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# WINTER 2021: PAIN MEDICINE

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### Feature Article



# **The Opioid Crisis: Four years later**

With opioid

prescriptions and

opioid overdoses

rising over the last

decade and phy-

sicians across the

country expressing

concern, a public

health emergency

was declared in

2016. The CDC

released new pre-

scribing guidelines

### By Matthew D. Riley, MD

Resident Physician Department of Anesthesiology University of Virginia, Charlottesville, VA



Dr. Matthew D. Riley

in efforts to reduce the numbers of opioid prescriptions and doses of narcotics available. Over four years later where do we stand?

Together we have made changes towards improving patient safety. Opioid prescribing in the state of Virginia saw a decrease in the daily Morphine milliequivalent (MME) per prescription across the board from 2015 to 2019. The number of prescribers has also decreased, leading to fewer available doses of narcotics.

Prescribers have also dramatically increased their use of the Virginia prescription-monitoring program, which integrates 38 states, DC, Puerto Rico and the Military Health System. Integration of the PMP into the EMR and clinical workflow has dramatically increased its use. The availability of reversal medication for treatment of acute overdose has also increased.

The new guidelines set a standard for which patients should have prescriptions for reversal medication. And the State Health Commissioner's standing order, put in place after the declaration of a public health emergency, has accounted for roughly 10% of naloxone prescriptions.

The new guidelines and changes in practice also led to the dramatic increase of non-opioid pain medications. Gabapentinoids have become one of the most popular non-opioid prescription medications, but we learned that this medication has its own adverse effects such as sedation and fogginess.

What also became alarming was the number of opioid overdoses with gabapentinoids

### Access to Interventional Pain Management in Virginia

### By Gabriel Beluchukwu, MD

Anesthesiology Research Resident Virginia Commonwealth University, Richmond, VA



In Virginia, like the rest of the country, pain is one of the most common causes of medical consultation. Pain can be either cute or chronic. Acute pain is the sudden onset of pain sensation triggered by the nervous system

Dr. Gabriel Beluchukwu

secondary to specific events like accident injuries, surgical site pain, child labor and delivery, etc. Acute pain usually resolves following adequate management of the underlying cause. Chronic pain is different. It is the persistence of pain beyond six months that usually results from a combination of biologic, psychologic and social factors.

Why is adequate pain management important? Several studies have linked chronic pain to reduced mobility, limitations in daily activities, opioid dependence, numerous psychiatric conditions and reduced quality of life (2). In 2016, an estimated 20.4% of U.S. adults had chronic pain and 8.0% of U.S. adults had high-impact chronic pain. Both were more prevalent among adults living in poverty, adults with less than a high school education, and adults with public health insurance (2). These socio-economic conditions are more prevalent in certain areas within the State and identifying populations at risk is necessary to advise efforts to ad-

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UPDATE

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The *VSA Update* newsletter is the publication of the Virginia Society of Anesthesiologists, Inc. It is published quarterly. The VSA encourages physicians to submit announcements of changes in professional status including name changes, mergers, retirements, and additions to their groups, as well as notices of illness or death. Anecdotes of experiences with carriers, hospital administration, patient complaints, or risk management issues may be useful to share with your colleagues. Editorial comment in italics may, on occasion, accompany articles. Letters to the editor, news and comments are welcome and should be directed to: Brooke Trainer, MD • brooke@gysahq.org.

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### Four Years Later, from page 1

present. Concomitant overdose coupled with its potential for abuse led the 2019 Virginia General Assembly to declare gabapentinoids a scheduled V controlled substances. After the changes in prescribing, reduction in number of MME's and increase in monitoring, how have we affected overdose rates?

Data from the Virginia Health Department on opioid overdose is readily available for 2015-2018. In 2015, the year before the emergency was declared; the state death rate of opioid overdose was 12.1 per 100,000 with the highest rates of overdose occurring in southwest Virginia.

In 2016 and 2017, the overdose rates climbed to 15.7 and 17.4 respectively. 2018 was the first year to see a decrease in overdose rates, falling to 15 from 17.4 per 100,000. National data available from the CDC correlates with our state data. Nationally, in 2018, 41 people a day died from an overdose of a prescription opioid--15,000 deaths in total. This represented 32% of all 2018 opioid overdose deaths.

Although consistently rising from the 1990's, natural-semi-synthetic opioid overdose plateaued in 2016 and has decreased in 2018, but is still over triple the rate that existed in 1999. Even more worrisome is the rate of synthetic opioid overdose that has grown exponentially since 2013.

In 2018, synthetic opioids accounted for roughly 67% of all opioid deaths with the primary culprit thought to be due to illicitly manufactured fentanyl or its analogs. The current data suggests that the 2016 guidelines have curbed the rising rates of prescription overdose, but synthetic opioids have far outstripped prescription opioids as the primary culprit of overdoses.

We have managed to make an impact on the opioid overdose rate in the US, but how have the new guidelines impacted our patients with chronic pain?

In 2019, The US Food and Drug Administration conducted patient focus groups and surveys to develop a report on the chronic pain patient's experience of symptoms and treatments. Patients described non-opioid medical therapies as having varying levels of effectiveness. Even when effective, sometimes treatments would need to be stopped due to side effects. This is not unique to non-opioid medications but the trial and error process of finding an effective alternative treatment was also felt as a heavy burden on patients. The patients did emphasize that they have had some relief from non-medicinal therapies as well, such as physical/occupational therapy, diet, psychotherapy and acupuncture. The survey and groups also spoke specifically about opioid treatments and the changes brought about by the new guidelines.

The feedback was concerning. Many chronic pain patients felt as though they had been wronged or abandoned because the new regulations have doctors forcing tapers or altogether refusing to prescribe medications that have previously provided meaningful benefit. Most alarming is that many of the patients stated that they have considered obtaining medications through illegal avenues or even considered suicide as a release from their constant pain.

There was such evidence and concern that physicians were dramatically decreasing or stopping chronic pain patient's opioid prescriptions that in October of 2019, the HHS released a new guide on opioid taper and cessation. The guide emphasizes care must be personalized to the patient and that any change to a stable opioid regime presents risk to the patient.

The guide states, "In certain situations, a reduced opioid dosage may be indicated, in joint consultation with the care team and the patient. HHS does not recommend opioids be tapered rapidly or discontinued suddenly due to the significant risks of opioid withdrawal, unless there is a life-threatening issue confronting the individual patient."

As physicians we must always aim to improve our patient's quality of life. A patient considering suicide or the use of illicit medications to control their pain is exactly what we would hope to prevent. We also have an important and key role in reducing the availability of prescription opioids that could be abused but we must consider each and every patient individually and use the best medical regimen for them.

That regimen will likely focus on opioid sparing multi-modal techniques combined with non-medicinal therapies, but sometimes a patient's quality of life may be significantly improved with the addition of a narcotic medicine.

Most importantly, we must work with our patients to ensure that their voice is heard, their concerns are addressed and that they are not going to be abandoned while together a safe treatment plan is made with them.



The MSV White Coats on Call January 21, 2021 Starting at 7:30 am. https://www.msv.org/lobbyday

### **VSA Membership Meeting**

Presented virtually February 2, 2021 7:00 pm

### The ASA Legislative Conference

May 10-12, 2021 Washington, DC

**MSV** Annual Meeting

October 22-24, 2021 Homestead Resort, Hot Springs, VA

### **In Memoriam**

**Dr. George H. M. Rector** 1925 - 2020

Dr. George H. M. Rector, 95, of Atlantic Shores, died peacefully at home on September 27, 2020.

Born in Upper Marlboro, MD in 1925, he is predeceased by his wife of 64 years, Patricia Twohy Rector; mother, Helen Merrick; stepfather, Judge George B. Merrick; brother, C. Eugene Rector, Jr., half-sister, Priscilla M. White, and half-brother, George B. Merrick, Jr., and his grandson, William (Billy) Donald Rector.

### President's Message

# Patient Safety and Comfort Will Always Be Our Concern

**By Jeffrey Green, MD, FASA** *President, Virginia Society of Anesthesiologists* **and Marie Sankaran Raval MD** *President-Elect, Virginia Society of Anesthesiologists* 

As anesthesiol-

ogists, one of our

biggest concerns is

and always will be

relieving pain. This

will never change,

but the strategies

we employ to man-

age our patients'

pain continues to

As the pain lit-

erature grows, we

continue to learn

more about the im-

portance of mini-

mizing physiolog-

ic stressors during

surgical procedures

using non-opioid,

multi-modal phar-

macologic and

non-pharmacolog-

ic approaches. The

evolve.



Dr. Jeffrey A. Green VSA President



Dr. Marie Sankaran Raval VSA President-Elect

days of escalating opioids to control pain are over, and here to stay are specialized protocols and techniques that more precisely target pain receptors and are individualized to each patient.

In this pain management themed issue, authors have submitted well-researched and evidence-based articles, broadly covering topics ranging from implementation of ERAS protocols and their importance, to where we stand in the current opioid epidemic. You will also find a relevant article on the perioperative management of spinal cord stimulators and intrathecal drug pumps, as these patients return to the operating room with other surgical issues.

One of the most interesting and thought

The management of pain is one of the key areas where physician anesthesiologists' specialized education, training and research can differentiate ourselves from other health care professionals.

provoking articles is a science based review of how one's sex, gender, immune system, and individual gene expression can alter pain experiences, even when given identical pain stimuli. Pain management is such a diverse and expansive topic and it is our hope to provide a broad and helpful overview. The management of pain is one of the key areas where physician anesthesiologists' specialized education, training and research can differentiate ourselves from other health care professionals.

The negative long term impact of opioids for patients are well known to all of us and several efforts have been made to curb their use. One author reviews the impact of the 2016 public health emergency declared by the CDC which issued new prescribing guidelines to physicians in an effort to reduce the number of opioid prescriptions written.

Virginia has taken several steps in line with the CDC guidelines including the implementation of the Prescription Monitoring Program (PMP), which requires prescribers to review and report dispensed controlled substances. Many institutions have incorporated it into their electronic medical records, which has dramatically contributed to the program's widespread use. Also, a physician cannot renew their Virginia medical license without first completing two continuing medical education credits on safe opioid prescribing.

In accordance with opioid mitigating efforts, more medical centers are now hiring experts in ultrasound-based regional anesthesia techniques and creating Acute Pain Service teams that specialize in post-operative pain management. Patients not only benefit from better pain control, but they are less likely to suffer long term negative sequelae from escalating opioid usage. It has taken the medical community an opioid epidemic and several decades of learning to realize the benefits of specialized perioperative pain services and customization of pain management for our patients.

As anesthesiologists, we are tasked with keeping our patients safe and comfortable. This is the promise we make to our patients everyday. They come to us in their most vulnerable state, putting complete faith and trust in the decisions we make, many of which can have long term consequences.

Striking a balance between administering too much or too little is a constant struggle and the reason why we continue to strive for evidence based research to guide our management. We thank the authors who have contributed to this meaningful discussion and hope this very important newsletter themed on pain management brings awareness to your practice.

Your VSA board represents you and all Virginia anesthesiologists, and we want to make sure that your voice is always heard. Your President and President-Elect, encourage you to become more involved in your society.

Please contact us if we can better serve you or if there are any issues/topics you would like addressed in future newsletters. Thank you once again to all the authors around the state of Virginia who have put their heart and soul into producing another great quarterly publication of the VSA UP-DATE newsletter.

# **Comments on Language Reflecting Gender Bias**

Dear Editor:



Dr. Anneke Schroen

en in Anesthesia and Women in Surgery, conducted in early 2020. Among the featured topics, the role of language in reflecting, and likely furthering, our gender biases.

I read your Fall

2020 issue on

Women and Di-

versity with great

interest. Drs. Ka-

milla Esfahani and

Allison Bechtel

highlighted leader-

ship development

seminars at the

University of Vir-

ginia titled, Wom-

My own research into gendered language in letters of recommendation for surgery residency demonstrated that letters for male applicants are longer, more likely to contain references to leadership and achievement, and a greater use of superlatives.

Letters for women more frequently included references to work ethic and featured grindstone adjectives and positive but general terms.<sup>1</sup> I cannot conclude from this work whether these differences in letter content correlate with different outcomes in the Match.

My bigger concern, however, is that gender biases reflected in the word choices of the letter writers have longer term effects for a new generation at the start of their careers. Do these biases influence: Whom and how we mentor others? Whom and what we sponsor? What opportunities we make available and how readily we offer them?

When I started this work, I was convinced I did not write recommendation letters that were different by applicant gender. And if others did write with gender differences, I would have noticed after more than 15 years of reading these recommendation letters.

Of course, I did not notice. I did not even pick up on a pattern of letter lengths. My results showed that gendered language was present in letters from both men and women writers. Finally, this work did not begin to uncover how the biases of the letter readers come into play.

Reducing inequity will not happen naturally over time, or at least not at an acceptable pace – studies have already confirmed this.<sup>2,3</sup> Achieving equity, and thereby full inclusion, requires intention and design, awareness and engagement, and leadership and action.

By all of us taking stock of our biases, then, we can and must address lingering inequities in advancements, pay, and leadership opportunities in medicine. Therefore, I am grateful that you chose to highlight efforts and viewpoints directed at creating a more inclusive work environment for all in your recent issue.

Anneke Schroen, MD, MPH

Associate Professor, Surgery University of Virginia

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# **Encourage Your Practice Administrators to Join VSA**

The VSA encourages your practice administrators to join! We have two options:



If 90% or more of a group's physician anesthesiologists are VSA Active members in good standing and all members will be on a single group bill, the annual dues are FREE.



If less than 90% of a group's physician anesthesiologists are ASA Active members in good standing, or the group does not participate in group dues billing, the annual dues are \$75.00

To have your practice administrator join, go to: https://www.asahq.org/member-center/join-asa/educational

- On this page, click on the category you're interested in in this case, its: Anesthesia Practice Administrators and Executives Educational Member
- Click on the + sign next to the title
- The box that opens, will contain full details and the membership rate(s)

### Editor's Message

# **Creation of an Acute Pain Service at the VA in Richmond, Virginia: Aims and Outcomes**

### By Brooke Albright-Trainer, MD, FASA

Acute Pain Physician, Anesthesiologist, and Intensivist Central Virginia VA Health Care System, Richmond VA

Special thanks to contributions from Robert Trainer; DO; Allen Ha, PharmD; Mercy Orikogbo, RN; and Diane Ibanez, RN



Dr. Brooke Albright-Trainer

Holmes McGuire VAMC cares for veterans with the most significant and life-threatening disease burden across the VHA system. Our VA in Richmond is one of only a few VA facilities across the

nation that has a true dedicated Acute Pain Service (APS). It was created as part of the perioperative home as a multidisciplinary initiative in collaboration with the chronic pain clinic, palliative care, addiction medicine, and Preoperative Anesthesia Service (PAS) to improve hospital wide outcomes. (See Figure 1)

Despite the obvious benefits, the establishment of an Acute Pain Service at our institution was initially very challenging and met with skepticism. Considered one of the largest in the nation and a "Center of Excellence", our hospital's size alone made it difficult to establish communication across multiple services. Surgeons feared our involvement would delay their case. Nurses stated they would not have the time or resources to assist. Creation of the service required additional protected space for procedures and monitoring, and acquisition of newer equipment including ultrasounds, probes, and catheter pumps. Implementation of the Acute Pain Service also meant negotiating approval of pharmacy purchasing for large quantities of local anesthetics. We



Figure 2: Diagram created by Robert Trainer, DO

recruited two specialized Anesthesiologists with experience in regional-based anesthetic techniques and treatment of acute pain in complex patients, along with two dedicated Physician Assistants. And last, but certainly not least, we alloted hours of dedicated time to educating the nursing staff around the hospital about fundamentals of peripheral nerve blocks, managing pain catheter pumps, as well as recognizing and

treating Local Anesthetic Systemic Toxicity "LAST". (See Figure 2)

Though these initial steps demanded an investment of thousands of dollars of resources and months of our time and attention, in the end, it was vital to the service's success.

The VAMC in Richmond, Virginia provides tertiary care and surgical services up to and including oncological, general, vascular, plastics, orthopedic, neurosurgical, urological, podiatry, and cardiothoracic surgery. As such, it is imperative that we have trained staff in-house at all times to handle the acute pain needs that occur in our surgical patient populations, as well as other areas. Since inception, we have seen more than a ten-fold increase in unique consults and regional based anesthetic techniques. (See Figure 3)

The hospital has also seen an overall decrease in lengths of hospital stay as measured by the Veterans Affairs Surgical Quality Improvement Program data. (See Figure 4)

On the post op surgical wards from 2015 to 2018, we saw a 32% decrease in use of Patient Controlled Analgesic (PCA)/month, and a 48% decrease in number of unique patients using a PCA/month. (See Figure 5)

We offer comprehensive pre-emptive treatments of acute pain with the goal of improving patient satisfaction, as well as lowering the transition from acute to chronic pain. We are frequently consulted to manage post-surgical pain in patients with complex medical problems in whom we are interested in decreasing opioid utilization. In the operating room, the dedicated pain service has contributed to improved OR efficiency due to a perceived decrease in block placement times leading to an increase in on-time starts, surgeon reported improved efficacy of the blocks performed, and an increased number

### Acute Pain Service, from page 6

of cases able to be performed solely under regional anesthetic versus general anesthesia (Figure 6).

In collaboration with the surgical and medical services, we have worked to standardize postsurgical pain regimens utilizing Enhanced Recovery After Surgery (ERAS) protocols, which are opioid sparing and include multimodal analgesics.

For example, those patients undergoing Total Knee Arthroplasty at our institution are given oral acetaminophen, meloxicam, and gabapentin (unless contraindicated) in the preoperative holding area, a spinal anesthetic, and either a peripheral nerve catheter infusing low-dose ropivacaine (0.2%) or a single shot nerve block with longer acting liposomal bupivacaine placed in the adductor canal in the post anesthesia recovery unit.

The protocol includes continuation of scheduled acetaminophen, meloxicam, and gabapentin, along with low dose oral oxycodone as needed for breakthrough pain. We have found this regimen to be very successful in ensuring our patients are discharged on time with minimal opioid requirements, and with optimal participation in physical therapy with adequate functional rehab scores.

For those patients undergoing non-traumatic trans-tibial and trans-femoral amputations, we aim to place peripheral nerve catheters upon admission to the surgical floors, sometimes days before their scheduled surgeries. Because these patients tend to have some of the most complex medical conditions, in nearly every case, we attempt to perform nerve blocks prior to the procedure that can be utilized not only to control pain, but also for the primary anesthetic technique.

Before 2015, most of these cases were performed under general anesthesia, and occasionally under spinal anesthesia, when there were no contraindications. Their pain was controlled mostly with opioids. These patients often spent days to weeks in the hospital, sometimes requiring further amputations because their pain was assumed to be related to further ischemia or disease. With a dedicated acute pain service, we are now able to better control their pain with regional-based anesthetic techniques.

Recently the Acute Pain Service teamed up with the Chronic Pain Service, and concluded a grant funded prospective random-



Figure 5: Data retrieved from Surgical Ward Omnicell, provided by Allen Ha, Pharmacist

ized controlled research trial evaluating the benefits of early neuromodulator techniques in decreasing opioid utilization, controlling pain, and minimizing the transition from acute to chronic pain in amputee patients.

Our research project compared the effectiveness and safety of a temporary implanted Peripheral Nerve Stimulation (PNS) device system (see Figure 7) in conjunction with Standard Medical Therapy (SMT) to SMT alone for the treatment of acute pain following lower extremity amputations. Other acute pain research at our VA includes ongoing retrospective comparisons of liposomal bupivacaine single shot nerve blocks versus continuous infusions of local anesthetics via nerve block catheters for post-surgical pain control after shoulder and knee arthroplasty surgeries. These efforts are all a part of the APS opioid mitigation strategies.

In addition to providing a twenty-four hour consultation service for acute pain related problems, we have integrated services with the chronic pain clinic, palliative care, spinal cord injury service, and addiction medicine for a more complete triage of

**Continued on page 8** 

# **Dr. Moses Running for the House of Delegates**

#### By Ben Moses, MD

Assistant Professor of Anesthesiology University of Virginia, Charlottesville, VA

Whenever my department meets

for grand rounds, or

M&M conference.

invariably one of

the old heads in the

room will stand up

and argue why this

policy or that prac-

tice is backwards.

or how ridiculous

it is that we still do

certain things, or



Dr. Ben Moses

don't do others.

For some, these are treasured moments of glee, hearing a loud, confident, voice shout

to a room full of people who generally agree with them, chastising the powers-that-be for failing to right the wrongs of the world.

For me, it's a simple reminder that it takes more than preaching to the choir to actually get things done.

My name is Ben Moses, and I am running for Virginia House of Delegates. I started my career as a military physician, stationed in Texas, then Missouri, then Texas again, initially training in general surgery before deciding on a different path.

I spent most of my time on active duty working for large groups of soldiers and their families, with a focus on primary care and deployment readiness. But I also spent four years in medical administration, writing policy for my units, meeting with hospital leadership to ensure best access to care for my soldiers, translating the language of medicine into terms both accessible and meaningful for those whose lives I worked to impact and improve.

Upon leaving active duty, I completed anesthesiology training here in Virginia, at UVA in Charlottesville, and after a critical care fellowship at Hopkins, returned to UVA, where my wife was already on faculty as a pediatric hematologist/oncologist.

I've spent most of my career dedicated to the education of students, residents, and fellows on the basics and the finer points of critical care anesthesiology. I may save hundreds of lives a year as a clinician, but the more I teach, the more lives I reach.

I have accomplished some of my goals, but now entering my fifth decade, I am faced with a challenge. How many more lives can

Continued on page 23

### Acute Pain Service, from page 7

inpatient pain consultation. Our constant presence on the wards and in the OR improves working relationships and fosters a better understanding of evidence-based pain practices for all involved services.

Lastly, we have taken on the long-term goal of eliminating opioid-related adverse events hospital wide. This includes minimizing the risk of opioid induced ventilatory impairment in post-surgical patients, especially those with OSA or at high risk of obstructed airways.

Focused efforts to achieve this goal have included collaboration between APS and the preoperative anesthesia service to identify patients with OSA, flag them as patients who require a non-opioid multimodal based perioperative anesthetic, utilization of regional anesthesia when appropriate, enhanced postoperative monitoring, and a discharge plan home with readily available intranasal or injectable narcan, as well as a functioning CPAP machine and proper fitting mask.

We have spearheaded a ketamine infusion protocol as an alternative to opioids for treating acute pain in those patients whom opioid tolerance has developed, such as those requiring escalating doses of opioids to control pain, or those in whom treatment of



Figure 6: Increased number of Anesthetics able to be performed under Regional vs. General Anesthesia



Figure 7: PNS device with Needle Introducer and Lead

acute pain has become resistant to common modalities. We have had such great success

with ketamine's safety profile and efficacy that we hope to eventually expand its utilization from the ICU environment to the Wards for use as an additional opioid-sparing adjunct in the treatment of acute pain.

In conclusion, the creation of a separate and dedicated care team, the Acute Pain Service, for treating patients with acute or acute on chronic pain, has shown multiple benefits in safety and effectiveness in the VHA's ongoing efforts to combat opioid related adverse events and has been an integral part of the successful collaboration between several multidisciplinary services.

# The Influence of Sex, Gender, and the "X" **Chromosome on the Pain Management Experience**

#### By Chinwe Anumudu, MD

Chief Anesthesiology Resident Virginia Commonwealth University, Richmond, VA and Denise D Lester, MD Anesthesiologist and Pain Physician Assistant Professor Anesthesiology and Physical Medicine & Rehabilitation

VCU/ MCV/CVHCS, Richmond, VA



Dr. Chinwe Anumudu



Dr. Denise D. Lester

discuss the science behind the concept of the individual selective patient-specific approach to pain management.

This topic requires an initial review of important definitions. First, it is essential to point out that the terms "sex" and "gender" are not synonymous. Sex is a characteristic defined by biological or chromosomal traits, whereas gender is a continuum of self-identified traits, which can be influenced by societal and cultural factors. Furthermore, gender refers to a person identifying themselves as being either male or female with many variations in the middle. It is essentially a modifiable, socio-culturally shaped behavior unrelated to your chromosomal makeup. It is your own personal self-representation of who you are.

cific individual experience and treatment of pain is currently a highly debated point of discussion. No longer are pain management consultants using a "standardized" concept to manage pain in their patients.

It is well known that many variables such as our personal immune system and our individual unique gene expressions alter our pain experience even when given identical pain stimuli. This article will



This topic may appear new in the clinical arena of the anesthesiologist, but the pain research world has studied this concept since the late 1990's

There is a range, with self-identified males being on one end and self-identified females on the other. Because it is a subjective and modifiable category, many of the older research studies on pain utilizing the term "gender" were not always scientifically objective.

The term "sex" is a purely phenotypical definition related to the expression of either two "X" chromosomes or an "X" and a "Y" chromosome. It is easily definable when comparing two people and placing them into a research (trial). Using the term "sex" you are defined as either male or female specifically by your chromosomes and studies using this identifier have more scientifically objective and less variable discussion.

Clearly there are a myriad of chromosomal variations that can occur and cause difficulty placing a subject into either male or female categories, but for the purpose of this discussion, we will focus on the traditional "X" and "Y" categories.

This topic may appear new in the clinical arena of the anesthesiologist, but the pain research world has studied this concept since the late 1990's.

Historically the first landmark paper that introduced the concept of gender differences in pain was by Bartley in 1997 termed "Sex Differences in Pain". This paper concluded that females had 1) lower pain thresholds, 2) higher pain ratings, 3) less tolerance to noxious stimuli and 4) a greater ability to discriminate pain.

They also concluded that females had pain in a greater number of body regions than their male counterpart. They reported three proposed mechanisms leading to these findings 1) sex specific hormones acting as neuroactive agents affecting various pain physiologic processes such as the opioid and nonopioid systems, nerve growth factor, and the sympathetic nervous system; 2) the vaginal canal being a route for trauma and

### Sex, Gender and the "X" Chromosome, from page 9

invasion by pathogens leading to hyperalgesia and 3) females having different patterns of pain for example a temporal pattern correlating with the menstrual cycle – which ultimately may influence how females "learn pain" and interpret painful stimuli.

So what are the specific differences found in the published literature when comparing the sexes? Females have 1) Greater pain discrimination 2) Less pain tolerance 3) Higher pain intensity 4) More rapid withdrawal reflex 5) Greater pupil dilation 6) Greater temporal summation 7) Less diffuse noxious inhibitory control (pain in one part of the body leads to pain in another part of the body) 8) Greater pain related fears and depression 9) Less self-efficacy 10) Greater disability.

In 2007 the International Association for the Study of Pain (IASP) Special Interest Group on Sex and Pain published a review of the previous ten years of publications on pain and they found that 79% of the papers used 100% male subjects in their research and only 8% of pain papers published used 100% female subjects. This made researchers aware of the importance of using female/ male subjects in the study designs of their future pain research in an effort to understand "individual patient specific "pain. Some authors suggest that this propensity for male only research subjects was an attempt to remove the variability of hormonal influences on their pain specific research outcomes. Since then, researchers make strong efforts to have equal representation of males and females in their study designs.

What types of pain are "sex" specific? Female specific pains include: 1) pelvic pain, vulvodynia, post mastectomy, dysmenorrhea, labor pain, and endometriosis. As far as pain in general – females (compared to males) more frequently experience migraine, temporomandibular pain, irritable bowel syndrome, and fibromyalgia. Male specific pains include 1) Prostatitis 2) Prostadynia and less frequently 3) Chronic pelvic pain.

What are the physiological differences between the sexes? There are four categories to consider 1) Bioavailability, 2) Distribution 3) Metabolism and 4) Excretion.

These four categories will affect medication management of your female patient. As far as bioavailability - females have lower body weight and higher body fat content in We are beginning to look at individualized medicine. The genetics and hormones of our patients and how that affects our patients pain experience and outcomes. Leaving the idea of treating everyone as a "hip replacement" or a "total knee" and taking into consideration our individual patient characteristics.

general which will affect drug bioavailability. They have a variety of drug catabolic enzymes that stored in less quantities compared to males.

An example is the long-held notion that females become more quickly and heavily intoxicated compared to males, which was subsequently found to be secondary to a deficient amount of alcohol dehydrogenase in females compared to males. Distribution in females is also different compared to males. The volume of distribution is less, the amount of albumin is less and the amount of protein binding in females compared to males is less.

Drug metabolism is different secondary to a higher amount of cytochrome P3A, which will metabolize certain drugs more quickly, such as Midazolam. Lastly, renal clearance is slower in females compared to males.

Female hormones affect many drugs. If you look at a variety of drug classes utilized in pain management and then look at their neurobiological precursors, you will find interactions with several female hormones.

Examples include: Opioids (Enkephalins), anticonvulsants (Gamma amino butyric acid), antidepressants (Serotonin), ketamine (Glutamate), clonidine (Angiotensin), THC (Cannabinoids). This has been demonstrated in the literature with females having a greater side effect profile with opioids particularly its sedative and respiratory depressive properties, which in turn limits the opioid dosing necessary for adequate pain control.

If opioids perioperatively are influenced by female hormones, wouldn't it be better to remove ourselves from the habit of generalized postoperative dosing of the female who is at the beginning of her menstrual cycle exactly in the same manner as a male dose per kilogram? This is an example of where patient specific pain management begins to cross into our clinical arena.

Additionally, not only a greater analgesic drug -dose per kilogram in females compared to males but considering a different class of analgesic in females compared to males based on progesterone and estrogen levels. We are beginning to look at individualized medicine. The genetics and hormones of our patients and how that affects our patients pain experience and outcomes. Leaving the idea of treating everyone as a "hip replacement" or a "total knee" and taking into consideration our individual patient characteristics.

What are the hormone characteristics of females? In general when estrogen decreases during the hormonal cycle - pain is increased. Alternatively, the hormone progesterone is an analgesic pain-relieving affective hormone and is found at about the halfway point in the female hormone cycle. If you compare the three hormones Estrogen, Progesterone and Testosterone (males) you will find very specific effects on 1) immune system, 2) brain 3) spinal cord 4) peripheral nerves 5) musculoskeletal system and 6) cardiovascular system. Progesterone is an anxiolytic. It is also a sedative, an analgesic, an anticonvulsant and is considered neuroprotective as well. Testosterone is analgesic, modulates endogenous opioids, and decreases norepinephrine. Unfortunately, estrogen has a number of nociceptive properties. It increases glutamate in the dorsal horn and changes facilitating pain pathways.

The physiological differences have been studied using the transgender and neutral sex populations. These groups allow specific physiologic hormone replacement environments to occur without correlation to genetic chromosomes allowing research to look in more detail at how hormones affect pain. In 2007, a publication reported cross-sexual hormone replacement changes

### Sex, Gender and the "X" Chromosome, from page 10

in transgender women and men. These are patients that undergo gender reassignment surgery as well as hormonal replacement to reflect their desired gender identity. The first category included transgender women (biological males undergoing the transition process to women.) They were given estrogens and anti-androgens. The second category included transgender men (biological females undergoing the transition process to men) and was given androgens. In this paper, 25% of the transgender women developed painful conditions including headaches, muscle aches and breast pain. When the transgender men (female to male) underwent the male-hormonal transition process, 54% of that group reported a global reduction of their previously reported pain. Although the study had some flaws, it was an interesting trend and made researchers want to study the role of testosterone and estrogen in analgesia more clearly.

There are psychological differences in males vs females. The prevalence of major depression and anxiety is significantly higher in females compared to males (5.3 vs 3.2% worldwide). In addition, coping mechanisms are also different between men and women with women more likely to verbalize their pain. Particularly, women are more likely to catastrophize and ruminate during painful experiences. These psychosocial factors more often found in women all play a role in not only how pain is experienced but subsequently how itub managed. Additionally, sociocultural differences include 1) childbirth stereotypes and 2) historical stereotypes (sedentary desk job in females vs manual labor in males).

Where does the immune system fit in when we discuss the difference in male and female pain pathways? Although social and psychological factors certainly play a role in the differences in prevalence and incidence of pain suffering in females – biological differences in the functioning immune system likely underlie these observed effects. Biological sex differences in the functioning of the innate and adaptive immune systems are related to the pain experience. With rodent models male mice utilize microglia in the The individual and combined influences of these biological and psychosocial variables result in a unique combination of factors that contributes to each of our individual pain.

spinal cord to mediate pain, whereas females preferentially use T cells in a similar manner.

The difference can be traced to differences in cell populations, differences in suppression by hormones, and disparate cellular responses in males and females. These sex differences also translate into human cellular responses and may be the mechanism by which the disproportionate chronic pain experience is based. Recognition of the evidence underlying sex differences in pain will guide development of treatments and provide better options for patients that are tailored to their physiology.

The key phrase in this review is pain experience "variability". There is tremendous inter-individual variability in the pain experience. As we have stated above - multiple biological and psychosocial variables contribute to individual differences in pain including demographic variables, genetic factors, and psychosocial processes.

This paper did not cover other variables such as culture, ethnicity and race but those factor heavily as well in the variability of pain. Even in experimentally-induced pain, many variables can be manipulated to reproduce the results we have discussed.

Additionally, the different biopsychosocial factors interact with each other in complex ways to influence the experience of our individual pain. Genetic associations with pain vary across ethnic and sex groups. Genetic factors also interact with psychosocial factors including stress and pain catastrophizing, to influence pain. The individual and combined influences of these biological and psychosocial variables result in a unique combination of factors that contributes to each of our individual pain.

Understanding these interactions is a critically important process in providing optimal pain treatment, and future research is needed to understand the crucial need to provide individualized, personalized pain care to our patients.

In the most fundamental terms, sex differences in perception, expression and coping with pain exist. Understanding these differences is instrumental to how we as pain physicians assess and manage pain. Future articles detailing how other factors including culture, race and ethnicity influence our understanding and management of pain are in the works but our hope with this article is to change the "one size fits all" approach to pain and develop pain management plans which allow us to provide the best possible individualized care to our patients.

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### **Interventional Pain,** from page 1



vancing and targeting quality pain services.

Chronic pain contributes to an estimated \$560 billion each year in direct medical costs, lost productivity, and disability programs (2). One study estimated that approximately 3 percent of patients in the primary care setting were receiving chronic opioid therapy for pain (defined as daily use of medically prescribed opioids for at least 90 days) (4). Although there is wide variation in patient and disease factors that determine the best mode of pain management for each individual, there is a wide belief that interventional pain management, when compared to chronic opioid therapy, is safer and more efficient, long-term. Hence, this article focuses on access to adequate pain management but not necessarily access to prescription analgesics.

Who is at risk for chronic pain and why does this matter in Virginia? Veterans are more likely to experience chronic pain than the general population. Joint and back pain and other musculoskeletal ailments are the most common diagnoses among Iraq and Afghanistan Veterans.

In a 2017 report, the National Institutes of Health (NIH) estimated that 65.6% of American Veterans reported having pain in the three months before they were surveyed, with 9.1% classified as having severe pain. Severe pain was 40% greater in Veterans than non-Veterans, especially among those who served in recent conflicts.

With that said, the demand for adequate pain management is especially high in Virginia. Of all the 116 Congressional Districts (CD) in the nation, the Commonwealth of Virginia's CD2 and CD3 has the 2nd and 3rd highest number of veterans after Florida's CD1. Virginia's CD2 includes the cities of Virginia Beach, Williamsburg, parts of Norfolk and Hampton, and counties of Accomack, Northampton and York. Virginia's CD3 includes Isle of Wight county, and the cities of Franklin, Newport News, Portsmouth, and parts of Chesapeake, Hampton, Norfolk and Suffolk.

How well is demand for adequate pain management being met in the Commonwealth? Based on Physician Profile Data from the Virginia Department of Health Professions, physician response rate to "Specific Specialty of Practice" survey is 76%. According to the survey, only 20 health facilities, excluding the major academic hospitals, self-reported as "Pain Medicine" facility (Of note, this data only represents Anesthesiologist, Physical Medicine and Rehabilitation Physicians, and Neurologists who self-reported as non-hospital based Pain Specialists to Virginia Department of Health Professions (Table 2) though response to specific specialty question was not required).

If this response rate applies to Pain Medicine, then we can estimate that there are less than 30 self-recognized Pain Management facilities in Virginia. This suggests the need for better data on the number, and distribution, of licensed Interventional Pain Specialists to better estimate the status of adequate pain service in the State. Nonetheless, the available data suggests significant deficit in supply of Pain Specialists in all Congressional Districts (CD) of the Commonwealth of Virginia; more pronounced in CDs' 2 and 3 where both the veteran and general population (Table 1) are skewed towards their constituent cities. This article therefore seeks to bring awareness to the possibility of relatively high demand for adequate pain management in the Commonwealth of Virginia. It identifies the need for better data to inform action and calls for estimates of pain management demands by Virginians and the corresponding supply of qualified Pain Specialists. It recognizes low supply of qualified Pain Medicine Physicians as a potential factor for improper access to adequate pain management within the State. Finally, it recognizes potential worsening Physician Workforce deficit within the

State, and potential worsening of access to adequate pain management.

CITY	POPULATION	POPULATION Rank	
Virginia Beach	449,974	1	
Chesapeake	244,835	2	
Norfolk	242,742	3	
Arlington	231,803	4	
Richmond	ond 230,436 5		
Newport News	179,225	6	
Alexandria	159,428	7	
Hampton	134,510	8	
Roanoke	99,143	9	
Portsmouth	94,398	10	
Suffolk	92,108	11	
Lynchburg	82,168	12	
Centreville	75,452	13	
Dale City	73,545	14	

Table 1: Most populated cities in VA. Source: United States Census Bureau. Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2019. U.S. Census Bureau, Population Division. Web. May 2020. http://www.census.gov/.

Future predictions are not quite encouraging either. While the Virginia Physician Supply Demand Model (VPSDM) predicts that Virginia will add physicians steadily, the rate of projected growth steadily declines. The VPSDM projects Virginia will add 3,500 patient care physicians from 2010 to 2020. From 2020 to 2030, Virginia is only projected to gain an additional 3,200 patient care

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### Interventional Pain, from page 12

CITY	ZIP CODE	BOARD Certified Pain	SELF-REPORTED	MEDICAID	MEDICARE
Alexandria	22314	TRUE	Physical Med & Rehab/Pain	FALSE	FALSE
Arlington	22209	TRUE	Neuro-Psych/Pain	TRUE	TRUE
Charlottesville	22903	TRUE	Anesthesiology/Pain	TRUE	TRUE
Chesapeake	23320	TRUE	Physical Med & Rehab/Pain	TRUE	TRUE
Colonial Heights	23834	TRUE	Physical Med & Rehab/Pain	TRUE	TRUE
Danville	24541	TRUE	Anesthesiology/Pain	TRUE	TRUE
Fairfax	22031	TRUE	Anesthesiology/Pain	FALSE	TRUE
Harrisonburg	22801	TRUE	Anesthesiology/Pain	FALSE	TRUE
Leesburg	20176	TRUE	Physical Med & Rehab/Pain	FALSE	TRUE
Manassas	20110	TRUE	Anesthesiology/Pain	FALSE	TRUE
McLean	22102	TRUE	Anesthesiology/Pain	TRUE	TRUE
Newport News	23606	TRUE	Physical Med & Rehab/Pain	TRUE	TRUE
Norfolk	23517	TRUE	Neuro-Psych/Pain	FALSE	FALSE
Petersburg	23805	TRUE	Physical Med & Rehab/Pain	TRUE	TRUE
Richmond	23219	TRUE	Physical Med & Rehab/Pain	FALSE	FALSE
Roanoke	24014	TRUE	Physical Med & Rehab/Pain	TRUE	TRUE
Salem	24153	TRUE	Anesthesiology/Pain	TRUE	TRUE
Sterling	20166	TRUE	Anesthesiology/Pain	FALSE	FALSE
Vienna	22182	TRUE	Anesthesiology/Pain	FALSE	TRUE

Table 2: Non-hospital based, Government-recognized Pain Specialists in Virginia. Source: Virginia Department of Health Professions. http://www.dhp.virginia.gov/downloads/profiledata.asp



Figure 1. Number of drug overdose deaths involving opioids in Virginia, by opioid category. Drug categories presented are not mutually exclusive, and deaths may have involved more than one substance. Source: CDC WONDER. physicians. Since new graduate assumptions in the model are constant, the decline in the projected growth rate is due to increases in projected retirements and mortality as the baby-boomers reach retirement age.

Virginia's full time employed patient care physician workforce will begin to decline by 2030 if the Commonwealth continues to capture only 500 new physicians annually. If Virginia manages to capture 700 new physicians each year, the VPSDM projects that supply will begin to approach demand, suggesting that Virginia may need to capture just over 700 new physicians annually to meet projected demand.

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# **ERAS Pain Control Protocol Explained**

**By Lynda T. Wells, MBBS** Associate Professor of Anesthesiology University of Virginia Charlottesville VA



Dr. Lynda T. Wells

of pain control in enhanced recovery after surgery (ERAS) was first described by George Washington Crile in 1912. He observed that outcomes for patients who received ether anesthesia alone for

The significance

surgery did very poorly compared to those who also received nitrous oxide and/or morphine. The best outcomes, he noted, were in patients who received cocaine nerve blocks and ether anesthesia. It was not until 1923 when Cuthbertson described the neuroendocrine stress response that the reasons for Dr. Crile's observations became clear.

The modern day ERAS concept was popularized by Henrik Kehlet, a Danish surgeon, in the 1970's. It caught on in Scandinavia, then Europe, other developed nations and eventually reached the USA. There are many different ways to enhance surgical recovery. Their common focus is on reducing physiologic stress using pre, intra and post-operative interventions. Surgical and post-procedural pain are obvious physiologic stressors.

The ERAS concept has led to ERAS protocols. These should be customized to the physiologic stressors inherent in the surgery/ procedure and to the needs of the individual patient...read...ONE SIZE DOES NOT FIT ALL. Thus, it is important to understand the role of each element of a given ERAS protocol and utilize it appropriately.

The first ERAS protocol introduced at UVA was for colo-rectal surgery in adults. For the purposes of this article, I will focus on the pain control portion of this pathway. As I mentioned before, there are many ways to achieve enhanced recovery not all of which are incorporated in this particular protocol, e.g. epidural analgesia. Multi-modal approaches are preferred as these reduce side effects while maintaining efficacy. The ERAS concept has led to ERAS protocols. These should be customized to the physiologic stressors inherent in the surgery/procedure and to the needs of the individual patient...read...ONE SIZE DOES NOT FIT ALL.

Pre-operatively, patients with complex pain problems and those on buprenorphine for addiction management are assessed in the Pre-operative Evaluation and Testing Clinic (PETC). Advice is given regarding medication use leading up to surgery and the Acute Pain Service (APS) is made aware of the patient's planned date of admission. This facilitates an APS evaluation of these patients in the PACU and on the floor post-operatively.

On the day of surgery, prior to induction of general anesthesia, patients receive oral acetaminophen 975 mg, celecoxib 200 mg, and gabapentin 600 mg followed by intrathecal morphine (250 micrograms).

Intra-operatively, patients receive a bolus dose of ketamine (0.5 mg/kg) followed by an infusion at 0.1 - 0.3 mg/kg/h; a bolus dose of



Figure 1: Pharmacologic effects of drugs on sensation with stimulus

lidocaine 1 mg/kg followed by an infusion of 2 - 3 mg/min; and, 2 g IV magnesium. Dexamethasone 4 mg IV for anti-emesis but which also has an anti-inflammatory effect. Local anesthetic is infiltrated into the wound(s) during closure.

Post-operatively, the lidocaine infusion is continued at 0.5 - 1 mg/min for approximately 48 hours. Acetaminophen 1 g IV or 975 mg po q 6 h, and celecoxib 200 mg po q day or ketorolac 30 mg q 8 h, are continued as scheduled medications. Ketamine, midazolam and oxycodone are prescribed per protocol for the PACU. Oxycodone is prescribed for break through pain as needed on the floor.

What is the rationale for using these drugs?

Figure 1 provides a simplified overview of the pharmacological effects of these drugs. Under normal conditions, there is no sensation without a stimulus. As a tactile stimulus increases the sensation created also increases until the point where it becomes uncomfortable, painful and agonizing (line A). In situations with baseline inflammation the stimulus/sensation line is moved to up and to the left (line B). Thus, there is pain without a stimulus and tactile stimuli are associated with allodynia and hyperalgesia. Treating an inflammatory pain with an anti-inflammatory drug will move line B down to line A. An anti-inflammatory drug will not

### Members in the News

# Dr. Marc Huntoon Receives 2020 ASRA Distinguished Service Award



Dr. Marc Huntoon

Dr. Marc Huntoon has received The American Society of Regional Anesthesia and Pain Medicine 's 2020 Distinguished Service Award.

ASRA thanked him for his com-

mitment and service to your many colleagues, fellows and patients and to advancing the specialty of regional anesthesia and pain management.

Join us in congratulating Dr. Huntoon on some of his myriad contributions:



- Editor-in Chief of RAPM 2012 2019
- Doubling the growth of submissions to RAPM since assuming leadership
- Creating the highly popular 'Daring Discourse' section
- First reported use of Ultrasound-guided PNS in 2008
- Nearly 200 citations ("MA Huntoon") under Google Scholar search

- Author on ten book chapters
- Past-President Association of Pain Medicine Program Directors
- ASRA Board of Directors 2005 2013
- NANS Board Member 2011 2017
- Former Naval Officer

ASRA annually recognizes someone who has made important contributions to our specialty through the Distinguished Service

Award. Past recipients of the award have made extraordinary contributions to the science, teaching, or practice of regional anesthesia and/or pain medicine and often have had active involvement in ASRA.

### ERAS Pain Control, from page 14

reduce sensation to below normal. Thus, if after using an anti-inflammatory drug(s) the sensation is still painful or too uncomfortable, an analgesic (line C) is required.

There are two classes of analgesic: opioids and local anesthetics. Analgesics can reduce inflammatory and non-inflammatory pain but, especially with opioids, the side effects are directly proportional to the dose given. Thus, by using anti-inflammatory drugs to treat inflammation, and using opioids to treat the remainder of the pain, the side effect burden is minimized.

Neuropathic pain represents a resetting of the central nervous system such that tactile sensations are more easily interpreted as allodynia and/or hyperalgesia (line D). It is sometimes termed "Wind-up" or central sensitization. This is the condition that exists when acute pain evolves into chronic pain. Depending on the type of surgery and pain definitions used acute post-surgical pain evolves into chronic pain in 30 - 70% of patients.

Typically, this sort of pain is treated with gabapentinoids, tricyclic antidepressants (TCA) and serotonin-norepinephrine re-



uptake inhibitors (SNRI). Selective serotonin reuptake inhibitors (SSRI) are not useful in treating pain per se, but may improve the pain experience through treatment of depression. During tissue trauma, e.g. surgery, the nervous system starts to become sensitized after 20 minutes of exposure to pro-inflammatory mediators, etc.

Placing the drugs into the Figure, acetaminophen, celecoxib, lidocaine infusion and dexamethasone all provide anti-inflammatory effects and bring line B back to

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# **Spinal Cord Stimulators and Intrathecal Pumps:** Anesthetic Considerations, Perioperative Evaluation, and Management

### By Elysha Dinh, MD

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drug delivery sys-

encounter patients

with these devices.

This article aims

to discuss possible

concerns regarding

the management of

patients with SCS

and IDDS in the

perioperative pe-

riod.



Dr. Elysha Dinh



Dr. Robert J. Trainer

### **Spinal Cord Stimulation**

#### Introduction

The SCS is FDA approved for the treatment of chronic neuropathic pain of the trunk and limbs, radicular pain from failed back surgery syndrome, and complex regional pain syndrome. It has also been used in the treatment of peripheral nerve pain, peripheral vascular disease, and chronic intractable angina (1). With SCS, wire leads with electrical contacts at the distal portion are placed in the epidural space over the dorsal columns. The wire is then connected to a pulse generator. Prior to implantation, patients undergo an approximately one-week SCS trial period with percutaneously placed leads; those who experience significant pain



relief or increased functional status progress to permanent implantation.

There are two options for permanent implantation. Wire leads can be placed percutaneously through a needle or a paddle can be placed via an open laminectomy. For both approaches, the leads will be tunneled beneath the skin and connected to the pulse generator (IPG) which can reside in the back, buttock, or abdomen.

There are five main companies offering SCS in the United States currently: Boston Scientific, Medtronic, Nevro, St. Jude/Abbott, and Stimwave.

### **General Intraoperative Management**

When a patient with an SCS presents for anesthesia, it is recommended that the device be reprogrammed to the lowest amplitude and turned off; patients can do this with their device controller as long as the battery has been charged and the patient has their controller present (1). Reprogramming ensures that in the event of inadvertent activation, the stimulation will be low and likely unnoticed. Turning off the device reduces the risk of accidental reprogramming via electromagnetic interference (2-6). The patient should be able to turn the device back on post-operatively via their controller. The device generally does not need to be interrogated immediately post operatively.

#### Electrocautery

Electrocautery used in surgery can potentially damage any implanted electronic medical device through four main mechanisms by creating electromagnetic interference (EMI):

- 1. Turning device on/off
- 2. Resetting IPG to different frequencies or amplitudes
- 3. Allowing high levels of current to pass through electrodes to target tissue causing inappropriate simulation or injury
- 4. Allowing high current to permanently damage battery (7).

Bipolar cautery is less likely to create EMI than monopolar cautery as bipolar passes radiofrequency current through 2 tips of the instrument at a very short distance apart. All 5 SCS companies recommend use of bipolar electrocautery (2-6). If care is taken to ensure the device does not come between the 2 electrodes on the bipolar cautery device, no harm should come to the device or the patient (8).

If monopolar electrocautery is necessary, it should be used on the lowest effective setting and grounding pad should be placed as far as possible from the SCS on the opposite side of the IPG (9). If using monopolar electrocautery, it is recommended that the device be interrogated post-operatively to ensure proper functioning.

### **Neuraxial and Regional Anesthesia**

The presence of SCS is not an absolute contraindication to neuraxial anesthesia. There have been case reports in which patients who developed postdural puncture headache after SCS lead placement were successfully treated with epidural blood patches with the leads in situ (10).

However, depending on the desired level, placement of an epidural without fluoroscopy can be difficult or impossible. Placement of an epidural catheter for post-operative analgesia often requires placement at the T7-T12 levels for adequate coverage of the

## **Spinal Cord Stimulators and Intrathecal Pumps,** from page 16

surgical site. These levels are also the most common levels for placement of SCS for coverage of low back and leg pain. At these levels, there is significant risk to damaging the SCS system. It is our opinion that the benefits usually do not outweigh the risks at certain levels.

Spinal anesthesia should not be influenced by the presence of a SCS device as long as pre-procedure x-ray is available to ensure that leads are not present at the desired neuraxial level (1). There is no contraindications to regional anesthesia for acute pain management in patients with SCS.

Infection risk is often cited as a concern and reason to avoid neuraxial and regional anesthesia in a patient with SCS. However, the risks of causing significant seeding of infection to the device are negligible during these procedures.

Seeding to the SCS device requires systemic bacteremia and has been reported from sources such as bowel perforation; infection of the SCS caused by seeding from neuraxial or regional anesthesia has not been reported. Of note, the mortality rate associated with infection of spinal implantable electronic devices (including both SCS and intrathecal drug delivery systems) is 1.83%.

This is significantly lower than the mortality rates associated with infections of CIEDs, knee replacements, and hip replacements (4.39%. 4.33%, and 4.22% respectively), yet neuraxial and regional anesthesia are routinely performed in patients with these hardware (11).

#### **OB** Anesthesia

Both spinal and epidural anesthesia are reasonable at the levels required for OB anesthesia and analgesia, well below the level of SCS lead entry. While there is always the potential to damage the SCS system during placement of spinal or epidural, the risk is dramatically decreased with prior knowledge/x-ray imaging of implant location and technique used. It may be wise for patients with SCS to present for early anesthesia evaluation to provide adequate time for anesthetic planning.

#### MRI

In the past decade, Boston Scientific, Medtronic, Nevro, St. Jude/Abbott, and Stimwave have all developed SCS models that are labeled full body MRI conditional. However, MRI safety recommendations continue to vary significantly between SCS models and companies (12-16). Therefore, prior to any MRI the device manufacturer and model should be identified, and the appropriate device manual should be consulted. Elective MRIs should be postponed until appropriate documentation can be obtained. In cases of emergent MRI without available documentation, the risks and benefits should be weighed and alternative imaging modalities should be considered.

### **Intrathecal Pumps**

#### Introduction

IDDS consists of a metal housing, usually implanted in the abdomen, that holds a bellow containing the drug, battery, and pump. Drug is delivered from the metal housing via a catheter into the intrathecal space (17). Currently IDDS are FDA approved for the delivery of baclofen, morphine, and ziconotide, however many other medications are used off label. Most pumps are designed to last 5-7 years and are refilled every 1-6 months depending on drug concentrations and dosing.

#### **General Intraoperative Management**

Prior to any procedure that might interfere with the IDDS, communication with the physician managing the pump is recommended. The age of the device, current pump medication and dosing, and the date of most recent pump interrogation should be determined. Contact information for the device representative and the patient's pain management physician should be available in case any issues arise. As device malfunction may cause inadvertent over or underdosing of intrathecal medications, it is important to be familiar of the signs and symptoms of overdose or withdrawal of relevant medications.

Intraoperatively, temperature and positioning must be approached more carefully to avoid unwanted alterations in dosing. At body temperatures over  $39\Box$ , pump temperatures can be impacted, and patient can be at risk of increased drug delivery rates and overdose. When positioning, avoid excessive bending or twisting as this can kink, occlude, or damage the intrathecal catheter (17).

According to manufacturer documentation, electrocautery is safe and unlikely to interfere with device function (18).

Peri-operative pain control in patients with IDDS can be challenging. In patients receiving intrathecal opioids at baseline, the addition of peri-operative opioids can cause respiratory depression. Unfortunately, there is not a reliable method to convert intrathecal opioids dosing to IV or PO dosing. Therefore, all patients should have opioid medications titrated carefully and receive appropriate monitoring. Of note, patients receiving intrathecal baclofen may have a greater than expected response to opioids due the synergistic nature of the drugs (17). Multimodal analgesia and regional anesthesia should be considered.

#### **Neuraxial and Regional Anesthesia**



Neuraxial anesthesia is not absolutely contraindicated in patients with IDDS. However, care must be taken to identify and avoid the entry point of the catheter into the spinal canal via review of prior imaging. Efforts should be made for multidisciplinary planning, utilization of imaging, and post-operative monitoring and device interrogation. Despite the challenges, a case series has been published describing the

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### Spinal Cord Stimulators and Intrathecal Pumps, from page 17

successful placement of epidural catheters in children with intrathecal baclofen pumps in situ. Sixteen children undergoing planned orthopedic surgery met inclusion criteria. The neurosurgical, pain, and regional anesthesia teams determined the appropriateness of epidural placement. Epidurals were placed fluoroscopically on the day of the procedure. Pumps were interrogated prior to discharge (19).

There are no contraindications to the use of regional anesthesia for acute pain management in patients with IDDS. In fact, the use of opioid sparing pain management modalities is often more important in these complex patients. An example of this a case report published describing the successful use of a lumbar plexus and sciatic nerve block as the primary anesthetic for left total knee arthroplasty in a patient with cerebral palsy with intrathecal baclofen pump. A continuous lumbar plexus catheter was used postoperatively for successful pain control (20).

#### **OB** Anesthesia

Several case reports describe successful placement of labor epidurals in patients with intrathecal pumps. An article published in 1997 describes a 23-year-old G2P0 with a morphine intrathecal pump implanted via direct surgical exposure through a midline incision from the level of L1 to L3. Epidural catheter was placed below the level of her scar at the L3-4 level without imaging guidance. Patient had adequate labor analgesia without any significant complications (21).

Another study describes at 28-year-old G2P0 at 28 weeks who received an uncomplicated epidural. This patient was evaluated by the anesthesia team in the antenatal clinic where review of x-ray imaging, operative notes, and consultation with her neurosurgeon were completed. Epidural placement was performed without imaging guidance at the level below her IDDS insertion site at L4-5 without complications (22).

Interestingly, ultrasound can be used as a tool in these cases. A 44-year-old G1 P0 received an uncomplicated epidural for labor analgesia. Ultrasound of the lumbar spine (transverse and longitudinal views) were used to determine epidural depth and to ensure the pump catheter was not in the pathway of the Touhy. In this case, patient also had significant pre-labor planning including review of x-ray imaging to confirm location and entry point of intrathecal catheter, discussion with neurosurgeon, and planned placement of epidural early in labor (23).

These cases demonstrate that epidural placement is feasible in patients with IDDS. X-ray imaging should be reviewed to confirm position and entry level of the intrathecal catheter. Consultation with patient's neurosurgeon or interventional pain physician should be considered. Imaging is not necessary, but ultrasound can be used.

### MRI

The Medtronic Syncromed ER, Syncromed II, and the Prometric Flowonix are MRI conditional.

Prior to any MRI the device manufacturer and model should be identified and the appropriate device manual should be consulted as significant differences exist. For example, Prometric states that the Flowonix pump should be emptied prior to MRI; failure to do so can result in drug overdose and significant morbidity or mortality. In contrast, Medtronic does not recommend emptying the pump prior to MRI with the Syncromed ER or Syncromed II (17).

It is important to know that MRI exposure temporarily halts the pump and suspends delivery of intrathecal medications for the duration of the scan (24). Prior to any scan it is important to determine if drug delivery can be safely suspended or if drug needs to be supplied via an alternate route. After completion of the MRI, the IDDS should resume normal drug delivery automatically. The device should be interrogated after completion of the MRI to ensure that drug delivery has restarted appropriately. Special attention should be paid to patients receiving intrathecal baclofen as withdrawal can be life threatening (17).

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# **Legislative Update**

### **By Lauren Schmitt**

Commonwealth Strategy Group

The 2021 legislative session is rapidly approaching! The General Assembly will convene on January 13 and it will be much different than usual. The House of Delegates will be 100% virtual and never meet in person.

The Senate will meet at the Science Museum of Virginia, as they did during the recent Special Session. However, no one from the public is allowed there or at the Pocahontas building. All public testimony and meetings with legislators will be conducted virtually.

Typically, the legislative session is 45 days in odd-numbered years. However, this always requires a procedural vote by two thirds of the legislative body. House and Senate Republicans have announced they will not support more than 30 days and will vote against any extension. We could potentially be looking at a very short, 30-day session.

Due to the length and recent Special Session, they have also implemented strict bill limits for legislators. Senators may only introduce up to 12 bills and Delegates only get seven. To give you an idea of how challenging this will be, some legislators typically introduce 20-30 bills (some even more). As a result, legislators are choosing their bills very carefully and avoiding controversial issues. Leadership has advised legislators to save complex and controversial items for 2022.

Lastly, 2021 is a major election year in Virginia. The statewide offices of Governor, Lieutenant Governor and Attorney General, and all 100 seats in the House of Delegates, will be on the ballot. Election year politics often spill over in the legislative session.

So, while this session will certainly be different, we will continue to advocate for our members and patients. Here is a preview of just some of the issues we know we'll be working on:

- Medical Malpractice; In 2012, Virginia passed a law capping the medical malpractice monetary reward for 20 years. This was an agreement between the Medical Society of Virginia and the Virginia Trial Lawyers Association. Senator Bill Stanley has introduced legislation to undo that cap. VSA will oppose this bill and work with our fellow physicians to advocate against its passage.
- Independent Practice for Nurse Practitioners. Virginia's current law allows a NP to practice independently after five years of clinical experience. Legislation

has been introduced that would change it from five years to two years. Governor Northam issued an Executive Order at the beginning of the COVID-19 pandemic changing it to two years. It is set to expire when we are no longer in a state of emergency. This legislation would permanently change it to two years. VSA opposes this and will advocate against it. This excludes Certified Registered Nurse Anesthetists and would not affect them.

- Telemedicine. During the COVID pandemic, many patients have relied on telemedicine to receive care. We are working with the Medical Society of Virginia to pass legislation that would make it easier for providers to be reimbursed for audio-only services.
- Medicaid Reimbursements. We were thrilled that the budget passed during the Special Session included funding to increase the anesthesiology Medicaid reimbursement to 70% of Medicare. We will work to protect that funding and ensure it remains in the budget.

As always, we will keep you updated on legislative matters and let you know how you can help!

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### Practice Spotlight

# **Community Memorial Hospital**

#### By Manhal Saleeby, MD



Dr. Manhal Saleeby

My name is Manhal Saleeby and I am living the dream! I am an anesthesiologist/ pain specialist physician employed by a community hospital in the town of South Hill, Virginia.

Community Memorial Hospi-

tal affiliated with Virginia Commonwealth University in 2014. The affiliation enabled our community hospital to grow and expand to multiple specialty services which are now offered to the people of rural Southside Virginia. The outpatient practices are housed in the adjoining C.A.R.E. building (Clinics, Administration, Rehabilitation and Education). The hospital and C.A.R.E. building are brand new with a beautiful surrounding healing garden and most notably, a great parking lot.

I originally started an outpatient interventional pain management practice at Community Memorial Hospital in 2007. Eventually, I was able to add a nurse practitioner which helped tremendously. We see patients three days a week from 8:00 a.m. to 5:00 p.m., and I perform fluoroscopy guided procedures the other two days. Although my main practice is in the outpatient pain management clinic, I also help to cover anesthesia call. The hospital has a busy anesthesia department which includes one anesthesiologist who provides anesthesia services and five nurse anesthetists.

I provide a wide range of pain services at VCU CMH Pain Management Services along with a wonderful group of people, which includes a great nurse practitioner who earned her doctorate degree in nursing practice. She has helped to transform the practice to a well-organized, time efficient, comprehensive care model which is available to patients suffering from chronic pain. We offer services to a vast population which covers several surrounding counties in Southside Virginia stretching to North Carolina.

While every clinic handles the tedious process of insurance authorizations, making appointments, gathering documents from referring practices, and answering numerous



Community Memorial Hospital pain management staff

phone calls daily, it is all performed at VCU CMH Pain Management Services by a dedicated staff in a seamless fashion.

With all the challenges that face rural communities in accessing health care resources, having pain management services available to an aging population with a variety of ailments such as osteoarthritis, osteoporosis, spinal stenosis, and cancer, to name a few, is essential. It is challenging to arrange transportation to appointments in a rural community. This is due to several reasons which may include the fact that public transportation is non-existent in rural areas. Medicaid transportation requires at least five days' notice and the elderly population often times have to have their sons and daughters take time off from work in order to accompany them to appointments.

I take pride in our team in that we don't just focus on interventional services, such as the usual epidural steroid injection, facet injections, radio-frequency ablation, intra-articular injection, and peripheral nerve block, we treat the whole patient. We also offer medication management when indicated and arrange for home health care, physical therapy, mental health, and addiction treatment referrals.

My belief when a pain practice advertises that it only provides interventional or limited medication management is that they are not treating the patient as a whole. Particularly when such practices tell patients they "don't prescribe opioids", I feel that these practices are looking for good income with less headache and liability. Our outpatient volume is somewhat less in quantity compared to some years ago but I think that is a good thing. Everyone knows that we are not pill pushers. Our processes require patients to go through an exhaustive evaluation and risk stratification in order to formulate a plan of care. Our patients understand that we offer quality care with a comprehensive care plan that does not start and end with a prescription for opioids and "see you back in a month".

We do not take "walk-in" patients. We acquire patients by referral only. Each patient must have a legitimate pain diagnosis that is properly worked up and that we feel will likely benefit from our services. Patients have rights but they also learn that they have responsibilities once they become established with us. We always discuss their diagnosis and plan of care. We don't just explain what spinal stenosis is or which nerve is being pinched, we try to explain in simple terms the neuroscience of chronic pain and how they can have a true role in their pain control beyond taking a pill or getting a steroid injection.

Pain is a serious health problem with significant impacts on our society – psychological, functional, and financial. Chronic pain is even more of a burden in rural communities that lack the resources of big tertiary care centers. However, it doesn't have to be that way! VCU CMH Pain Management Services, along with all our primary care and sub-specialty services, bring the experience of tertiary care to the local community. We offer safe, quality care close to home.

# **Richmond Spine Interventions and Pain Center**

### By Peyman Nazmi, MD

Anesthesiologist and Interventional Pain Specialist Richmond Spine Interventions and Pain Center Richmond, VA

I have had the

privilege of being a

part of an interven-

tional Pain man-

agement practice

in the greater Rich-

mond, Virginia

area for the past 20

years. This could

be a good point in

time to share some



Dr. Peyman Nazmi

of our experiences with our other colleagues. Being an independent, or more correctly interdependent, medical specialty practice comes with many advantages and some challenges. We have been offering a variety of services over the years and, like most other practices, have made some changes to the way we practice to be compliant with new evidence and guidelines and regulations. One of our challenges has been to find a balance between interventional treatment modalities and medication management. I think we all may know providers who are in favor of, or against, one or the other. We may also have heard phrases like "I don't believe in injections or opioids, etc." One could find pretty good arguments or counter-arguments on each side but I think the answer we have found at this point has been to try and balance the two and hopefully choose the modalities that pose the patients and sometimes the providers to the least amount of risk. These could be medical risks or even financial risks, where patients' and healthcare funds are spent on one modality and there is not enough funds left to cover the basic life needs or preventative services.

The following are some of the advantages/ challenges of practicing at a focused and interdependent specialty practice:

One major advantage is that making decisions and implementation of new services and products are easier in general. The practice is smaller compared to a larger healthcare system. Asking four providers to possibly change to a different EMR service is far easier than asking a couple of hundred.

Being smaller could also mean limited access to some higher cost products and administrative talent. Some EMR services are out of our reach due to cost but the gap has been narrowing in some cases. We have also been looking at using fractional talent for higher level and more expensive administrative needs.

I think one of the choices we have made that has worked to the advantage of the patients and us tremendously, has been to look at the specialty of pain management as a multidisciplinary one and try to focus on what we are truly passionate about and trained to do.

As I was told by my mentors, do what you like best and odds are you will do it more often and be better at it. I believe this advice has served us well in the past 20 years at our practice. At present, we are focusing on fluoroscopy guided spinal injections, Neuromodulation, percutaneous balloon Kyphoplasty and medication management.

We have offered most of these services for the better part of the past two decades except for balloon Kyphoplasty, which we have added more recently. Performing these services in an office setting has proven to be safe, efficient and cost-effective.

In summary, it has been our experience that office based and independent specialty practices offer a focused, highly specialized, and cost-effective alternative to hospital based services and that there is a role for both models. We hope that patients will continue to have access to both services for the foreseeable future.

### ERAS Pain Control, from page 15

line A. Non-steroidal anti-inflammatories would do the same. Intrathecal morphine and local anesthetic wound infiltration provide analgesia (line A to line C; line B to line C). Ketamine and magnesium block N-methyl D-aspartate (NMDA) receptors and guard against central sensitization (stops line A to line D). Gabapentin treats neuropathic pain and helps ease visceral discomfort (line D to line A).

Additionally, ketamine by its dissociative effects focuses the pain experience on nociception alone. By removing the patient's appreciation of the emotional, psychological, spiritual and social elements of pain, the pain experience can be made much more manageable.

Experience with this protocol has led to some changes. Ketamine is sometimes withheld in the elderly and those with dementia to avoid altering their cognitive state, or only the bolus dose is given. Dexmedetomidine is substituted in some cases. Gabapentin has an NNT of 6 and causes prolonged sleepiness in drug naïve patients at the 600 mg dose.

Although many studies have shown benefit in the immediate post-operative period, more recent work shows this is not sustained in terms of long term pain control and improved function. Thus, several protocols at UVA are being revised to omit single dose gabapentin. The consequences of this change in patient outcomes is awaited.

Understanding the concepts of enhanced recovery and the role of each component in a protocol allows the best customized care for each patient. Drug treatment of pain should address all the types of pain expected. The drug mixture is not as important as the pharmacological targets. Local anesthetic infiltration and blocks are best but limited in many instances.

ERAS protocols are not check lists. Customization is required.

### Resident Editorial

# **Anesthesia Trainees and Pain Management: Learning through the Global Pandemic Lens**

### By Daniel H. Gouger, MD

VCU Health Department of Anesthesiology Resident Editor, VSA Update



to intubate people with COVID, and with diligence, restock my PPE for intubating people Dr. Daniel H. Gouger with COVID. But then intercom lul-

Lately, my task

a select few things.

labies for newborn deliveries let me float away, for just a moment, to my baby nieces and older nephew. The mental reprieve fades, so I chart check lab results to do OR cases that -fingers crossed-do not have COVID.

Hopefully, this will not be another lamenting editorial about the pandemic. Nevertheless, I will acknowledge that both inside and outside the GME training bubble, normalcy for me, patients, and families has long since disintegrated.

Practicing in an era of much change in healthcare delivery, we recognize the importance of health professions education, now more than ever. And given the newsletter theme issue of Pain Management, I ask myself, "With any core anesthesiology principles for residents, or learning basic patient care fundamentals for medical students, how will the US medical education system begin teaching things differently, given our current pandemic circumstances?"

Working with medical students in VCU's Global Anesthesia Program as part of the Acute Care and Systems Strengthening (ACCESS) track for global surgery gives me a case study-like example to answer that question.

This program, led by VCU Health's Acute Care Surgeon Edgar B. Rodas, MD, FACS, touts a longitudinal track in global health for VCU School of Medicine students. Its



scholarly track of students examines health disparities in the global burden of surgical disease across all four years of school. Then, students pick a subspecialty like Anesthesiology during their third and fourth years for a more narrowed focus.

Across multiple anesthesiology subspecialty modules, these third and fourth year medical students participate in journal clubs, ethics discussions, problem based learning challenges, and both high and low fidelity simulations. They are encouraged to think outside the box for global surgery and what anesthesiology practice is like in the United States.

They learn to ask mature, challenging questions like, "How can pain still be adequately managed with limited resources?" How does the rest of the world provide adequate analgesia when opioids and other drugs are in strikingly limited supply? How can we teach international healthcare teams in constrained settings to use point of care ultrasound for regional anesthesia in short amounts of time? How do acute and chronic pain management concepts have utility in healthcare systems where the anesthesia workforce is largely not physician-trained?

And in the era of enhanced recovery after surgery, how do we work with our international colleagues to examine healthcare system infrastructures and identify breakable barriers to meaningful change?

Trainees, whether medical students, residents, fellows, or other health professionals, are all experiencing a critical inflection point, learning literally everything through the COVID lens. And it's largely unprecedented- at least in most recent practitioners' memories.

For those of us who are future anesthesiologists, we're seeing unequivocally that we have important, transferrable skillsets to many unexpected practice environments. Our knowledge of sedation, pain management, drug supply, and resource utilization are just a short list of areas where we're becoming increasingly valuable.

But we're also learning to think and practice differently because constrained resources are no longer hypothetical. And looking to my global anesthesia medical students' experiences, I'm appreciating alongside them that COVID is underscoring the need for all of us to readjust how we think about core anesthesiology concepts like pain management. Because although we in the US can offer many things to other places, we stand to learn just as much.

# Senator Emmett Hanger Awarded as VSA's 2020 Legislator of the Year



Senator Emmett Hanger

January 8th so that we could formally thank him for his work. VSA chose Sen-

The VSA Board

of Directors chose

Senator Emmett

Hanger as the 2020

VSA Legislator of

the Year. Senator

Hanger joined our

board meeting on

ator Hanger for

this award because he carried the budget amendment to increase the Medicaid reimbursement rates for anesthesiologists to 70% of Medicare. Because of his leadership on this issue, we were successful in the 2020 special legislative session and received the funding for this in the budget.

The Senator has always been a champion for health care providers and our patients. He was instrumental in the historic passage of Medicaid Expansion in 2018, which expanded access to health care for hundreds of thousands of Virginians. Senator Hanger also understands that for Medicaid Expansion to be successful, we need to ensure there are enough providers to treat patients. As a result, he led the initial effort in 2019 to increase physician reimbursement rates.

Senator Hanger has represented the 24th Senate District since 1996, which includes Waynesboro, Staunton, Augusta, Greene, Madison and parts of Rockingham and Culpeper counties. Before that, he served in the House of Delegates for multiple terms.

Virginia Society of Anesthesiologists appreciates the Senator's advocacy on our behalf and we look forward to eventually honoring him in person!

### Dr. Moses, from page 8

#### I reach?

I've heard the loud confident voices so many times in academic settings, but as I look out at the practice landscape in the Commonwealth, there are not enough of us using those voices in ways that actually lead to change. In the House of Delegates this session, there are zero physicians. How do we fight for physician-led care if physicians aren't in the room, seated at the table, where laws are written?

The VSA is a powerful voice for both physician anesthesiologists and patients in Virginia. As such, I am proud to be a member of an organization that advocates for effective healthcare and patient safety. I am aware of the hard work you do for our specialty and our patients, and hope that I have the chance to make that work easier for you, with a seat at the table in our Virginia House of Delegates. Please consider investing some of your time and energy to helping me get elected in 2021.

Until we have a physician elected to office in our state House of Delegates, our voice will only be heard when given an invitation to speak. Imagine the difference we can make and the greater number of lives we can impact, if we have a dedicated seat at the table?

I considered this when I made my decision to run for public office. If nothing else, hopefully I can inspire other physicians that running for a public office is a real possibility. Please feel free to contact me with questions, concerns, or suggestions.

My name is Benjamin Moses, and I

am running for Delegate, so that you will know you have at least one loud, confident voice in the room that needs no invitation. Please visit my campaign website at www. benmosesforva.com for more information or opportunities to get involved.





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