumothorax after CT-guided lung biopsy.[2] Ko et al. studied 150 post-biopsy CTs and found that both emphysema along the needle path and obstructive pulmonary function tests increased necessity for post-biopsy chest tubes.[5] Fish et al. found that in a study of 160 patients, pneumothoraces occurred in 42% of patients who had obstructive airway disease diagnosed by chest x-ray findings, compared with 25% of patients with normal chest x-rays. The patients with obstructive airway disease in that study also required more chest tube placements.[14] Cox et al. had similar conclusions when studying 346 patients, as emphysema increased the risk of pneumothorax and patients with emphysema were three times more likely to require chest tube placement.[15]

Based on our results, imaging diagnosis of emphysema was a risk factor for post-biopsy pneumothorax, while clinically documented COPD was not, possibly due to the fact that COPD encompasses both entities of chronic bronchitis and alveolar destruction, while radiographic findings were assessed for alveolar abnormalities only. This observation allows the operator to more confidently rely on the imaging diagnosis of emphysema as an assessment for post-biopsy risk of pneumothorax, rather than relying on the clinical diagnosis to be documented in the patient's chart. However, both emphysema and COPD were risk factors for increased requirement of chest tubes in the presence of pneumothorax, which may relate to altered respiratory dynamics and air trapping.

We use relatively larger diameter needles (18G needle through 16G Trocar) to obtain core and FNA samples per consensus with the pulmonology and pathology departments in our institution. This likely explains the higher rate of pneumothorax (38%) in our cohort compare to 20-30% in the literature. However, despite using larger needles, our data demonstrates minimal risk of late presentation pneumothorax following lung biopsy with only 5% of cases occurring after the initial computed tomography scan and no cases occurring after the one hour post-biopsy chest x-ray. Therefore our data suggests that follow-up imaging beyond one hour after CT-guided lung biopsy does not appear to be necessary.

Safely discharging patients one hour after lung biopsy would reduce health care costs. It would free up beds in post-operative areas, which is a necessity now more than ever with expanding busy hospitals. Nurses would require less overtime pay as well, as they sometimes have to stay after hours to monitor these patients until the series of timed follow-up exams are completed and the patients can be discharged.

Additionally, patients would benefit from earlier discharges. Their medical bills and time spent in the hospital and away from work would be reduced. Many patients travel hours to our tertiary care center to receive these biopsies and incur hotel costs the night of the biopsy after late discharges due to waiting for serial images. Patient satisfaction is expected to increase with implementation of new post-biopsy imaging policies, which in turn would help hospitals with reimbursement.

Our data demonstrates that all pneumothoraces large enough to require chest tube placement occurred within the first hour. Therefore, the risk of a large enough pneumothorax to require treatment occurring after patient has been discharged would be minute.

Our study has multiple limitations, including its retrospective nature. Additionally, only emphysema was evaluated for on imaging and the influence of other disease processes such as consolidations or fibrotic changes on development of post-biopsy pneumothoraces are unknown. An additional limitation is that only pneumothorax was evaluated as a post-biopsy complication. Biopsies can result in other complications, such as hemorrhage, which could necessitate serial imaging even in the absence of pneumothorax. However, significant intraparenchymal hemorrhage and hemothorax are invariably evident in the immediate or one hour imaging surveillance. When comparing clinical diagnosis of COPD with presence of post-biopsy pneumothorax, it is possible that incomplete documentation of this diagnosis in the medical record influenced our results. Finally, patient symptoms should be considered when designing a policy for follow-up imaging and discharge in the setting of post-biopsy pneumothorax.

Conclusion

In conclusion, our data suggests that in the absence of pneumothorax on immediate post biopsy CT scan, follow up imaging can safely be limited to one hour chest radiograph. In patients with small pneumothorax, longer clinical observation and further imaging should be considered based on the patient's respiratory condition.

References

1. Manhire A, Charig M, Clelland C, Gleeson F, Miller R, Moss H, et al. Guidelines for radiologically guided lung biopsy. *Thorax*. 2003; 58 (11): 920-936.
2. Boskovic T, Stanic J, Pena-Karan S, Zarogoulidis P, Drevelegas K, Katsikogiannis N, et al. Pneumothorax after transthoracic needle biopsy of lung lesions under CT guidance. *Journal of Thoracic Disease*. 2014; 6, Suppl 1 : S99–S107.
3. Rappleye, Emily. "Average cost per inpatient day across 50 states." *Becker's Hospital Review*, 19 May 2015. Web.
4. Hospital adjusted expenses per inpatient day.» The Henry J. Kaiser Family Foundation, Web.
5. Ko JP, Shepard JO, Drucker EA, Aquino SL, Sharma A, Sabloff B, et al. Factors influencing pneumothorax rate at lung biopsy: Are dwell time and angle of pleural puncture contributing factors? *Radiology*. 2001; 218 (2): 491-96.
6. Hiraki T, Mimura H, Gobara H, Shibamoto K, Inoue D, Matsui Y, et al. Incidence of and risk factors for pneumothorax and chest tube placement after CT fluoroscopy guided percutaneous lung biopsy: Retrospective analysis of the procedures conducted over a 9-year period. *American Journal of Roentgenology*. 2010 ; 194: 809-14.
7. Choi C, Um S, Yoo C, Kim YW, Han SK, Shim Y, et al. Incidence and risk factors of delayed pneumothorax after transthoracic needle biopsy of the lung. *Chest*. 2004; 126(5) : 1516-1521.
8. Byrd RP, Fields-Ossorio C, Roy TM. Delayed chest radiographs and the diagnosis of pneumothorax following CT-guided fine needle aspiration of pulmonary lesions. *Respiratory Medicine*. 1999; 93(6) : 379-381.
9. Geraghty PR, Kee ST, McFarlane G, Razavi MK, Sze DY, Dake MD. CT-guided transthoracic needle aspiration biopsy of pulmonary nodules : Needle size and pneumothorax rate. *Radiology*. 2003; 229(2):475-481.
10. Dennie CJ, Matzinger FR, Marriner JR, Maziak DE. Transthoracic needle biopsy of the lung : Results of early discharge in 506 outpatients. *Radiology*. 2001 ; 219(1) :247-251.
11. Stevens GM, Jackman RJ. Outpatient needle biopsy of the lung: its safety and utility. *Radiology*. 1984;151(2) :301-304.
12. Perlmutt LM, Braun SD, Newman GE, Oke EJ, Dunnick R. Timing of chest film follow-up after transthoracic needle aspiration. *American Journal of Roentgenology*. 1986 ; 146(5): 1049-1050.
13. Yamagami T, Nakamura T, Iida S, Kato T, Nishimura T. Management of pneumothorax after percutaneous CT-guided lung biopsy. *Chest*. 2002;121(4) : 1159-1164.
14. GD Fish, JH Stanley, KS Miller, SI Schabel, and SE Sutherland. Postbiopsy pneumothorax: estimating the risk by chest radiography and pulmonary function tests. *American Journal of Roentgenology*.1988 ; 150: (1), 71-74.
15. Cox JE, Chiles C, McManus CM, Aquina SL, Choplin RH. Transthoracic needle aspiration biopsy : Variables that affect risk of pneumothorax. *Radiology*. 1999 ; 212(1) : 165-168.

Delays in care of sudden sensorineural hearing loss, an unrecognized emergency

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Abstract

Sudden sensorineural hearing loss (SSNHL) is an acute loss of hearing due to poorly understood insults to the inner ear. SSNHL is a medical emergency warranting urgent referral to an otolaryngology specialist because hearing outcomes are improved with steroid treatment that must be administered soon after the onset of hearing loss to be effective, making early diagnosis and triage essential to salvaging hearing. This prospective study catalogued the timeline of the onset of hearing loss, diagnosis, treatment, and settings where care was administered for patients with SSNHL. We diagnosed 21 patients with SSNHL in the otolaryngology specialty clinics of West Virginia University over a 6 month time period. Nine of those patients (42.9%) were diagnosed outside of the window for treatment. The most common cause of delayed diagnosis was inappropriate treatment and triage in the primary care setting. As the quality of life burden of hearing loss is quite significant, improving recognition and triage in the primary care setting would allow for more patients with SSNHL to undergo treatment, improving hearing outcomes and quality of life.

Introduction

Making the Diagnosis

Sudden sensorineural hearing loss (SSNHL) is an acute onset, usually unilateral, significant hearing loss due to damage to the inner ear that is frightening and often emotionally devastating to affected patients. It is a medical emergency and when suspected, patients should be referred urgently for an otolaryngology specialist evaluation, as early diagnosis and steroid treatment is essential to maximizing hearing outcomes.

A tentative diagnosis of SSNHL can made in the primary care setting based on history and physical exam alone without a formal hearing test, or at least can create a high enough degree of suspicion to prompt an urgent referral to an otolaryngology specialist. The hearing loss of SSNHL may occur over a period of 3 days or less, but patients most commonly describe loss of hearing over a few hours, or that they awoke from sleep to find their hearing significantly decreased.[1,2] They typically do not have pain, but may have a sensation of aural fullness, tinnitus, and/or problems with balance. Any patient with acute hearing loss should have a tuning fork test and an otoscopic exam. The Rinne test is always used in conjunction with the Weber test to determine the nature of a patient's hearing loss (see Figure 1 for instructions on how to perform and interpret basic tuning fork testing).

In SSNHL the Weber tuning fork test lateralizes to the unaffected, better hearing ear (indicating asymmetric hearing), and the Rinne test demonstrates air conduction greater than bone conduction on both sides (confirming sensorineural hearing loss). Tuning fork testing and otoscopic exam can identify a conductive versus a sensorineural pattern of hearing loss in almost all cases. Patients with SSNHL have a sensorineural pattern to their hearing loss with no signs of conductive or middle ear pathology such as middle ear fluid, acute otitis media, or tympanic membrane perforation. Patients with these findings should be urgently referred to an otolaryngology specialist for possible SSNHL, ideally the next day, where it can be confirmed with a formal hearing test and treated if indicated.[2] In cases of sudden hearing loss where the diagnosis is unclear, these should also be treated as time-sensitive and referred to a specialist urgently.

Pathophysiology and Epidemiology

SSNHL occurs due to an inner ear insult to the cochlear and/or auditory nerve (as distinct from a conductive

Weber Test

Weber Test Procedure: A 512 Hz tuning fork is gently set vibrating and it is held firmly on the patient's forehead in the midline for a few seconds. The patient is asked if the tone is heard more clearly on one side (lateralization) or if they cannot identify a side which hears the tone better (no lateralization).

Interpretation: If there is no lateralization there is unlikely to be asymmetric hearing loss. If the tone lateralizes to one side, there is an ipsilateral conductive hearing loss or a contralateral sensorineural hearing loss.

Rinne Test

Rinne Test Procedure: A 512 Hz tuning fork is gently set vibrating and it is held firmly on the mastoid just behind and above the external ear for a few seconds (bone conduction position). While the fork is still vibrating (expect the vibration to have diminished somewhat) it is moved off the mastoid and held 1-2 cm from the ear canal with the tines of the fork oriented in line with the ear canal (air conduction position). The patient is asked in which position the tone is heard louder.

Interpretation: An ear with a significant conductive hearing loss hears bone conduction louder than air conduction. An ear that is normal or has sensorineural hearing loss hears air conduction greater than bone conduction.

Figure 1: *Tuning Fork Testing. The Rinne test is always used in conjunction with the Weber to determine the nature of a patient's hearing loss. In SSNHL the Weber test lateralizes (indicating asymmetric hearing loss) to the unaffected, better hearing ear and the Rinne test demonstrates air conduction greater than bone conduction on both sides (confirming sensorineural hearing loss).*

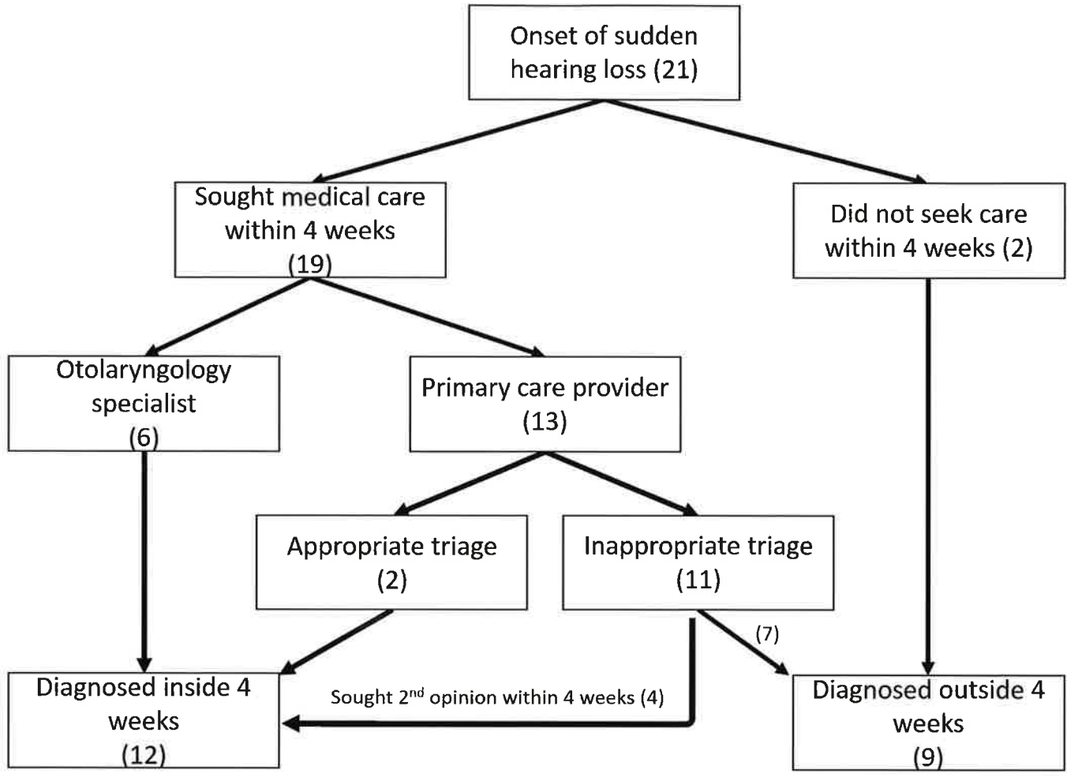

Figure 2: *Flow diagram of events after onset of hearing loss to diagnosis of SSNHL: Of the 12 patients who were seen within the window for treatment, 6 (50%) were seen initially by an otolaryngology specialist, while the other 6 were seen by a primary care provider initially. Of these 6 seen by a primary care provider initially, 2 were appropriately triaged and an urgent specialist referral made. The other 4 sought a specialist evaluation on their own after being treated with antibiotics and/or low-dose steroids for middle ear fluid or acute otitis media. Of all patients seen initially by a primary care provider, 2 of 13 (15.4%) were appropriately triaged.*

hearing loss due to interference with conduction of sound such as a tympanic membrane perforation, middle ear effusion, or ossicular chain discontinuity). The etiology of SSNHL is poorly understood. The cause is identified in only 10% of cases, which are usually due to vestibular schwannoma, stroke, or malignancy. In the remaining 90% the cause is unknown, though viral and/or vascular causes are suspected.[3] The incidence of SSNHL is relatively rare, estimated between 5 and 160 cases per 100,000 people.[2,4]

Natural History and Treatment

Without treatment, approximately half of patients with SSNHL will see at least some meaningful improvement in their hearing in the weeks following the acute loss, though most in this group will not reach their pre-loss hearing level. Currently, the only proven treatment for improving hearing outcomes is high-dose oral steroids and/or intratympanic steroid injection, in which high doses of steroid are injected through the tympanic membrane directly into the middle ear where it can diffuse into the cochlea. This is also a good option for diabetics or other patients for whom a high-dose oral steroid course is contraindicated. Treatment with oral and/or intratympanic steroids has been shown to improve hearing outcomes in cases where a cause for the hearing loss is identified such as in patients with vestibular schwannoma as well as idiopathic cases; however in all cases the window for efficacy of treatment is short. In rare instances, hearing improvement has been demonstrated with treatment as long as 4 weeks from the onset of hearing loss, but most will not improve that late in the course of the disease. Steroid treatment is much more likely to be effective, and to have a larger effect, the earlier it is given, ideally within a few days of hearing loss onset. Thus, prompt identification of patients with SSNHL and urgent referral to an otolaryngology specialist is crucial for salvaging as much hearing ability as possible.[2,3]

Delays in Care

Due to the acute nature of SSNHL, most patients are seen by primary care providers, not specialists. They often present with other associated symptoms such as tinnitus, fullness, or dizziness, all of which are also associated with much more common ear conditions such as middle ear effusion or otitis media. This leads to frequent misdiagnosis, improper treatment, and delays in care, often to the point where treatment is no longer beneficial.[2] Any strategy to maximize the effectiveness of care to patients with this devastating condition and salvage as much hearing ability as possible must address the delays in care. The objective of this prospective study was to quantify the causes for delays in care for patients with SSNHL.

Materials & Methods

Study design was evaluated by the Institutional Review Board at West Virginia University and was given expedited approval on March 21, 2017 (Protocol #1701409758). Patients who were diagnosed with SSNHL at a tertiary referral otolaryngology clinic in West Virginia were prospectively identified for 6 months from April 2017 – September 2017. Inclusion criteria were 1) history of subjective unilateral hearing loss over a period of 3 days or less, and 2) audiogram demonstrating unilateral sensorineural hearing loss of at least 30 dBHL over 3 continuous frequencies (if they presented within the window for treatment). If they presented greater than 4 weeks from the onset of their hearing loss, this criterion was relaxed to 10 dBHL, as it is possible that these patients may recover some hearing prior to presentation. Exclusion criteria were concurrent conductive hearing loss or previous surgery in the affected ear.

Patients meeting inclusion/exclusion criteria had the following aspects of their care categorized: Did they seek evaluation by any healthcare provider within the 4 week window for treatment? If so, what was the specific treatment

setting (emergency room, primary care doctor, specialist, etc.) and was there appropriate treatment or triage? Four weeks was set as the window period from the onset of hearing loss because this is the longest time interval from the onset of hearing loss that treatment has been shown to be effective. We determined that there was appropriate treatment or triage if SSNHL was diagnosed and treated, or if an urgent referral was made to an ENT specialist, even if a diagnosis was not made or the patient was not treated appropriately. Appropriate treatment was considered to be a prescription of at least 40 mg of oral prednisone (or an equivalent dose of a different steroid) and for at least 5 days.

From this data set, the following proportions were calculated: the proportion who sought care within the 4 week window, the proportion seen at the otolaryngology specialty clinic within the 4 week window, and the proportion inappropriately triaged or misdiagnosed prior to their eventual diagnosis.

Results

Twenty-one patients were diagnosed with SSNHL over the 6 month course of the study. The mean age was 59.0 years (SD 13.1) and ranged from 18-75 years. There were 9 males (42.9%) and 12 females (57.1%). The right ear was involved in 10 cases (47.6%) and the left ear in 11 cases (52.4%). The average hearing loss of those who presented within the window was 56 decibels.

The sequence of events for all patients from onset of hearing loss to eventual diagnosis is summarized in Figure 2. Twelve patients (57.1%) were seen by an otolaryngology specialist inside the 4 week window from the onset of hearing loss with an average time until specialist evaluation of 10.3 days. Nine patients (42.9%) were seen outside of the window, with an average of 161 days from onset to specialist evaluation. In all 9 delayed cases, the delay was due to one of two causes: the patient did not seek any medical care within the window (2 patients), or the patient was seen by a primary care provider within the window for treatment and was inappropriately triaged (7 patients). Of these 7 patients who were inappropriately triaged/misdiagnosed, all were given a diagnosis of either middle ear fluid or acute otitis media and prescribed antibiotics and/or a low dose steroid course.

Discussion

The most salient finding from our prospective study was the large proportion of patients (42.9%) who became ineligible for treatment because of delayed diagnosis. Because hearing outcomes are improved with treatment, this represents a significant amount of hearing ability that could have potentially been recovered with proper treatment. In general, patients seemed to realize the urgency of sudden loss of hearing, as all but 2 of 21 patients sought medical care within 4 weeks, and 6 went straight to an otolaryngology specialist. In addition, of the 11 patients that went to their PCP and were misdiagnosed with middle ear effusion or infection, 4 sought a specialist opinion on their own within 4 weeks even when a referral was not made.

The main driver of delayed diagnosis was the high rate of inappropriate triage and/or misdiagnosis of SSNHL in the primary care setting, as only 2 of 11 patients who initially presented to a primary care provider were appropriately triaged. SSNHL is less common than other causes of hearing loss, such as middle ear effusion or acute otitis media, which contributes to frequent misdiagnosis. However, an appropriate history, otoscopic and tuning fork exam can easily differentiate the two, or at least identify those with potential SSNHL who need an urgent referral to a specialist.[2] The authors suspect that knowledge gaps in the primary care community regarding SSNHL are in large part responsible for misdiagnosis/inappropriate triage, though this has not been studied.

These delays are a modifiable contributor to loss of potentially salvageable hearing ability. The burden of hearing loss is significant, with even moderate levels of hearing loss being comparable with emphysema or diabetes in terms of quality of life decrement.[5] Thus, increasing the proportion that are diagnosed and treated early in the disease course would significantly increase the quality of life of patients affected by SSNHL. As overall SSNHL is rare, and patients may initially present in a variety of care settings, improving triage and diagnosis is a challenging endeavor, and would likely require far-reaching educational efforts.

The main weakness of this study is the limitation to the geographic area that the otolaryngology clinics of West Virginia University serve, although the goal of the study was to characterize delays in care specifically for this population and region. The study may also suffer from selection bias, because there may be a significant number of patients who have SSNHL and never see a specialist or ever get diagnosed. This could occur because the patients themselves never seek medical care, or they never see a specialist evaluation after seeing a primary care provider. There is also a subset of patients who fully recover to their pre-loss hearing level. If these patients are seen after full recovery has occurred, they may never have an objective hearing loss on audiometric testing and thus are not diagnosed, or may never seek evaluation at all once their hearing ability returns. This potential for selection bias could result in the study over-representing those patients with worse final hearing outcomes and those that seek or have access to medical and particularly specialist care.

Conclusion

SSNHL is a rare but treatable medical emergency with potentially devastating functional and emotional consequences for affected patients.[2] Patients with SSNHL often cannot receive treatment due to delays in diagnosis related to high rates of inappropriate recognition and triage in the primary care setting which contributes to loss of potentially recoverable hearing ability. Improving diagnosis and triage of SSNHL patients in the primary care setting would reduce delays in diagnosis, improve hearing outcomes, and quality of life for persons affected by SSNHL. However, due to its rarity relative to other otologic conditions with similar symptoms, and diverse settings in which patients present, this is a challenging endeavor requiring far-reaching educational efforts.

References

1. Rauch S, Halpin C, Antonelli P. Oral vs intratympanic corticosteroid therapy for idiopathic sudden sensorineural hearing loss: a randomized trial. *JAMA*. 2011;305(20):2071-2079.
2. Stachler R. Chandrasekhar S, Archer S, et al. Clinical Practice Guideline Sudden Sensorineural Hearing Loss. *Otolaryngology-Head and Neck Surgery*. 2012;146(3),sup S1-S35.
3. Conlin A, Parnes L. Treatment of sudden sensorineural hearing loss: a systematic review. *Arch Otolaryngol Head Neck Surg*. 2007;133(6):573-581.
4. Byl F. Sudden hearing loss: eight years' experience and suggested prognostic table. *Laryngoscope*. 1984;94(5):647-661.
5. Simpson A, Simpson K, Dubno J. Health-related quality of life in older adults: Effects of hearing loss and common chronic conditions. *Healthy aging research*. 2015;4:4.

Image-guided balanced orbital decompression for the management of thyroid eye disease: An analysis of outcomes and complications

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Key words: Graves' disease, thyroid eye disease, proptosis, lid retraction, lagophthalmos, orbital decompression, exophthalmometry, diplopia, inferior medial strut, image guidance

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Abstract

Background: Thyroid eye disease (TED) commonly presents with proptosis, lid retraction, and diplopia. Multiple surgical techniques have been described to rehabilitate the orbit and to restore vision. Balanced orbital decompression is advocated as a standard surgical technique, and image guidance is encouraged to minimize surgical risks. We evaluated the outcomes of patients who underwent image-guided balanced three walls orbital decompression for TED.

Methods: An IRB approved retrospective chart review study was performed on all patients who underwent image-guided balanced orbital decompression between January 2010 and December 2016 at West Virginia University Hospital. Demographics, pre-operative and post-operative clinical data including indications, presence of pre- and post-operative diplopia, and exophthalmometry were abstracted.

Results: 169 orbital decompressions in 103 patients were performed. The mean age was 56 years, and the prevalence of pre-operative diplopia was 73%. The incidence of new-onset post-operative diplopia was 5.8%. Among patients who had pre-operative diplopia, 48% had resolution of their diplopia post-operatively. The mean reduction in proptosis was 4.7 mm. No patient experienced intraoperative and/or post-operative complications.

Conclusion: Image-guided balanced lateral, medial and inferior orbital decompression can result in improvement of visual acuity and resolution of pre-existing diplopia while allowing for significant reduction in proptosis.

Introduction

Thyroid eye disease (TED) or Graves' orbitopathy, often associated with Graves' thyroid disease is the most common chronic autoimmune orbital disorder.[1] Lymphocytic infiltration along with fibroblast reaction generates a volume expansion for the orbital cavity which manifests in several ophthalmic consequences including lid lag, retraction, proptosis, exposure keratitis, strabismus, and diplopia. TED occurs in about 50% of cases of Graves' disease, and significant corneal dryness, orbital pain, double vision, and proptosis can lead to visual deterioration and functional disability in 20–30%.[2] In 3-5% of patients, severe cellular proliferation, inflammation, and accumulation of hydrophilic glycosaminoglycans also resulted in compressive optic neuropathy for which patients are at risk of permanent blindness without rapid intervention.[3]

High-dose corticosteroid therapy can limit the progression of ocular sequelae.[4] However, for those with severe disease-causing compressive optic neuropathy, or proptosis with exposure keratitis, surgical decompression is recommended. The methods of decompression have varied with mixed results with respect to symptomatic improvement and morbidities.[5] Two-wall (lateral and medial) and three-wall (lateral, inferior and medial) balanced decompressions are the most common surgical approaches used. In addition, image-guided surgery has been gradually adopted for use in orbital decompression surgery to provide intraoperative anatomic localization with the goal of improving surgeon confidence in minimizing potential rare serious surgical complications, such as ocular laceration, periorbital hemorrhage, and nerve injury.[6,7] Dural tear and cerebrospinal fluid (CSF) leak have also been reported.[8,9] Diplopia, however, is not only one of the most common symptoms but also one of the most common side effects of orbital decompression surgery, and the incidence of new onset or worsening of existing diplopia in balanced orbital decompression surgery is 7-33%.[10,11] Several modifications have been suggested to decrease the diplopia rate such as preserving optic strut, preserving periosteal band over rectus muscles, and avoiding decompressing of the orbital floor. We report our experience of image-guided balanced orbital decompression without fat excision in patients with thyroid eye disease.

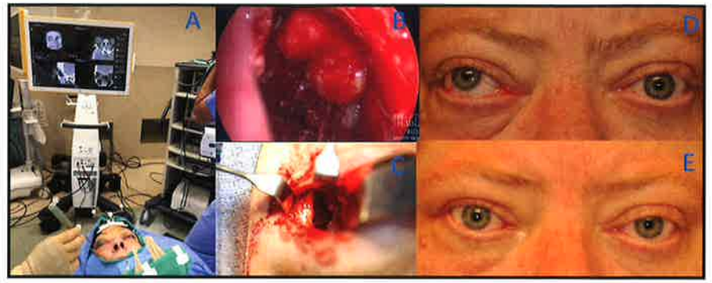
Material and Methods

An institutional review board (IRB) approved retrospective chart review study was performed on consecutive patients undergoing stereotactic navigation assisted balanced orbital decompression for Graves' orbitopathy between January 2010 and December 2016. All patients were evaluated pre-operatively and post-operatively in the otolaryngology and oculoplastic clinics at the West Virginia University Hospitals. Demographic data including age, sex, gender, date, and side of surgery were collected. Preoperative and postoperative formal ophthalmologic evaluation included Snellen visual acuity, pupillary response, ocular motility, color vision, slit lamp biomicroscopy, fundoscopy, palpebral fissure height, scleral show, lagophthalmos, Hertel exophthalmometry, and Humphrey visual fields. Nasal endoscopy was performed preoperatively to evaluate the nasal anatomy and presence of any pathologies, and postoperatively to monitor healing. Pre-operative BRAINLAB (Munich, Germany) computed tomographic (CT) scan of the sinuses and orbits to evaluate for anatomic variations was routinely performed on all patients and used for intra-operative navigation. All decompressions were performed by the same otolaryngologist and same oculoplastic surgeon (HR, JN).

Surgical techniques

Endoscopic medial and inferior decompression was performed first by the otolaryngology service, (HR) under intraoperative navigation with BRAINLAB (Figure 1A). Bilateral nasal cavities were initially packed with cotton pledgets soaked with 0.5% oxymetazoline. After allowing time for initial hemostasis, 1% lidocaine with 1:100,000 epinephrine was injected into the nasal septal mucosa and lateral nasal wall mucosa. Open or endoscopic septoplasty was performed when necessary for access. An uncinectomy was performed followed by a wide middle metal antrostomy. The maxillary sinus ostium was identified and enlarged posteriorly and inferiorly. Complete anterior and posterior ethmoidectomy and frontal sinusotomy was then performed. The sphenoid rostrum and lamina papyrecea were identified. Using BRAINLAB, the most posterior aspect of decompression was mapped. The lamina papyrecea was removed. The vertical buttress of the maxillary sinus was partially removed posteriorly enough to allow for inferior periorbital incision. After exposure of the periorbita, it was incised with a sickle knife in a posterior to anterior direction inferior to the medial rectus muscle and another incision superior to it. The septae with the intraoral fat are gently divided, and gentle retropulsion of the globe is performed to assess for orbital fat extrusion (Figure 1B). Finally, the maxillary antrostomy and nasofrontal recess are assessed for patency to prevent any postoperative stenosis by orbital fat.

Lateral orbital decompression began with infiltration of the lateral canthal region consisting of 2% lidocaine with 1:100,000 epinephrine. A 2-cm lateral canthal incision was made. Dissection was carried through the orbicularis to the



Figures 1A-E

Table 1. Descriptive statistics of study population (total 169 orbits in 103 patients)

CATEGORY	SAMPLE SIZE
Gender	
Male	33 (32%)
Female	70 (68%)
Ethnicity	
Caucasian	97 (94.2%)
African-American	5 (4.9%)
Others	1 (0.9%)
Thyroid Disease	
Hyperthyroid	83 (80.7%)
Hypothyroid	19 (18.4%)
Hashimoto thyroiditis	1 (0.9%)
Smoking	79 (76.9%)
Thyroid treatment	
Thyroidectomy	13 (12.6%)
Radioactive iodine	29 (28.2%)
Antithyroid medications	61 (59.2)
Orbital decompression surgeries	
Unilateral	37 (21.9%)
Bilateral	132 (78.1%)

Table 2. Post-decompression outcomes.

	Pre-op	Post-Op	p-value
Vision (logMAR)	0.4 (0.1-1)	0.1 (0-0.7)	0.021
Lagophthalmos (mm)	1.1 (0-4)	0.6 (0-3)	0.168
Exophthalmometry (mm)	24.1 (19-30)	19.4 (17-25)	0.039
Diplopia	75 (72.8%)	45 (43.7%)	

lateral orbital rim using monopole cautery. The periorbita was incised along the lateral orbital rim, and blunt dissection was performed to expose the lateral orbital wall. The Sonopet ultrasonic bone aspirator (Stryker, Kalamazoo, MI) was then used to methodically remove the lateral wall including the trigone of the sphenoid greater wing (Figure 1B). Superior, posterior, and inferior limits of decompression were noted to vary depending on bony anatomy, and in each case, the safe maximal limit of bone removal was determined using BRAINLAB navigation. At the completion of the osteotomy, the periorbita was fenestrated, allowing retrobulbar fat to fill the space created. The lateral canthal wound was closed in two layers.

Results

One hundred sixty-nine orbits of 103 patients underwent image-guided three-wall balanced orbital decompression (Table 1). 66 patients had decompressions of both orbits, and 37 patients had decompression of one orbit. Mean age was 56 years old, ranging from 31 to 73 years. 70 (68.0%) were women. 79 patients (76.9%) were smokers. Average postoperative follow up time was 22 months (range of 11-48 months).

The indications for surgery were proptosis, lagophthalmos with exposure keratopathy, and/or compressive optic neuropathy. Eighty-eight (52.1%) surgeries were performed on the left orbit. Seventy-five (72.8%) patients presented with pre-operative diplopia and the incidence of new-onset post-operative diplopia was seen in six (5.8%) patients (Table 2). In the 75 patients with pre-operative diplopia, thirty-six (48%) had resolution of their diplopia post-operatively, 51(68%) of which had bilateral orbital decompression. All patients maintained or had improved Snellen visual acuity. The mean reduction in proptosis was 4.7 mm (3-8mm). All patients also had improvement of lagophthalmos (Figures 1D-1E). No intraoperative complications were encountered during any of the cases, and immediate post-operative sequalae included pain, regional hypoesthesia, and epiphora which resolved at subsequent follow up.

Discussion

Orbital decompression is a well-established surgery for the treatment of exophthalmos and visual loss from optic neuropathy in Graves' orbitopathy.[6] Since the 1950s; its indication has widened from treatment of optic neuropathy to include disfigurement from proptosis and eyelid retraction along with ocular complications of exposure keratoconjunctivitis.[7,8] Walsh popularized Transantral approach to the inferior and medial walls in 1957.[7] With the introduction of the endoscope, Kennedy introduced the endoscopic decompression approach of the medial wall and of the orbital floor in the 1990s, with fewer complications and better outcomes.[9] While balanced orbital decompression was more commonly performed, rare cases of orbital roof decompression have been reported in severe cases refractory to traditional decompression.[7,12,13,14]

The incidence of new-onset diplopia after orbital decompression has been reported to occur from 0 to 64% depending on the technique.[10,11] Our results showed a 5.8% incidence of new-onset post-operative diplopia which is lower than 7-33% in similar series of balanced orbital decompression. Several modifications to lower the incidence of diplopia have been described, including the orbital sling technique described by Metson and Samaha in 2002,[16] and preserving the inferomedial bony strut between the medial orbital wall and the orbital floor which was utilized in our case series.[17,18,19] Kingdom et al. reported no new incidence of diplopia among patients who underwent three-wall orbital decompression. Their surgical technique included preserving the vertical inferomedial strut in all patients, and their improvement in proptosis was 3.2 mm.[19] Furthermore, the rate of smoking in our patient population is among the higher of the reported series which had been known to produce more severe disease and are more resistant to medical and surgical interventions.

Few studies reported on diplopia resolution which ranged from 0-36%. Leaving an intact periorbita was described to minimize diplopia in the series by Mainville et al. that reported a rate of 28.1%.[20] However, leaving an intact periorbital significantly reduces the decompression achieved. The periorbital was opened in all of our patients, and 42% of our patients had resolution of their diplopia which is higher than all reported series.

In our series, the imaged-guided balanced orbital decompression with partial removal of the inferomedial strut and the orbital sling technique described by Metson resulted in exophthalmometry improvement of 4.7 mm which is similar to what is reported in the literature.[14] Surgical techniques have contributed to the difference when compared to certain series with less proptosis reduction. Various techniques have been described including temporary removal of the lateral orbital wall for access to the deep lateral orbital wall, removal of the lateral wall without replacement of the frontal process of the zygoma, and valgus rotation of replaced lateral wall to add volume to the orbit.[21-23] Complete removal of the sphenoid trigone has been advocated by some authors, and the contribution of this bony removal has been shown to be 2.3mm; however, this was not performed in our series.[24] All the current patients had resolution of optic neuropathy, exposure, and proptosis, and none required subsequent surgery for lateral orbital wall removal.

The application of image guidance system to orbital decompression

surgery provides orbit surgeons as well as ENT surgeons with real-time feedback of the anatomy and can potentially enhance the surgeons' comfort in deep orbital bony removal. This may lead in a given case to greater orbital decompression or may lead to greater decompression with more benefits for the patients over a surgeon's personal series as she/he becomes more comfortable with the anatomy based on real-time navigation output. As there is a variation of anatomy and agreement of the extent of bony removal in the literature, the posterior limit of orbital decompression is difficult to define intraoperatively. The surgeon is often restrained with the deep orbital bony removal to prevent complications. Image guidance is, therefore, advantageous for deep orbital decompression, in that it enhances the surgeon's radiologic view of the posterior orbit. It virtually eliminates any benefits of concurrent radiographic examination such as intraoperative CT.

This study is limited by its descriptive nature and lack of control or comparison cohorts. Studies of this technique on larger numbers of patients are desirable to reaffirm the advantages of this technique compared with other operating techniques. No serious complications were encountered in this cohort. Image guidance systems are relatively accurate and reliable enough to aid in orbital decompression surgery. The registration process for image guidance is quick and poses no distraction from the surgery. In addition, the single handpiece ultrasonic bone aspirator aids in improving safety to orbital tissues and might increase some surgeons' confidence, especially while learning the procedure.

Conclusion

The image-guidance three-wall balanced orbital decompression is an effective treatment strategy for Graves' orbitopathy with restoration of visual acuity, lowering the risk of new-onset diplopia, and improved proptosis.

References

1. Borumandi F, Hammer B, Noser H, Kamer L. Classification of orbital morphology for decompression surgery in Graves' orbitopathy: two-dimensional versus three dimensional orbital parameters. *Br J Ophthalmol* 2013;97:659-662
2. Bartalena L, Tanda ML. Clinical practice. Graves' ophthalmopathy. *N Engl J Med* 2009; 360:994–1001.
3. Weisman RA, Osguthorpe DJ. Orbital decompression in Graves' disease. *Arch Otolaryngol Head Neck Surg* 1994; 120:831-4.
4. Guy JR, Fagien S, Donovan JP, et al. Methylprednisolone pulse therapy in severe dysthyroid optic neuropathy. *Ophthalmology.* 1989; 96(7):1048–52; discussion 1052–3.
5. Silver RD, Harrison AR, Goding GS. Combined Endoscopic Medial and External Lateral Orbital Decompression for Progressive Thyroid Eye Disease. *Otolaryngology–Head and Neck Surgery* (2006) 134, 260-266
6. Mourits MP, Rose GE, Garrity JA, Nardi M, Matton G, Koornneef L. Surgical management of Graves' ophthalmopathy. In: Prummel MF editor(s). *Recent developments in Graves' Ophthalmopathy*. Boston, Dordrecht, London, Kluwer Academic Publishers, 2000:133–52.
7. Walsh TE, Ogura JH. Transantral orbital decompression for malignant exophthalmos. *Laryngoscope* 1957; 67(6):544–68.
8. Bahn RS. Is orbital decompression a safe and effective treatment for Graves' orbitopathy? *Nature Clinical Practice Endocrinology and Metabolism* 2007; 3(12):796–7.
9. Kennedy DW, Goodstein ML, Miller NR, Zinreich SJ. Endoscopic transnasal orbital decompression. *Archives of Otolaryngology - Head and Neck Surgery* 1990; 116(3): 275–82.
10. Leong SC, Karkos PD, Macewen CJ, White PS. A systematic review of out- comes following surgical decompression for dysthyroid orbitopathy. *Laryngoscope* 2009;119:1106–1115.
11. Mourits MP, Bijl H, Altea MA, et al. Outcome of orbital decompression for disfiguring proptosis in patients with Graves' orbitopathy using various surgical procedures. *Br J Ophthalmol* 2009;93:1518–1523.
12. Sewall E. Operative control of progressive exophthalmos. *Arch Otolaryngol Head Neck Surg.* 1936; 24 621-624
13. Hirsch O. Surgical decompression of exophthalmos. *Arch Otolaryngol Head Neck Surg.* 1950; 51 325-331
14. Naffziger H C. Progressive exophthalmos. *Ann R Coll Surg Engl.* 1954; 15 1-24
15. Platt MP, Metson R. Endoscopic management of exophthalmos. *Facial Plast Surg* 2009; 25(1): 038-042
16. Metson R, Samaha M. Reduction of diplopia following endoscopic orbital decompression: the orbital sling technique. *Laryngoscope.* 2002; 112 1753-1757
17. Bleier BS, Lefebvre DR, Freitag SK. Endoscopic orbital floor decompression with preservation of the inferomedial strut. *Int Forum Allergy Rhinol.* 2014 Jan; 4(1):82-4.
18. Wright ED, Davidson J, Codere F, Desrosiers M. Endoscopic orbital decompression with preservation of an inferomedial bony strut: minimization of postoperative diplopia. *J Otolaryngol.* 1999 Oct; 28(5):252-6.
19. Kingdom TT, Davies BW, Durairaj VD. Orbital decompression for the management of thyroid eye disease: An analysis of outcomes and complications. *Laryngoscope.* 2015 Sep;125(9):2034-40.
20. Mainville NP and Jordan DR. Effect of Orbital Decompression on Diplopia in Thyroid-Related Orbitopathy. *Ophthal Plast Reconstr Surg* 2014; 30(2): 137-140.
21. Kakizaki H, Takahashi Y, Ichinose A, et al. The importance of rim removal in deep lateral orbital wall decompression. *Clin Ophthalmol* 2011;5:865–9.
22. Fichter N, Krentz H, Guthoff RF. Functional and esthetic outcome after bony lateral wall decompression with orbital rim removal and additional fat resection in graves' orbitopathy with regard to the configuration of the lateral canthal region. *Orbit* 2013;32:239–46.
23. Tessier P. Expansion chirurgicale de l'orbite. *Ann Chir Plast* 1969; 207–14.
24. Millar MJ, Maloof AJ. The application of stereotactic navigation surgery to orbital decompression for thyroid-associated orbitopathy. *Eye* 2009;23:1565–71.

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Chairman & CEO
West Virginia Mutual
Insurance Company

We Are Committed to Your Risk Management

Your West Virginia Mutual Insurance Company strongly values risk management as a means for practitioners to provide quality healthcare and ensure patient safety, thereby avoiding medical liability pitfalls. We have excellent risk management professionals that work every day with the physicians of our area, and practitioners often have the same question: What can I do to prevent a lawsuit? Interestingly, some relatively simple measures can help to avoid the immense future heartache of going through the defense of a medical malpractice lawsuit. First, since our area is at the epicenter of the opioid crisis, always ensure that you prescribe opioids responsibly and that you follow state guidelines, as should be obvious. Second, it is definitely not a good idea to use single-dose medication vials in a multiple-dose way, as this will come out during the discovery process and will be a huge hurdle in defending the claim if it involves infection. Third, always document after-hours telephone conversations with a short note, as it is not uncommon that even a simple notation of "go to the ER" can make the defense of the lawsuit much easier and, indeed, make some lawsuits go away completely. Fourth, never keep unlabeled and/or pre-filled syringes in the office, as medication errors are a very significant driver of medical malpractice claims. Fifth, even though it is an onerous duty, please ensure that EMR documentation is accurate and that medication and allergy lists are current. Auto-population of electronic health records can be a huge problem, in that allergy lists and medication lists can be dated and no longer accurate leading to therapeutic misadventures. In addition, spurious information can make defending a claim quite difficult. For example, "normal prostate exam" in a female or "normal pelvic exam" in a male can make the entire medical record very suspect, even if the remainder is truthful and accurate. Furthermore, unless an error or omission is recognized and amended immediately, including a time and date along with an explanation as to why the addendum is necessary, never, ever add a later undated addendum to a medical record after the fact, as this can be considered spoliation of the medical record. This leads to the lawsuit falling outside the medical liability tort reforms that we so vigorously fought for and won, which has the consequence of markedly increased potential damages, including punitive damages that are rarely granted in a medical liability lawsuit. Sixth, please make sure that your medical assistants are adequately trained to their level of allowed responsibility and that you and your staff have an excellent system of test tracking, as ignored tests can lead to extremely adverse health outcomes, which, in turn, lead to lawsuits. Finally, please ensure the security of the health record, as HIPAA claims can be quite expensive. To this end, our compliance specialist, Michael Harmon, can help you, our insureds, in establishing and maintaining proper procedures and protocols.

Our risk management specialists stand ready to assist you in these and other matters impacting patient safety and the quality delivery of health care, and please be assured that your Mutual's commitment to risk management is unwavering, as we are ***Physicians Insuring Physicians***.

Confronting a Crisis: How West Virginia's Health Commissioner Took on the Opioid Epidemic

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PUBLIC OFFICIALS of the YEAR, Rahul Gupta, MD 2018 HONOREE
Photo by Danny Scalise, WVSMA Executive Director

It was an unlikely journey that led Rahul Gupta, MD to become the public health commissioner for West Virginia, but it was one that followed his passion for treating the most vulnerable patients in the world, from plague victims in New Delhi to opioid addicts in rural America.

The son of Indian diplomats, Gupta was raised in the Washington, D.C., area, but returned to his native New Delhi for medical school. There, he worked on a vaccination campaign to eradicate polio. It was the first time such a campaign had been tried in the country, and it worked. "It gave me a sense of what's possible," Gupta says. "I've seen children die because of polio, tetanus and the plague. We don't really see those public health problems in America, and that gives me a larger perspective for what I do."

Gupta's sense of medical possibility was reinforced for him when he returned to America to work as a doctor in Birmingham, Ala. He dealt with Medicaid patients who had trouble meeting $1 copays on their prescription drugs. He called pharmacies and found he could get them to waive those fees.

His work led him to West Virginia, where he won notice for his handling of the 2014 Elk River chemical spill, which left more than 300,000 of the state's residents in nine counties without safe tap water. He was praised for working quickly to get clean water restored, preventing larger-scale public health problems. Soon after that, in 2015, Gov. Earl Ray Tomblin asked Gupta to be West Virginia's public health commissioner.

Upon taking office, he was met with one of the worst epidemics in the state's history. West Virginians were overdosing from opioids at an alarming rate. Nearly 900 people died from opioid abuse in 2016; even more died in 2017. "The opioid epidemic has been a punch to West Virginia. It's crippled us," says Danny Scalise, executive director of the West Virginia State Medical Association. "But Gupta has been the counterpunch."

In order to curb overdoses, Gupta sought to understand exactly who the victims were and how they were falling into danger. He led a team that conducted what he calls a "post-autopsy autopsy." The findings were illuminating: Four out of five of those who died had come into contact with the health-care system, and those who had visited three or more pharmacies getting prescriptions filled were 70 times more likely to die. Only 2 in 10 of those who died had received naloxone, the antidote to an overdose.

Gupta established an opioid response panel that asked affected communities what they wanted from the state. This year, as a result of the research and community input, the state legislature passed the Opioid Reduction Act, a multipronged approach that, among other features, expands the availability of naloxone throughout the state and limits when and how often doctors can prescribe opioids.

It's too soon to say whether Gupta's efforts and the new legislation will make a serious dent in the epidemic. Gupta himself will not be there to see the impact: He accepted a position with the March of Dimes in September. Still, Scalise says that the commissioner's impact on the state will far outlast his tenure. "We are going to see a drawback in overdoses," he says. "The reason we have any good news is because of Dr. Gupta."

—Mattie Quinn

WVSMA and the West Virginia University Health Law Society are collaborating to bring our members relevant legal news.

OPIOID REDUCTION ACT

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On June 7, 2018, the Opioid Reduction Act ("ORA"), formerly known as Senate Bill 273, was enacted into the West Virginia Legislature.[1] While the goal of the ORA is to address the opioid crisis currently affecting the majority of the United States, including West Virginia, the ORA places significant limitations on the ability of a practitioner to prescribe opioids. Furthermore, the ORA addresses opioid prescription notifications, subsequent opioid prescriptions, ongoing treatment, and referral to pain clinics or pain specialists. A violation of the ORA is grounds for disciplinary action by the board that regulates the health care practitioner who commits the violation.[2]

The ORA defines very narrow mandates regarding initial opioid prescriptions, allowing a private physician to issue an opioid prescription only for a maximum of seven (7) days at the lowest effective dose, unless the patient has executed a narcotics contract with their prescribing physician.[3] The ORA further prohibits a practitioner from issuing an opioid prescription to a minor for more than three (3) days, and the practitioner is required to discuss the risks associated with opioid use with the parent or guardian of the minor.[4] Dentists and optometrists are restricted even further, allowed to only issue a three (3) day initial opioid prescription.[5] Similarly, a health care practitioner may not issue a prescription for more than a four (4) day supply to an adult patient seeking treatment in an emergency room or urgent care facility setting for outpatient use.[6] This provision specifically highlights the legislature's attempts to control the opioid crisis. The legislature reasoned that limiting opioid prescriptions in emergency settings will reduce the overall exposure to opioids, thus reducing the threat of addiction. Reducing the threat of addiction will also reduce the frequency of opioid-related emergencies and deaths in West Virginia. The legislature hopes that the restrictions placed on initial opioid prescriptions will reduce follow-up visits for subsequent opioid prescriptions. To accomplish this goal, the ORA prohibits physicians from issuing a subsequent opioid prescription within six (6) days after issuing the initial opioid prescription.[7] During a follow-up visit, the physician or other health care practitioner is required to educate the patient on the risks that are associated with opioid prescriptions.[8] To ensure that a patient acknowledges the risks associated with opioid prescriptions, physicians and health care practitioners are encouraged to prepare a form the patient will sign as an indication of the patient's understanding of the associated risks. This documentation not only increases the likelihood of a patient's education, but it could also reduce the risk of liability for physicians and health care practitioners.

Upon the issuance of a third opioid prescription, the physician is required to consider referring the patient to a pain clinic or specialist and must discuss the benefits of treatment through a pain clinic or specialist.[9] However, if the patient declines to seek treatment through a pain clinic or specialist, and the physician continues to prescribe opioids to the patient, the physician is required to attempt to stop or decrease the use of opioid prescriptions and document the efforts made by the physician.[10]

The ORA does not apply to a prescription for a patient who is currently receiving treatment for cancer, palliative care, substance abuse or opioid dependence, or post-surgery care.[11] Furthermore, the ORA does not apply to an existing practitioner-patient relationship established before January 1, 2018, where there is an established and current opioid treatment plan, reflected in the patient's medical records.[12]

The provisions of the ORA affect the way that a physician or other health care practitioner may prescribe opioids. Therefore, physicians and other health care practitioners are encouraged to review the changes set forth by the ORA and to consult with legal counsel regarding the ORA's implication on practicing medicine in West Virginia.

Endnotes

[i] W. Va. Code Ann. §§ 16-54-1–16-54-9 (West 2018).
[ii] § 16-54-9.
[iii] § 16-54-4(e); § 16-54-4(j).
[iv] § 16-54-4(c).
[v] § 16-54-4(d).
[vi] § 16-54-4(a)-(b).
[vii] § 16-54-5(a).
[viii] § 16-54-5(b).
[ix] § 16-54-6(a).
[x] § 16-54-6(b).
[xi] § 16-54-7(a)-(b).
[xii] § 16-54-7(d).

HPV Vaccine Update

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In a press release on October 5, 2018, the US Food and Drug Administration (FDA) announced the expanded approval for the human papillomavirus (HPV) vaccine to be available for men and women between the ages of 27 to 45. Previously, the FDA, as well as the Advisory Committee for Immunization Practices (ACIP), recommended the HPV vaccine be given to patients age 9-26. This expanded age group will allow greater protection to more patients against cervical, vulvar, anal, vaginal, and oropharyngeal cancers.

On October 7, 2016, the FDA approved a 2-dose schedule for patients age 9-14. Previously, 3 doses were required for everyone receiving the HPV vaccination. The HPV vaccine can be given using a 2-dose or 3-dose schedule. For the 2-dose schedule, the second shot should be given 6–12 months after the first shot. If the second shot is given less than 5 months after the first shot, a third shot should be given at least 4 months after the second shot. For the 3-dose schedule, the second dose should be given 2 months after the first, and the third shot should be given 6 months after the first.

Patients age 15 or older should be given the vaccine using a 3-dose schedule; the second shot should be given 2 months after the first shot, and the third dose should be given 6 months after the first dose.

HPV is the most common sexually transmitted infection (STI). With more than 100 strains of HPV, 40 are specifically linked to STIs. HPV has no signs or symptoms, therefore is easily passed between partners without any warning of the disease. 79 million Americans are currently infected with HPV. 14 million are newly infected each year. 31 thousand new HPV associated cancers are diagnosed each year. Most of these cancers can be prevented with the use of the HPV vaccine.

The current HPV-9 vaccine, Gardasil 9®, protects against the following strains of HPV: 6, 11, 16, 18, 31, 33, 45, 52 & 58). This 9-valent vaccine decreases cervical cancer risk by 90-95%, vaginal cancers up to 85%, vulvar and anal cancers up to 90% while decreasing the risk of genital warts caused by HPV up to 90%. For additional information regarding HPV vaccination and recommendations, please visit www.cdc.gov/vaccines.

Marshall Health, School of Medicine launch 'dementia café'

Marshall Health and the Marshall University Joan C. Edwards School of Medicine are launching a new experience that takes a different approach in caring for patients with dementia.

A concept that originated in the Netherlands in 1997 and came to the United States in 2008, the "dementia café" offers creative activities, social interaction and refreshments in a supportive setting to help individuals with dementia and their caregivers.

"As dementia progresses, it often becomes difficult for persons with dementia to be around people, places or events they previously enjoyed," said Shirley M. Neitch, M.D., a geriatrician at Marshall Health, professor and director of the Maier Institute for Excellence in Prescribing for Elders with Dementia at the Joan C. Edwards School of Medicine. "In addition to concern about their forgetfulness, persons with dementia may also worry about being too messy or slow."

The dementia café experience will allow participants to interact with others who understand the challenges and concerns they face. Activities will include musical performances, gallery-type art displays, art creation and crafts, as well as other literary activities such as poetry writing and journaling.

Participants may drop in briefly or stay the entire time. Caregivers will also be able to engage with other caregivers without having to plan activities or clean up.

The dementia café is an extension of the specialized care Marshall Health patients receive through the Susan Edwards Drake dementia clinic, which integrates physicians, pharmacists, social workers and caregivers into a patient's care and communication.

For more information or to volunteer, call Marshall Internal Medicine at 304-691-1681.

Upcoming Sessions

Huntington's Kitchen
911 3rd Avenue, Huntington
2 to 4 p.m.

Friday, Jan. 25

Friday, Feb. 22

2nd & 4th Fridays beginning in March

Marshall School of Medicine brings monthly training sessions to primary care providers across West Virginia

Marshall University Joan C. Edwards School of Medicine, in partnership with Project ECHO® (Extension for Community Healthcare Outcomes), offers teleECHO™ training sessions at noon on the first Tuesday of each month.

"TeleECHO clinics are basically interactive sessions between specialists and primary care providers who are serving an often rural patient population," said Jennifer Plymale, director of the Robert C. Byrd Center for Rural Health at the Joan C. Edwards School of Medicine. "These sessions allow rural providers to participate from their clinics, therefore eliminating time away from their offices or their families."

The clinics connect primary care providers from multiple locations with a team of specialists using low cost, multi-point videoconferencing. The providers present de-identified patient cases, and the specialists provide expertise on managing patients with chronic, common and complicated conditions. The case-based discussions are supplemented with short didactic presentations to improve content knowledge and share evidence-based best practices. TeleECHO topics currently alternate between endocrinology and cardiology, with further expansion related to substance use disorder and geriatrics expected.

Primary care provider participation in teleECHO clinics is free and includes continuing medical education (CME) opportunities. The technology needed to participate can be a desktop or laptop, a hand-held mobile device or videoconferencing capabilities for group participation. Primary care providers interested in participating in these teleECHO clinics may contact Plymale at plymale@marshall.edu.

PROACT opens in Huntington

The Provider Response Organization for Addiction Care and Treatment, or PROACT, opened to patients in October, bringing an innovative approach to recovery with it.

The PROACT concept was born out of a need to address substance use disorder differently and more comprehensively to include the clinical, behavioral, spiritual and professional issues of those affected by substance use. PROACT functions as a centralized hub for treatment, recovery, therapy, education, research, workforce opportunities and support for those affected by addiction.

PROACT is located at 800 20th Street in Huntington.

"The PROACT model consolidates what can be a very confusing and disjointed process so that individuals who need help see a physician quickly and receive timely access to an individualized plan of treatment," said Stephen M. Petrany, M.D., professor and chair of the department of family & community health at the Marshall University Joan C. Edwards School of Medicine and member of the PROACT board of directors. "Our goal for each patient looks beyond the initial stages of recovery as we work to help them become long-term, committed members of society."

This outpatient facility acts as a regional referral point to assess patients following discharge from local emergency rooms and inpatient detox units and by referral from community physicians, quick response teams and other emergency medical responders. PROACT also accepts self-referrals.

Cabell Huntington Hospital, St. Mary's Medical Center, Marshall Health, Thomas Health System and Valley Health came together to establish PROACT as a separate nonprofit organization that leverages dynamic partnerships with other clinical providers, substance abuse organizations, education groups and other support services to leverage existing community resources. Plans are underway to establish a second PROACT location in the Charleston area in 2019.

For more information about PROACT, visit www.proactwv.org or call 304-696-8700.

Several hundred health care providers, behavioral specialists and community members attended PROACT's open house on Nov. 7.

Marshall establishes multidisciplinary ALS clinic

Sarah Clemins

Dominika Lozowska, MD

Marshall University now offers a multidisciplinary clinic for patients with ALS, or amyotrophic lateral sclerosis, a condition commonly referred to as Lou Gehrig's disease. The clinic's care team consists of an onsite neurologist, physical therapist, speech therapist, dietitian, respiratory therapist and social worker.

Dominika Lozowska, M.D., a board-certified, fellowship-trained neurologist with Marshall Health and assistant professor in the department of neurology at the Marshall University Joan C. Edwards School of Medicine, leads the clinic's neurology services. "The convenience and expertise of a multidisciplinary ALS clinic is a much-needed resource in southern West Virginia," she said.

"There are many patients suffering from motor neuron disease who need the type of services this clinic provides," Lozowska said. "By establishing with a neuromuscular clinic, we're giving our patients access to the type of care they need—a team of experienced, qualified providers facilitating their therapies and closely monitoring disease progression."

During their first clinic visit, each patient will receive a comprehensive assessment by their care team, followed by the opportunity to ask questions as well as review the recommended course of treatment and schedule of follow-up visits. In addition to specialized care, the clinic also connects ALS patients and their caregivers with information about a support group and resources available through the ALS Foundation.

The clinic is open to patients from noon to 4 p.m. on the third Friday of every month at the Marshall University Speech & Hearing Center, located in Smith Hall 143 on Marshall University's Huntington campus. For more information or to schedule an appointment, contact Clinic Coordinator Sarah Clemins at nuckels@marshall.edu or 304-696-3246. Physician referrals can be faxed directly to 304-696-2986.

New training model mimics real-world surgery for WVU residents

Instinct— surgeons act on it in the operating room, but it can be difficult-- though not impossible-- to teach, thanks to a perfused cadaver training model at the West Virginia University School of Medicine that mimics real-world surgery conditions.

Surgical residents are placed in simulated operating rooms, working with fresh cadavers which are connected to perfusion machines that pump simulated blood through the body. This allows the blood vessels and tissues to "bleed" as they would in live patients.

The surgeons can then treat the "patient" as if they were treating a real injury – exposing and controlling blood vessels-- ultimately stopping the "bleed."

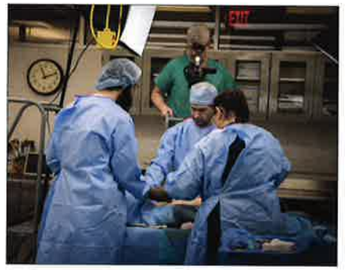
"It's as close as we've come to mimicking the effects and intensity of the operating room," Daniel Grabo, M.D., director of trauma education at WVU, said. "When you have moments to react, you draw on your experience. Today, the majority of routine surgeries are done with less invasive procedures which create gaps in hands-on training and experience for emergencies and critical injuries."

The residents use the perfused cadaver model to train in trauma, open vascular, thoracic and advanced liver and biliary procedures. In some cases, the training provides immediate results, as was the case for Patrick Bonasso, M.D., WVU surgery resident.

Dr. Bonasso completed a simulated operation using the perfused cadaver model the same day he performed the procedure on an admitted patient.

"Surgery is about repetition and being comfortable in your skillset. You have a split-second to manage bleeding and perform care," Bonasso said. "I was better prepared to treat my patient because I had walked through this same scenario just hours before I was in the actual operating room."

The Fresh Tissue Training Program, which houses the perfused cadaver model, is a collaborative effort between WVU's Critical Care and Trauma Institute and the Departments of Pathology and Surgery. Faculty from these



disciplines identify emerging trends from the Accreditation Council for Graduate Medical Education and then look at the number of surgical cases residents perform at WVU. Based on that data, they identify any potential deficiencies in surgical opportunities and mediate that with the perfused cadaver training.

"Unfortunately, it's difficult to develop these skills only at a patient's bedside these days," Grabo said. "You need to be able to act in the moment – and it's not just something we can create for our residents."

To learn more about surgery education at WVU, visit medicine.hsc.wvu.edu/surgery.

WVU researchers investigate how hospital lighting may hinder patient recovery

Now that Daylight Saving Time has ended, cyclists are attaching lights to their helmets, and dog walkers are storing flashlights next to their leashes. But one place that won't get darker with the time change is the hospital. New research out of West Virginia University illuminates how the round-the-clock brightness of hospital rooms may stymie some patients' recovery.

Randy Nelson, who chairs the Department of Neuroscience in the WVU School of Medicine, and Courtney DeVries, the John T. and June R. Chambers Chair of Oncology Research at WVU, are studying how light at night may worsen outcomes in cardiac patients. Both researchers are members of the WVU Rockefeller Neuroscience Institute. The National Institutes of Health has awarded them nearly $1.2 million for their three-year investigation.

"This research actually grew out of one of our student's hospital stays," says Nelson, who also directs basic science research at the WVU Rockefeller Neuroscience Institute. "He said, 'The lights are on all night. I can't sleep.' So we asked the question, 'What does constant light exposure do to folks in critical-care areas, like cardiac intensive care or surgical step-down units, where people are already immunocompromised?'"

Cardiac arrest doesn't just hurt the heart. It also hurts the brain. One way this happens is that cardiac arrest and the subsequent oxygen deprivation inflame the nervous system and overstimulates brain cells so much that they can die.

Nelson and DeVries suspect that spending nights in hospital rooms that never get truly dark can amplify these responses. Earlier work they conducted with preclinical models suggests that a light no brighter than a child's nightlight may be enough to trigger inflammation in the brain, "overload" brain cells and make cardiac arrest more lethal.

Building on their previous findings, the researchers will now explore the physiological mechanisms that link light at night to neurological damage—and a greater mortality rate—after cardiac arrest. They also want to determine whether certain wavelengths of light are more detrimental than others.

To do this, they will expose animal models of cardiac patients to different amounts and wavelengths of light at night. They will then measure the models' brain inflammation, determine the extent of brain-cell damage and evaluate how nimbly the heart can beat faster or slower to meet the body's changing needs. Next, they will pinpoint which lighting environments correlate to the best health outcomes.

"The circadian system is affected by short-wavelength light, which is blue, like from your phone or tablet. Fluorescent light is also quite bluish. But if we can use longer-wavelength lights—sunset colors—that doesn't affect the circadian clock," says Nelson. Perhaps replacing the fluorescent bulbs in hospital rooms with sunset-toned bulbs would enable the hospital staff to administer drugs, operate equipment and monitor patients at night without disrupting their circadian clocks and hampering their recovery from cardiac arrest.

Light at night seems to be associated with a range of conditions, including obesity and diabetes. But "unlike a lot of things we've studied so far with dim light at night," says DeVries, "the problem after cardiac arrest is that, if the neurons die, they're dead. It's not reversible. We're interested in preventing that."

WVU, partners announce regional hub to train entrepreneurs, commercialize healthcare technology

Hoping to speed up the move from idea to application, West Virginia University and 23 other regional institutions have come together to create a "virtual hub" that will ultimately help speed the commercialization of groundbreaking university research.

WVU, as part of its commitment to create and support a strong entrepreneurial culture in the state, will collaborate with XLerateHealth, a small business that focuses on healthcare technology startups and commercialization.

The hub will help accelerate cutting-edge biomedical technologies and products move from the laboratory into the marketplace and commercialize new innovation in pharmaceuticals, medical devices, healthcare IT and electronics.

WVU, the University of Kentucky and the University of Louisville co-lead the university side of this effort and organized a consortium of participating regional universities to collaborate with XLerateHealth.

"This biomedical technology accelerator will provide unparalleled opportunities to bring the brightest minds together to advance and commercialize technologies that can truly make a difference in people's lives here in West Virginia, across Appalachia and beyond," WVU President Gordon Gee said. "West Virginia University is pleased to be able to join forces with so many of our neighboring institutions to deliver world-changing discoveries and innovation that will generate economic opportunities while leveraging breakthroughs in healthcare."

Through the creation of this online "virtual hub," WVU, XLerateHealth, UK and UofL will coordinate programming, educational resources and commercialization tools for all participating institutions to utilize. There will also be support services to help entrepreneurs protect their intellectual property, assist in technology transfer that will forge mutually beneficial relationships between researchers and the business community and offer business coaching, business incubation and networking opportunities.

"As WVU's health research embodies partnerships, innovation and workforce development, we are excited to help pave the way for more leading researchers to commercialize their advanced technologies and products that could ultimately save lives, revolutionize our healthcare system and boost regional economic opportunities," said Laura Gibson, senior associate vice president for research and graduate education. "Thanks to these collaborative efforts, this accelerator hub will provide vast resources, training and networking opportunities to help groundbreaking research get off the shelves and enter the real world, making a lasting impact on future medical treatments and long-term health.

The accelerator hub will be funded by a three-year $3.5 million grant from the National Institute of General Medical Sciences, a division of the National Institutes of Health, as part of their Institution Development Award program. The Southeast region includes West Virginia, Kentucky, Arkansas, Louisiana, Mississippi, Puerto Rico and South Carolina.

Installation ceremony celebrates Nemitz as WVSOM's seventh president

A huge celebration took place on the West Virginia School of Osteopathic Medicine's (WVSOM) campus during the installation ceremony of James W. Nemitz, Ph.D., the school's seventh president.

The installation, which took place in September, is an official recognition of the school's change in presidents and marks a new beginning for the institution. The formal ceremony included words of support from the WVSOM Board of Governors' Chairman Charles Davis, D.O., and Alumni Association President Robert Olexo, D.O. Music was provided by the Greenbrier Valley Chorale and the Greenbrier Academy for Girls.

"It's been an honor for me to take part in this selection process and see its completion with Dr. Nemitz as the seventh president," Davis said. "The office of president and the word 'honor' just feel right in the same sentence. It's an honor to hold a position of power, leadership and responsibility. I have no doubt that Dr. Nemitz will keep the honor and integrity of this great institution."

Nemitz said he is humbled and filled with gratitude to serve as WVSOM's next president. He thanked his parents for being such an integral part of shaping his values and ultimately passion for the school.

"There's something special about people who are good parents, who raise their kids and let them go and become what they're supposed to be. My parents did that. They gave me my work ethic and gave me my values," Nemitz said during the formal installation.

The ceremony also focused on celebrating three main themes that included "honoring our heritage, living our mission and engaging our future." WVSOM was founded on modest beginnings, but has risen to national prominence due to the dedicated hard work of many. The new president reiterated the importance of the past while also looking toward the future.

Nemitz explained the "Living our mission" initiative that encourages students, faculty, staff and alumni to immerse themselves in community service projects and share the work they are doing throughout the local area and state.

"We are a public institution and we are here to serve this great state and take care of the citizens of West Virginia. We have to live our mission every day. Many of our alumni are going back to their communities and serving others. We should be taking care of our neighbors, communities and recognizing the diversity and differences of opinion. We need to celebrate those differences and care for our communities," he said.

"Living our mission" bandanas were given to all guests in order to highlight the sense of service among the WVSOM community.

"These are a symbol of what I'm going to challenge you with — to go out there and do something for somebody else," Nemitz said. "I want to inaugurate a year of community service. So go out there and do something for your community."

The informal celebration that followed included music by the Ramp Supper Band and RiverJam Band, dancing and West Virginia-focused dinner menu that paid homage to Mrs. Gwen Clingman, owner of the former Clingman's restaurant in downtown Lewisburg. The early business of WVSOM was often conducted in her restaurant, and she is credited by many for providing nourishment of the body and soul to many students and their families over the years. WVSOM continues Mrs. Clingman's legacy through the Gwen Clingman Scholarship award for a graduating student who has demonstrated a commitment to serve people and classmates unselfishly and humbly through community service.

Gov. Justice announces funding for WVSOM's Healthy Children's Initiative

Gov. Jim Justice announced that the West Virginia School of Osteopathic Medicine (WVSOM) Healthy Children's Initiative, a program that raises awareness about childhood obesity and works to promote healthy life choices, received $50,000 in funding.

"When you're able to give away money that's great stuff," Justice said during a press conference that was hosted on WVSOM's campus in Lewisburg. "West Virginia used to be 50th in everything. The likelihood of crawling out of 50th with Jim Justice as your governor was not very high. But the reality is we have and we are on our way. I don't think we want to go backwards. West Virginia today is a different place than it was 22 months ago."

WVSOM's Healthy Children's Initiative is working toward creating a healthier West Virginia for the state's youth. The initiative was created in 2011 along with the *Abracadabra* television series. It has served as a springboard for greater visibility around the issue of childhood obesity and engagement with other health issues of importance to West Virginians. Combining magic, ventriloquism and original music with important lessons about health, nutrition, exercise, safety and science, the show has captured the hearts of young viewers.

Justice commented on the importance of programs that educate children.

"Any and every effort that we make to help children and to educate kids in a better way should always be taken note and we should always hold that close to our heart, because that's good stuff and that's just all there is to it," he said.

Delegate George "Boogie" Ambler played a role in helping to secure funding for the initiative. He said he was pleased to receive the announcement of the governor's funding.

"*Abracadabra* and other parts of the Healthy Children's Initiative are fantastic," he said. "Those programs are what we need to keep moving West Virginia forward."

In 2018, *Abracadabra* received a regional EMMY Award for a STEM episode. The show is aired on West Virginia Public Media and PBS stations in three other states. In total, the stations reach portions of 10 states and parts of Canada, with the opportunity to showcase West Virginia to a viewing audience of more than 5 million people.

Episodes have centered on topics such as bullying, cyber predators, STEM, bicycle safety, visiting the doctor, growing a garden, fire safety and social development including sharing, courtesy and curiosity.

"A special episode of *Abracadabra* in post-production focuses on opioids and the drug epidemic," said Michael Adelman, D.O., J.D., WVSOM's president emeritus and the TV show's creator. "This particular episode is directed toward elementary-aged children and their parents. We are excited about this special, as it is one of a few drug prevention and educational initiatives that focuses on this age group."

James W. Nemitz, Ph.D., WVSOM's president, said the osteopathic medical school is appreciative of the support from Gov. Justice and funding for what WVSOM leaders think is such an important program for the state.

"The impact we are having on youth in West Virginia is already profound and we know from school visits that the initiative is effective. It's amazing to see these children respond so well to our message," he said.

In addition to the television series, the initiative includes an outreach coordinator who works with school counselors and teachers at various elementary schools throughout West Virginia to present health, nutrition and STEM educational concepts that are reinforced by the *Abracadabra* series.

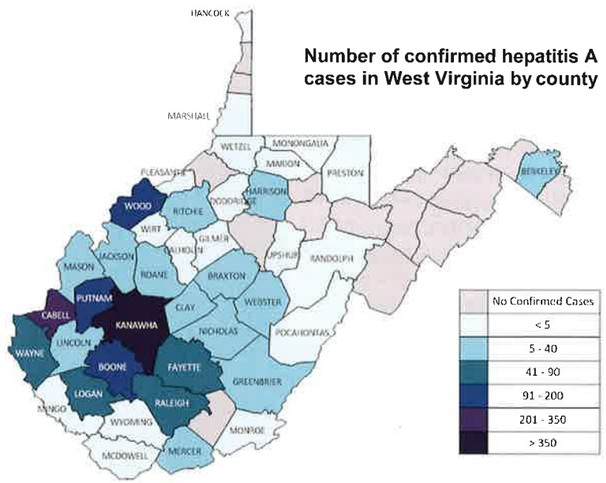
WEST VIRGINIA Department of Health & Human Resources
BUREAU FOR PUBLIC HEALTH

Hepatitis A Outbreak in West Virginia: Free Vaccine Available for Providers with At-Risk Patients

Since March 2018, West Virginia has been experiencing the largest hepatitis A outbreak in the state's history. This outbreak is molecularly linked to the multi-state outbreak in which genotype 1B is the hepatitis A strain of concern. As of November 16, 2018, there have been a total of 1,859 reported cases, 1,119 hospitalizations and five deaths related to the outbreak. The age range is from 12 to 86 years old, with a median of 37 years. Currently, the at-risk populations are:

- people who use illicit drugs;
- homeless persons;
- people recently in jail or prison;
- persons with chronic liver disease such as hepatitis B and/or C;
- men who have sex with men;
- persons who provide direct services to those using illicit drugs or are homeless;
- persons exposed to someone with hepatitis A; and
- anyone who has frequent contact with any of these populations.

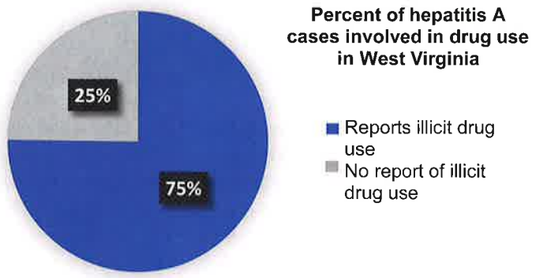
Number of confirmed hepatitis A cases in West Virginia by county



To date, 40 out of 55 counties have been affected by this outbreak.

To reduce and stop the transmission of hepatitis A, the West Virginia Department of Health and Human Resources (DHHR), Bureau for Public Health (BPH) is working with public and private partners to vaccinate the population at-risk. BPH has obtained hepatitis A vaccines which are available to healthcare providers at no cost, and encourages providers to screen and vaccinate at-risk patients during routine medical visits. Free vaccines can be offered to individuals age 19 years and older and fall into any of the risk groups identified above. BPH recommends one dose single antigen hepatitis A vaccine to protect individuals at highest risk. This has been shown to be 90-95% effective and provides protection during an outbreak.

Percent of hepatitis A cases involved in drug use in West Virginia



Encouraging patients to get vaccinated and to properly wash their hands is crucial to prevent the spread of hepatitis A. For more information, weekly outbreak updates, or to acquire a screening tool and vaccine request form for state-funded vaccines visit, www.hepawarewv.org or contact DHHR's Office of Epidemiology and Prevention Services at (304) 558-5358.

Author:
Shannon McBee, MPH, CHES
Syndromic Surveillance Director
Office of Epidemiology and Prevention Service

2019 Legislative Outlook

by Alex Macia, Esq.

The next 60 day regular session of the West Virginia Legislature commences on January 9, 2019. While much of the nation seemed transfixed by the recent electoral changes, the most significant political change in West Virginia actually preceded the election. Indeed, the House of Delegates got a new Speaker, Roger Hanshaw (R-Clay), when Governor Justice appointed his predecessor to the WV Supreme Court. Speaker Hanshaw retained his seat and leadership position post-election. As we go to print with this issue, there is still no word whether there will be any changes to the remaining House leadership positions. Overall, however, the election only yielded minor changes to the composition of both chambers, which the Republicans control. In the House of Delegates, the Republicans held off the Democrats but suffered a net loss of 5 seats and now hold a 59-41 majority; in the Senate they sustained a net loss of only 2 seats, leaving them with a 20-14 majority.

WESPAC endorsed 7 winners out of the 9 candidates it supported in the Senate races and 25 winners out of 33 races in the House. The most significant success for WVSMA, however, was the reelection of Dr. Tom Takubo, the Chair of the Senate Health Committee. Dr. Takubo, a WVSMA member, held off a strong challenge to win a second term as a Kanawha County Senator. Shortly after the election, Dr. Takubo was elevated to Senate leadership and will become the Majority Leader, from which position he will be able to influence the type of legislation considered and enacted by that chamber. Dr. Mike Maroney (R-Marshall), also a member of WVSMA was announced as Dr. Takubo's successor as Chair of the Senate Health Committee. WVSMA applauds both announcements and looks forward to a more physician-friendly Senate chamber.

WVSMA's expected agenda for the 2019 legislative session may be reminiscent of the classic movie Groundhog Day. Specifically, WVSMA will again pursue a bill regulating Prior Authorizations by insurance companies; last year's bill was vetoed by the Governor over an alleged technical defect. Working with other stakeholders in the healthcare practitioner arena, we will remedy that concern. To be sure, we have already secured the commitment from legislative leadership to advance this bill rapidly. Screening Certificates of Merit, the statutory prerequisite for the filing of medical liability lawsuits, will be refined so as to require higher standards of proof, pre-suit, thus making frivolous lawsuits less likely. While the Legislature enacted the omnibus Opioid Reduction Act of 2018 with the express purpose of reducing opioid addiction rates, it is clear that a cleanup bill will have to address some internal inconsistencies and correct some unintended consequences of that legislation. Similarly, the Medical Cannabis Act of 2017 must be revised to address certain open-ended issues and its implementation will most likely be postponed until after the original July 2019 start date. WVSMA will seek some clarification as to the role of the physician in the medical cannabis certification process. Other bills of interest will include Prohibition of Smoking in Vehicles when minors are present, Mandatory CPR Training for 911 centers, and the Sugary Beverage Tax.

Finally, and perhaps most critically from a public health standpoint, WVSMA will fight to maintain the protections contained in West Virginia's Vaccination Laws against those who would seek to weaken the same in the name of health liberty. We are hopeful that the appointment of Dr. Takubo to the role of Senate Majority Leader may prove to be the most important bulwark against this potential public health catastrophe.

WVSMA will keep its members informed via e-blasts and other media of significant developments for the 60 days the West Virginia Legislature meets to consider and enact these and other laws impacting public health and the physician community.

2018 Appalachian Addiction & Prescription Drug Abuse Conference "Prescriber Education Continued"

P. Bradley Hall, M.D.
Executive Medical Director, WVMPHP
AAPDAC Conference Chair

The 2018 Appalachian Addiction & Prescription Drug Abuse Conference (AAPDAC) exceeded our expectations for continued growth, integration and collaboration of multiple healthcare professional disciplines. Held October 18-20 at the Embassy Suites in Charleston, WV, with nearly 400 participants from 11-disciplines and 39 exhibitors in attendance. This year's conference opening and overview were led by the AAPDAC organizer, P. Bradley Hall, M.D. Dr. Hall is the Executive Medical Director of the WV Medical Professionals Health Program and Immediate Past-President of the Federation of State Physician Health Programs and Christina Mullins, Commissioner, WV Bureau for Behavioral Health.

Daniel Farmer, DO, MSc, Addiction Medicine Fellow, WV University School of Medicine, Dept. Behavioral Medicine & Psychiatry moderated the first day of the conference. Scott Hambleton, MD, DFASAM, Medical Director of the Mississippi Physician Health Program, provided an update on proper prescribing and information on atypical drugs of abuse, with related case studies. Pearls for proper prescribing, the use of drug screens, consulting the Board of Pharmacy database and careful prescribing were the lessons shared with participants.

Senator Shelley Moore Capito honored us with her presence providing a brief update and perspective from Washington.

Mark Gold MD, Chairman, Scientific Advisory Boards, Rivermend Health, followed with a presentation on obesity, sugar and addiction. Our luncheon program featured John Fromson, MD, Associate Professor of Psychiatry, Harvard Medical School, Chief of Psychiatry, Brigham & Women's Faulkner Hospital speaking on spirituality in medicine and in recovery. C. Chapman Sledge, MD, Chief Medical Officer, Cumberland Heights spoke on the topic of extended release Naltrexone. The first day's presentations ended with Sherri Young DO & Adam Breinig, DO providing an update on WV laws, rules and regulations, including the Controlled Substance Monitoring Program. The evening concluded with an evening speaker on recovery and spirituality.

Supreme Court Justice Evan Jenkins opened the second day of the conference by welcoming participants and provided an update on West Virginia's drug epidemic and his perspective. Justice Jenkins commented on his Washington experience and conveyed his personal support to everyone involved in the conference.

Svetlana Grinberg, DO, PGY-III, Lincoln Memorial University, Beckley AccessHealth Teaching Health Center moderated the second day of the conference. David Gastfriend, MD, chief architect, CONTINUUM-The ASAM Criteria Decision Engine, discussed ASAMs Patient

Placement Criteria and Continuum. James Harrow, MD, PhD, DABAM, FASAM, Addiction Medicine Physician & Consultant, provided an indepth presentation on adolescent addiction and where it all starts followed by Carl Grey, M.D. Dept of Medicine, Section Gerontology and Geriatrics, Wake Forest School of Medicine who spoke on addiction in the older adult, an epidemic of misuse and abuse with an ethical duty to prudently treat pain.

Sky Kershner, LPC, LCSW of KPCC Counseling provided the luncheon program focusing on mindfulness as a super power. Leah Claire Bennett, PhD, director of clinical operations, Pine Grove, stressed the importance of "self-care" and Alexis Polles, M.D., medical director, Professionals Resource Network Florida PRN provided insights and management of sex addition. Our evening was topped off with

Dr. James Berry, DO, medical director, Chestnut Ridge Center and Inpatient Acute Dual Diagnosis Program who gave a compelling presentation on medical marijuana.

Our moderator for the third day was Louie Olive, MD, PGY-III, Marshall Family Medicine, Paul Ambrose Health Policy Fellow. Don Teater, MD, MPH, owner, Teater

Health Solutions started off the morning with uncoupling a deadly triad, opioids, addiction & the treatment of pain. James Berry, DO, medical director, Chestnut Ridge Center and Inpatient Acute Dual Diagnosis Program, gave an excellent update on comprehensive opioid addiction treatment with MAT. Chester "Trip" Buckenmaier, III, MD COL (ret) MC, USA; program director, Defense and

Veterans Center for Integrative Pain Management, Dept. of Defense Center of Excellence, Professor Anesthesiology, Dept. of Military Emergency Medicine, Uniformed Services University, USU '92, provided an overview on pain and pain management, why measurement matters.

Saturday morning ended with an update on understanding lethality, WV overdose statistics provided by Allen Mock, MD, MS, FCAP, FNAME, Chief Medical Examiner, State of WV Office of the Chief Medical Examiner. Dr. Mock provided statistical information indicating that while WV has seen a reduction in opioid overdoses, heroin-related overdoses continue to be a major concern with rates

surpassing previous years, and the co-use of heroin and fentanyl have reached record setting highs.

The conference was supported by WVSMA, WVMPHP, WVDHHR, WVSAM, WVBOM, WV Board of Osteopathic Medicine and the WVOMA. CAMC and the WV Medical Foundation worked jointly in providing CME for the conference. A physician education grant provided by the WVDHHR Bureau for Behavioral Health and Health Facilities and administered by the WVMPHP helped make this conference possible.

Mark your calendars for next year's conference, October 17-19, 2019, at the Marriott at Waterfront Place in Morgantown, WV.

THANK YOU 2018 WVMPHP "Spirit of Wellness in Medicine" Contributors

On behalf of the West Virginia Medical Professionals Health Program (WVMPHP), our participants, all of organized medicine and the public we serve; the WVMPHP wishes to express our sincere appreciation to our 2018 WVMPHP "Spirit of Wellness in Medicine" Contributors.

The West Virginia Medical Professionals Health Program (WVMPHP) was established in 2007 by organized medicine as an independent non-profit 501(c)3. The WVMPHP promotes the health of West Virginians through improving the well-being of West Virginia physicians, podiatrists, physician assistants, medical students/residents, and other healthcare professionals. The WVMPHP remains the designated physician health program by both the allopathic and osteopathic licensure boards.

The WVMPHP has provided assistance and guidance to more than 270 ill healthcare professionals experiencing addiction and/or mental illness. Eighty-plus-percent of those individuals have achieved successful completion or pending completion of the program. In addition, the WVMPHP has provided more than 145 educational presentations, with more than 15,000 attendees, and continues to provide additional education at the annual Appalachian Addiction and Prescription Drug Abuse Conference – most recently hosting more than 350 professionals.

The accomplishments achieved for the participant, the patient, the healthcare system, and the state of West Virginia are only because of the ongoing support and recognition of organized medicine and specifically including our 2018 "Spirit" contributors.

The WVMPHP Board of Directors wishes to recognize our 2018 "Spirit of Wellness in Medicine" Funding Campaign Contributors:

Friend ($1 - $499)
Russell Biundo, M.D.
Craig Boisvert, D.O.
Davis Medical Center/Hospital
Michael Brumage, M.D.
James Felsen
Marlene Hall
Randall Hawkins, M.D.
David M. Hess, M.D.
Robert Knittle
William A. Merva, M.D.
Charles McMullen, M.D.
Roots & Harmony
Pam Scott, PA
Neil Strobl, M.D.
Philip H. Strobl, M.D.
Elizabeth & Peter Strobl, M.D.

Caregiver ($500 - $999)
Phyllis & Sam Cann,
Cheryl & Creel Cornwell, M.D.
Laura & Owen Lander, M.D.
Lorenzo Pence, D.O.
Sathyanarayan Reddy, M.D.
Sherri Young, D.O.

Advocate ($1,000 - $2,499)
R. Curtis Arnold, DPM
Ahmed D. Faheem, M.D.
Scott Gilchrist, M.D.
Omar Hasan M.D. & Irene Wasylyk, M.D.
Huntington Internal Medicine Group
Kane Maiers, M.D.
Carl Overmiller, M.D.
River Park Hospital
Joseph Selby, M.D.
Stonewall Jackson Memorial Hospital

Ally of Hope ($2,500 - $4,999)
Steven Novotny, M.D.

Pillar of Hope ($5,000 - $9,999)
Princeton Community Hospital
Roane General Hospital

Partner in Health ($10,000 - $24,999)
Charleston Area Medical Center
Charleston Area Medical Center – Medical Staff
Monongalia General Hospital

Leader of Healing ($25,000 - $34,999)
Cabell-Huntington Hospital

Legacy of Wellness ($35,000 +)
WVU Health System*
**The WVUHS includes the following hospitals:*
- Berkeley Medical Center
- Camden Clark Medical Center
- Jefferson Medical Center
- Potomac Valley Hospital
- Reynolds Memorial Hospital
- St. Joseph's Hospital- Buckhannon
- United Hospital Center
- West Virginia University Hospitals

To date, your 2018 contributions have supported the WVMPHP which will assist us as we proceed forward in further establishment of a viable and successful Physicians Health Program.

On behalf of myself, the WVMPHP Board of Directors, our participants (current and future) and the public in which we serve, THANK YOU for your contributions and continued support of the West Virginia Medical Professionals Health Program.

P. Bradley Hall, M.D.
Executive Medical Director, WVMPHP
Immediate Past-President, FSPHP

American Cancer Society holds inaugural Real Men Wear Pink Campaign reception

In its inaugural year in West Virginia, men united to fight breast cancer with the American Cancer Society through participation in the Real Men Wear Pink campaign. Throughout October, Real Men Wear Pink participants encouraged community members to take action in the fight against breast cancer.

In addition to wearing pink and raising awareness about breast cancer, these men raised funds to help the American Cancer Society attack cancer from every angle and save more lives from breast cancer. Funds raised help us save lives from breast cancer through early detection and prevention, innovative breast cancer research, and patient support.

Each Real Men Wear Pink participant accepted a fundraising challenge and competed to be the top fundraiser among his peers by the end of the campaign.

A reception was held on October 16, 2018 at the West Virginia State Medical Association. Danny Scalise graciously offered for our event to take place at this facility and we had about 50 people in attendance. The candidates had time to network and be recognized for their efforts in our cause. Kathy Smith shared her personal story. We also would like to thank our in-kind donors: Estep's, In Stitches, the Homer Laughlin China Company, and photographer, George Brown.

The 2018 Real Men Wear Pink candidates are:
Clay Marsh, MD, *West Virginia University, Vice President and Executive Dean for Health Sciences*
Richard Goldberg, MD, *WVU Medicine/Director of WVU Cancer Institute*
Andrew Byrd, *WV State Delegate, Warner Law Offices, PLLC*
Robert Shafer, *City of Summersville, Mayor*
David Mullins, MD, *Surgeon, Princeton Community Hospital*
Allen McVey, *West Virginia Insurance Commissioner*
Caleb Gibson, *Edward Jones Financial Advisor*
Nicholas Oxley, *Buckingham Strategic Wealth*
Timothy Woodward, *Hancock County Schools, Superintendent*
Bryan Hughes, *WOWK 13, Meteorologist*
Danny Scalise II, *West Virginia State Medical Association, Executive Director*
Anthony Jenkins, *West Virginia State University, President*
Kevin Fowler, *Cabell Huntington Hospital, Chief Executive Officer*
Mark Morgan, *HIMG, Chief Executive Officer*
Ryan Morgan, *Steptoe & Johnson, Attorney*
Rick Boothby, *Bowles Rice, Attorney*
John Norman, *FirstEnergy Corporation*
Phillip Wright, *AEP, Vice President of Distribution Operation*
Jeremy Hall, *Beckley ARH Hospital, Associate Administrator*
Chris Wood, *Davis & Elkins College, President*
Josh Baldwin, *Havenbrook Media, President*
Richard Eid, *Woodlands Retirement Community, Director of Technology*
Matthew Midkiff, *Mardi Gras Casino and Resort, Database Specialist*
Dale Sparks, *All Pro Photography*
Greg Elkins, *Lincoln Primary Care, Chief Medical Officer*
Benjamin Moosavi, *St. Mary's Medical Center*
Mark Heitman, *Movement Mortgage, Market Leader*
Austin Pollack, *WDTV, Anchor/Reporter*
Dan Moore, MD, *OB/GYN, Weirton Medical Center*
Scott Sincoff, *WBOY, Meteorologist*
Larry Mazza, *MVB Bank, Chief Executive Officer*

Rob Johnson, *State Farm Insurance, Agent*
Gaston Caperton, *Former Governor of West Virginia*
Dave Zimmerman, *Graybar Electric*
Van Broughton, *Mayor of Elkins*

According to the American Cancer Society *Cancer Facts & Figures 2018*, an estimated 266,120 women in the United States will be diagnosed with breast cancer, and an estimated 40,920 will die from the disease this year. In West Virginia, 1,700 women will be diagnosed this year, and 280 will die from the disease. Breast cancer is the second leading cause of cancer death in women, and it is the most common cancer diagnosed in women other than skin cancer.

"Our community can make a huge impact in the breast cancer cause," added Ellenwood. "We are grateful to our Real Men Wear Pink participants for lending their voices to this cause and fighting for everyone affected by breast cancer."

For more information about breast cancer or the Real Men Wear Pink campaign in West Virginia call 1-800-227-2345 or visit www.realmenwearpinkacs.org/WV.

Obituaries

The WVSMA remembers our esteemed colleagues...

Elena H. Cendana, MD

Dr. Elena H. Cendana, 82, of Kanawha City, admired and beloved wife of Jun Cendana for 59 years, passed away peacefully, surrounded by family, on November 10, 2018, at CAMC Memorial Hospital, Charleston, W.Va.

Dr. Cendana was born on June 22, 1936, in Manila, Philippines, daughter of the late Dr. Antonio and Salud Hernandez. Elena had numerous strengths, gifts and talents but devotion to family was her priority. Elena is survived by her beloved husband of 59 years, Jun Cendana, M.D.; her four sons, A. Brett Cendana (and wife Trish, Ed.D.) of Morgantown, W.Va., A. Jay Cendana (and wife Melissa) of Huntington, W.Va., A. Ray Cendana, M.D., (and husband Cory) of San Francisco, Calif., A. Michael Cendana (and wife Toni) of Dallas, Texas; her brother, Amando Hernandez (and wife Edith) of Cross Lanes, W.Va.; many grandchildren and great - grandchildren. She was preceded in death by her parents and her younger brother, Freddie Hernandez.

Dr. Cendana graduated Cum Laude from the University of St. Thomas in Manila with her Doctorate of Medicine. She completed post-graduate courses in Hematology at the University of Kansas Medical Center and Cancer Chemotherapy and Electrocardiography at New York University.

She was very passionate about her faith and devoted her life to service. She graduated from Wheeling Jesuit University, Wheeling, W.Va., with a Master's of Arts in Applied Theology.

Dr. Cendana was also involved in many societies and organizations that included the American Medical Association, West Virginia State Medical Association, Kanawha Medical Society, Philippine Medical Association, and the National Pastoral Musician's Association. Elena was a founding member of the Tri-State Fil-Am Association of West Virginia, Kentucky, and Ohio, Board Member of Kanawha Hospice, President and Board Member of Charleston Community Music Association, Founding Member of West Virginia Real Estate Investor's Association, Director of Community Pastoral Care (where she started a University approved program towards a Doctor of Ministry Degree), Co-Founder and Vice President of Charleston Montessori School, and served on the Parent Advisory Council for the Kanawha County Board of Education.

You may send condolences to the family at www.barlowbonsall.com.

Lewis Nevin Fox, MD

Lewis Nevin Fox, MD, 91, passed away on February 11, 2018.

Born March 22, 1926, in Morgantown, West Virginia, and raised in Prenter, West Virginia, he was the son of Benson Earl Fox, who worked as a coal miner, and Marie Nicholson Fox, who worked as a postmaster.

He graduated as salutatorian of Sherman High School where he played the clarinet in the marching band. He then enlisted in the United States Army and served as a Sergeant for the 76th Infantry in Europe during World War II. After the war, he went on to graduate from Marshall University with a bachelor's degree in chemistry, attended West Virginia University's medical school, and graduated from the Medical College of Virginia. He interned at Charleston General Hospital (CAMC).

Lew began his medical practice as the physician for Slab Fork Coal Company and shortly after married Shirley Gray Walters in 1957. He then set up a private practice in Mabscott, West Virginia, where he practiced for over 30 years. He was an avid fisherman and lover of big band and jazz music.

He is survived by his wife of 61 years, Shirley; daughter, Lynn Evans and her husband Kenneth; grandchildren: Christopher Drescher and his wife Abigail, Molly Widney and her husband Evan, Ashley Evans, and Ethan Evans; great grandson, Fox Drescher; and son-in-law, Alan Drescher

In addition to his parents, he was preceded in death by his younger sister, Frances Dolores Fox, and his oldest daughter, Nancy Drescher.

In lieu of flowers, memorial donations may be made in Lew's memory to the Beckley Presbyterian Church.

Manuscript Submission Guidelines

ORIGINALITY: Articles submitted for publication become the sole property of the West Virginia Medical Journal. Prior publication is unacceptable. The Publications Committee reserves the right to edit any material submitted. Scientific articles are to be prepared in accordance with the "Uniform Requirements for Submission of Manuscripts to Biomedical Journals." Please go to www.icmje.org for complete details.

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STYLE: Manuscript word count is limited to 3200 words and approximate the style adopted by the American Medical Association as illustrated in JAMA and detailed in the AMA's Manual of Style. An abstract of 200 words or less should accompany each manuscript, stating the exact question considered, the key points of methodology, key findings, and the conclusion directly supported by the findings.

VISUALS: No more than 5 visuals (tables and figures combined).

REFERENCES: References should be prepared in accordance to the American Medical Association Manual of Style. These instructions for authors are available online at www.jama.com. References are to be in superscript and appear AFTER punctuation.

PHOTOGRAPHS/FIGURES: Submit digital files, which are at least large enough to fill a 2-3/8 inch space at 100% at 300 dots per inch (dpi). Use arrows to point to areas of interest.

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