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HW **Hal Wain** 0:03

Thank you Carlo for your help in the past throughout the week.
I want to welcome all of us back to our monthly pain Webinar series. As you know, our goal is to enhance our clinical Aiken.
We want to encourage questions.
We also hope that many of your pre-existing questions are answered in that way.
Also generate new thoughts and hypotheses that can facilitate growth.
In our clinical and academic skills.
Please feel free to use the chat box.
And to contact us later if questions remain after the conclusion of this webinar.
It now gives me great pleasure to introduce Doctor Matt Mala, who I've known since his medical school days.
I've watched him grow until the physician he is today.
I know him during his internship, his residency in physical medicine in physical medicine.
His staff participation and his being director of training for the Physical Medicine Residency. So without further ado, I look forward to your presentation, Doctor Miller.

M **Miller, Matthew E LTC USARMY DHA NCR MEDICAL DIR (USA)** 1:13

Thank you, Doctor Wayne.
I appreciate it.
I appreciate everyone's time.
I know it's lunchtime and everyone's got a busy schedule, so we'll we'll hop right in and we'll have time for questions.
So today we're going to cover complex regional pain syndrome. As Doctor Wayne

mentioned, physical medicine and rehab by background.
So it may be.
Skewed towards that experience, but I'm having a great time as a pain fellow this year as well.
This disclaimer slide you know.
Just want to plug uniform services, university Centers for rehabilitation science and research and our musculoskeletal injury research for operational readiness. So.
Nothing's directly related to this, but all those team members are critical and caring for these patients.
We're gonna go over an instruction for complex regional pain syndrome, which I'm sure many of you encountered in our combat casualties over the years.
We'll go over some of the latest diagnostic criteria.
And talk about the clinical and research use of those touch on the pathophysiology and that will sort of frame our evaluation and treatment and then really wanna talk about some of the latest and greatest advancements in pain management techniques while we still kind of cover doing the BAS.
Well, in terms of our interdisciplinary approach.
So just wanted to set the stage with the case and there's been many to pick from, but.
We had this patient who.
Actually came into our lecture diagnostic lab 4 year old female who is previously diagnosed with Pneumonia syndrome, which was novel about this case is that she had surgery for that over a decade ago and had been dealing with chronic regional pain in the upper extremity for years. They.
Tried. They decompressed the median nerve, you know, in the forearm.
And she had painful dysaesthesias, but it went back in and took out a neuroma, which really didn't change her pain and sort of regionalized the pain to the entire forearm.
Otherwise, had no past medical history and sort of was, uh, dealing with this over.
For the years with suboptimal management server server tried a lot of things here as we'll touch on your typical neuropathic pain agents.
Occupational therapy, etc.
So on our exam, you know she did this healed incision really bad allodynia over.
A region of the form.
It was a mild swelling, but otherwise no dystrophic changes.

Or other color changes at that time.
We'll get too much in detail with electrodiagnostic testing.
I like this newer machine. We have kind of highlights in red or green.
So that when we're seeing our tons of patients in clinic, we can go through it quickly, but sometimes the electrodiagnostic testing.
Doesn't get done in complex regional pain syndrome because it's obviously not something well tolerated and often times as we'll talk about, you may not be able to identify the nerve injury.
You know, in this case we didn't get responses to two small sensory nerves in the arm. The lateral and medial antibodies nerve. But we didn't know which one had the surgery, which one did it. And so when you refer someone for evaluation, we're able to do an ult.
In clinic.
In the physical medicine rehab clinic, as well as the pain clinic, and we can kind of look for these small little sensory nerves and neuromas or this bundle of scar tissue here.
Hopefully you can see my pointer.
I'll play that again because I think the dynamic assessment kind of.
Shows us and I know in primary care the bedside ultrasounds in all of our fields have become a prominent tool.
This is something with the spatial resolution of ultrasound.
Now, you wouldn't necessarily appreciate on MRI as well and to find this could surgically can be very tedious, especially in a prior area of surgery, so.
Another picture of this neuroma for of the patient's medial antibacotinous nerve so.
We'll go through how this patient was managed as we talked, but essentially this required a interdisciplinary team approach through our peripheral nerve clinic beyond just getting this initial assessment.
And you know, this patient was managed both with medications, therapy, surgical interventions as well as pain interventions that all of which we'll talk about.
So you know the history of complex regional pain syndrome.
Is near and dearest to the heart of the military, obviously with a compact casualties over the years and prior conflicts. These names.
For CRPS have sort of persistent in literature but evolved over time.
So 'cause algae now is something that we kind of refer to as complex regional pain syndrome type 2, but something that was observed during civil war times as well.

Sudec atrophy.
We'll see these in, you know, areas of infection, but.
But even after patients who have post stroke, they would call it shoulder hand syndrome, reflex sympathetic dystrophy.
That's something that now we classify as type, oftentimes type type one, CRPS where maybe.
They have some sympathetic nervous system involvement, or not necessarily an identifiable nerve injury, so the.
Budapest criteria.
And now I guess there's even a modified one tried to make the term broad enough to encompass all these patients and we'll go over that briefly, but essentially.
You don't have to hit all the criteria. You don't necessarily need to have sympathetically mediated pain.
You could have sympathetic independent pain.
So.
So you can see now we kind of don't use those terms before that we mentioned causal.
For manner of injury, we just kinda call it Type 2 and then for type one we don't necessarily use the term RSD, but you may still see that or use it, which is OK.
So there's two things for criteria. I think there's a strict use for research so that you're studying patients that are.
Specific as possible for the diagnosis, but then in clinical settings you.
Don't always have to.
Stick to that strict research criteria so that you make sure.
You're providing appropriate treatment for the for the patient.
I think in this case most patients now with the newer criteria is broad enough where most people will meet the criteria so.
The main thing I want to point on this slide is that there is some kind of allodynia and.
Or hyperalgesia allodynia being if there's a non noxious stimuli causing pain, whereas hyperalgesia would be an exacerbated response to pain. So Aldenia would be if you're doing your light touch sensation and they interpret that as pain, whereas hyperalgesia maybe your pimpric exam, they're having an exaggerated response to.
Pain.
And then, of course, when something's chronic, it persists longer than the period

you'd expect it.
And then they have to have some don't have to have, but oftentimes have some changes, whether it's in the skin color, edema, changes in pseudomotor activity early in the course OFT times of mild edema late in the course.
If it progresses, they actually may have.
Atrophic changes to the skin.
And modeled skin appearance.
So we try to they don't.
They don't always progress in that fashion, but we try to avoid them progressing those later stages.
So I think this next guy kind of shows you some pictures of that.
The mild edema in this case.
And some of the color changes that occur that could be position dependent and or temperature dependent. What I want to point out here is that you only need at least one symptom in three of the four of the following.
So if a patient doesn't have the pseudomotor changes.
Or edema. They can still have sensory motor changes or trophic changes.
Likewise on your and.
This is reported and likewise on your examination.
You don't need to find everything, just just at least one of these signs.
We try to differentiate it from other diagnosis. So a lot of times what I look for, especially in nerve injury is it kind of contains the area or is it regionalized, which we'll talk about.
So some of the epidemiology and and again those iasp criteria, it's good to kind of use as a reference. But I think clinically most of us are when we assess a patient can kind of tell the chronicity and look at some of those physical exam findings.
So as you can see, it's a slight predominance for female versus male incidents, still quite uncommon. Median ageix here is 42 so.
We won't talk too much about Pediatrics, but we can talk about that later.
Kind of younger age range that after even a simple ankle sprain, can develop some of these signs of CRPS and you can have older patients.
Develop it after trauma or genetic causes as well.
The key thing here, I think, is that they do see quite a number of positions before they get to a tertiary referral, and I think they often times get appropriate care.
I think what we.

Try to do differently is get everyone involved early.
In disciplinary fashion and you can see it's a little bit higher in some of these occupations to include the military work related injuries, surgery. So certainly that increases the prevalence and.
Really, that aggressive treatment you want to try to get them engaged and return to work as soon as possible.
And all these chronic pain conditions and lastly, not least not least some of the biopsychosocial.
Aspects of care are often times the most important.
So wanted to touch on 1st is the pathophysiology and we wanna layer on then our treatment approach.
So just a quick review for pathophysiology of pain perception.
It starts with transduction in the periphery and this inflammatory milieu that ensues after nerve injury, trauma, infection, or other noxious input.
Then gets transmitted to the central nervous system to the peripheral nerves, modulated both at the spinal cord and.
Cortical.
Levels and ultimately perceived.
Umm, that's an important thing because as we'll talk about with the pathophysiology, which we'll layer on next, there's this inflammatory milieu that is used in the periphery. And if that persists.
The peripheral nerves can become sensitized.
That's when you can get development of sympathetically mediated pain where you couple some of these autonomic changes with the pain pathways at the level of the spinal cord.
You know, typically the dorsal horn, laminar, laminar is such that you have pain ones and.
Ones for pressure.
So when your why dynamic range neurons?
In you know, layers three to five, which not that's not important, but when they start to interpret non noxious stimuli as noxious.
That is, when we kind of spill over into regionalization of the pane, aldenia and chronicity of pain.
Likewise, we do see, you know these descending inhibitory fibers.
Lose their efficacy and chronic pain syndrome and, of course, the behavioral afferent

component of perceiving pain. We see changes in the central nervous system as well. Also you can see changes in the homunculus in terms of what's perceived as pain. So you get sort of widening of that receptive field.
So once we kind of identify or understand some of the pathophysiology.
It's important then to say what do we need to do to evaluate these patients, I think. My my bias is that just living in the EMG lab for awhile, I think a lot of the and we don't have quite, we don't have percentages of this. Even the pain chapter I review for this talk didn't include EMG, but my bias now with the tools we.
Have with ultra high frequency ultrasound electrodes testing. I think we can in most cases in a lot of cases identify nerve injury. So patients that maybe were previously. Classified as Type, One node identified by nerve injury.
Maybe we can move over to Type 2 and then maybe then we could have some additional treatment.
Options for those patients.
So we try to do lecture diagnostic evaluation. If you refer a patient to our clinic, if they can't tolerate it, that's OK. We'll get as much information as we can with the ultrasound assessment.
Autonomic testing is of unclear benefit, but there definitely are changes that occur. Doctor Cook and the neurology clinic here has an autonomic testing lab.
And so if you have any questions about that, we can go into it, but we don't really need it for the work up. I think for research investigations, it's important to note that we can detect those changes.
We can do some simple temperature assessments to look for temperature elevations usually can detect some of that on your exam, or the patient can report it to you. And sometimes, as we'll talk about with our interventions, we'll monitor that as well.
Vascular assessment, I think.
You don't necessarily need to do a formal work up for that.
I think it's usually that pseudo motor response that we discussed. Bone scan, something that I think.
Some people advocate for you.
Certainly can't see changes. I think that as you see here this highly sensitive, but really the specificity is not as good as we want it to be.
There could be other, you know, causes for increased uptake. If there's, say, an infection or other inflammatory causes. Some have looked at using that.
Phone scan to correlate to outcomes from interventions such as sympathetic

blockade and as controversial as well. But for a while that's discussed in the literature. Should you? If they have a positive bone scan, will they then respond better to? Sympathetic blockade or have more likely to have sympathetically mediated pain. I don't think that's.
Necessarily a fact, but definitely a thought in the literature. And there's some evidence to support that.
So how to get this evaluation?
Well, here in this area I guess you can put a plastic surgery clinic referral in for peripheral nerve clinic.
So that's nice, but and there's an association trying to build peripheral nerve clinic networks throughout the the country, separate from the military.
We have the one here at Walt Reed throughout the DoD and.
Otherwise you're you can utilize some of our interdisciplinary pain management clinics, the ipmcs throughout the MHS.
That will have a lot of these services, so we try to get them in early for the assessment they'll get with a referral, they'll get a we do it a combined didactic or review the case and make sure it's appropriate and then we'll try to see them at.
Our clinic, which is once a month and fortunately we have all the folks you see listed here.
Also, we have our Warrior clinic docs that are central to the care. A lot of these patients and primary care.
So I don't know if folks like Doctor Hawk and others are on, so I appreciate.
All the help over the years, umm we added this so it used to be the surgeons and US interpreting the EMG.
But I think now we have kind of the full gamut of interdisciplinary care, which is nice and we have some data that we published for a nerve injury specifically.
In the military, if you want to look at that briefly.
So there's over a four year period. I mean they all have nerve injuries, right?
So not all of them necessarily classified as complex regional pain syndrome. If they don't regionalize.
In in practical sense, I think they get treated similarly.
But I think what we found here is that a lot of them had comorbid conditions beyond just the nerve injury, especially if it's traumatic.
So a lot of them have comorbid traumatic brain injury, post traumatic stress, and we have to address all those things at the same time.

And here's some of the breakdown. I think sometimes we see a little bit higher incidence of upper extremity injuries compared to our civilian counterparts and of course more trauma.
But we certainly get other etiologies.
For.
Peripheral nerve injury and chronic pain.
So in brief, we'll just go over, you know, ultrasound, especially if you're gonna use it at the bedside or in your clinic or what you can look for.
I think this is geared towards.
Looking for the Nur.
Looking for the nerve injury assist with surgical planning and some of our pain interventions.
I think diagnostically can be a useful tool, especially if you're.
And an austere location and and don't have access to imaging advanced imaging.
So really what we look for is the follow the nerve or track it until it enlarges.
The challenging thing is that if you try to old sound right over the painful area, it may just see disorganized scar tissue and not really have defined your normal anatomy.
So that's why the Sino Palpatations here. We kind of over the tender area.
And and take a look. But then we kind of go back and look at our.
Landmark. So as well I don't have too many old pictures, but this is another example of a median nerve where you see the normal honeycomb appearance and then this enlargement.
So if you were to start here, it may.
It just looks like scar, which it is, but if you start at kind of a normal anatomy where you see your honeycomb appearance of the nerve, you can kind of trace it down.
And then you know from here could be trying to determine is it a normal in continuity or is it actually cut and so?
I think what specialized MRI you can see some of this for these nerves, but again I think the limitation is.
The spatial resolution and our neuroradiologist, I think if they do some special protocol, this can probably achieve some of this but.
A routine MRI, not necessarily something like a median nerve.
You should be able to see.
And you know, this is what it would look like in long access. This talk and the bulbous end of the neuroma. So and this is a median of injury and a Poly trauma patient.

All right. So once we kind of do our evaluation, we're gonna jump right into the treatment because as we mentioned, early referral, early aggressive interdisciplinary care is the key.
And with our anesthesia, colleagues have kind of coined this term multimodal analgesia where you're addressing the pain from every angle from the periphery to the central.
So.
If you start in, you start.
But the superspinal approach that cognitive behavioral therapy.
Even the early education of complex regional pain syndrome, so you know, if you had a pediatric patient with an ankle sprain, right?
That looks like they're developing CRPS that early education of them and their family that actually pediatric patients have a better prognosis than adult patients. And as we'll go through some of treatment plans, early aggressive care, physical therapy can get them better.
Is helpful, I think as an intervention in of itself, and of course getting paid psychology involved in these patients is critical.
We'll utilize our.
Antidepressants, specifically Snris, because they we think they accentuate the descending inhibitory pathways for chronic pain. We try to avoid long term opioid use but they work at the level of the spinal cord as well along with our centrally acting muscle relaxants.
And acupuncture.
And then the mainstay really here is using some of our neuropathic pain agents that we know are tolerated well. We are familiar with their side effect profile, whether it's, you know, a pregabalin or or gabapentin.
But there's a lot of overlap with our interventions as well. And peripherally, you can use topical agents. We used to do the compound creams for a while, but even capsaicin I think is still very effective.
I think the downside of that is they have to use it applied to.
Apply it three to four times a day for at least two weeks to get that efficacy, so trying to convince someone to apply pepper cream to a painful, sensitive area can be challenging and something may be we can do in coordination with desensitization and physical therapy.
And then there's a lot of interventions we do in the pain clinic, whether it's

neuromodulation, it's the spinal cord level or the peripheral level that can be helpful. So.
Alright. So we'll kind of walk through starting with pharmacology. Some of the other medications we use and then some of the interventions.
I think anti Inflammatories early on.
Can be useful for general noiseceptive pain in general.
I think it's reasonable to start them on early gabapentin or pregabalin for the neuropathic component of the pain to try to minimize any of the other types of medication and that you know, as we mentioned up should work a little bit quicker than some of the SNRI ther.
What we also try to do, especially if they're admitted for a Poly trauma or anesthesia. Will give them perioperative ketamine, or NMDA antagonist.
And we're also in the chronic phase kinda MIT them to our physical medicine rehabilitation service, which is the way it's established now with the help of our pain colleagues to give them ketamine over.
Usually right now we're doing over one to two day period to try provide a reset.
And provide that NMDA antagonism that, again, works the level of spinal cord.
And we think it helps with preventing that central sensitization.
We talked about.
Those wide dynamic range neurons spilling over under chronic pain.
Umm, really?
You know there's not.
Too many contraindicates to this to this.
I mean, you wanna make sure they if they have behavioral health diagnosis that they're stable, that you're in communication with their team.
I know they're using ketamine for the acute phases of depression. In certain circumstances, you want to make sure it's stable and that you've kind of addressed that with their psychiatrist and psychologist.
Some of the more novel things that you may have heard of over the years for complex regional pain syndrome, of course, are orthopedic colleagues, primary care care colleagues.
Just treating patients with distal wrist fractures quite familiar with given vitamin C up front as a benign intervention.
It's interesting.
You know, meta analysis and randomized control trials definitely pan out that given

acutely for 50 days, it seems to be beneficial.
So some have used it for foot and ankle.
Injuries as well.
With some benefit.
And so I think that intervention probably should be maintained just cause of how safe and effective it can be, but we don't.
We don't know if you give it later in other forms of CRPS.
If it's helpful, we've looked at there's some literature, older literature on oral steroids for post stroke, complex visual pain syndrome.
I would say we we don't use that routinely, but it's a consideration. We'll tend to use the other pharmacologies.
Project mechanisms we talked about.
Uh was an issue in one that I delved into because it seems like early in course it has some class 11B evidence, at least for bisphosphonates, and I have not seen it routinely used, and it's probably something I may revisit in the future as a treat.
Modality, I think later in the course, maybe after they already have periarticular atrophy or.
The later stages of Cdr PS seems like it has less data.
So anyway, there's an interesting side note. Magnesium.
I know our neurology colleagues and you all have used that more and more now for headache patients and seems like it has some data for use in complex regional pain syndrome.
So that's definitely a consideration we talked about capsaicin I think here was nice with capsaicin is if there can't tolerate the topical cream four times a day or.
It's not working for them.
We can trial AQ 10s of patch now where we can do a nerve block to numb the entire area or use emla cream and we could put it on for an hour in clinic. I think my colleague Dr. Pesino talked to folks early in the year about using.
It for.
Diabetic peripheral neuropathic pain as well.
The low dose naltrexone?
I have some experience using that in patients with fibromyalgia.
You just have to get it from a compound pharmacy and I don't believe it's covered.
I would say the data is limited to small studies.
But it's not one of these interventions which is relatively benign.

Lastly, ivig.
We looked at the literature for that.
Our neurology colleagues are really familiar with treating patients with VIVIG, but it's not a mainstay there.
Mainstay therapy. The only time we gave it here was someone that had that.
What they thought was a small fib or a peripheral neuropathy and not necessarily CRPS.
And what was confusing is when we looked it up is that you can see changes in those peripheral nerve fibers.
In both CRPS and a small fiber neuropathy, a patient did well with the IVIG.
So it's something we, you know, we consider I think in these refractory cases with our interdisciplinary team, but not something that's routine.
What is routine?
I think especially if we get them referred early and we think they have a sympathetically mediated component to the pain is to do sympathetic blockade.
We'll do Stella ganglion blocks most commonly in clinic.
Now for post traumatic stress, but also works for upper extremity complex regional pain syndrome. And so they found in the studies that while we're just putting anesthetic in there, typically we pivot can, but it can be other anesthetics that wear off in a couple hours.
They do to get three to five days of relief of their pain.
So that's our window of time for early aggressive physical therapy with desensitization.
And then what we find is that in combination and maybe doing a few serial injections, we can move them in the right direction for this blockade, we can use fluoroscopy or ultrasound. The biggest risk is the vertebral artery.
It's uncovered at the C7 level in front of the transverse process and it usually goes cover behind the osseous process transverse process here.
Or I'm sorry, the articular process here at C6, some patients have variable anatomy where it remains uncovered. So we use ultrasound in our clinic.
Or fluoroscopy with contrast, to assure we minimize risk of damaging any any of the vasculature.
So so we for these patients, we do like to see them and talk to them about the pros and cons of the injection.
Prior to proceeding, luckily do a fairly routinely to minimize those risks and

successful blocks denoted by Horner's syndrome, ketosis, meiosis, anhidrosis. We also could monitor for an increase in temperature in the extremities.
Likewise for the lower extremity, we could do a lumbar sympathetic block.
Similar rationale we tend to do this under fluoroscopy.
Again, I think with the frequency of doing, we're able to minimize risks.
Same goal to get them into physical therapy early.
We tend to go to L3 level here.
And we use oblique AP lateral views for safety.
This is showing kind of our one of our safety views on lateral on the contrast spread.
So we we try to do these these blocks early.
They can be done a little bit later, especially if they're stagnating in their recovery, but often times you have to do something in addition for these patients, so you know the peripheral approaches we do them via ultrasound because again, if this is very sensitive neuroma we don't want.
To irritate it further.
If they're too sensitive to do an injection at the area of the nerve injury or pain will go proximal to the site, away from the area of pain, and that's something I think that can be very effective sometimes.
Diagnostic block be helpful for the surgeons but you know more and more I think we have the ability to do neuromodulation as well.
So before I think we can do some injection therapies, but now?
We have technology advanced to the point where we can put a peripheral nerve stimulator in this one.
Picture here is for 60 day implant but we have ones that can be long term and so you know this particular patient I treated here had a fall with a.
Or hemorrhagic and ulnar nerve injury and the hand was so sensitive he couldn't even touch it.
So put in one of these peripheral nerve stimulators for 60 days to help with some of that sensitivity and this particular patient didn't want to take a lot of the medications or any medications for that matter.
I remember talking about alpha lipoic acid as a supplement for nerve pain just because they where has it just taken any of the medications?
Due to potential for side effects.
And they've already had surgery and didn't want to get additional surgery, so it's nice to have some additional additional tools.

For years I've been sending folks up to the pain clinic here for spinal neuromodulation.
So I think if certain instances, whether it's not an identifiable nerve injury or some of the other interventions, did not help, we can put a spinal cord stimulator in. The nice thing about this is we can do a trial in the clinic same day procedure where they wear.
An external battery.
To see if it covers their area of pain, we'll have them screened by the pain psychologist and the whole team first to make sure that we're on the same page in terms of expectations.
I think in looking through the literature, there's a lot of the case. Series are small but very compelling that there's some data here.
There's not a lot of large meta analysis or studies to say, it's something that should be first line.
In our system, we've put them in fairly early after.
Uh Poly trauma with some success. We have still have to tease out.
Maybe this is an intervention that can be done earlier, or would be more efficacious if done earlier.
It tends to be something that's done later, after several months of management.
But ultimately we could do an implant it internal.
Ipg.
And the patient can have some control over their chronic pain.
There are obviously a lot of modalities that are non interventional nonsurgical and so mirror therapy is interesting.
Start with stroke therapy.
And chronic pain to include CRPS as well as motor recovery.
We've used it in our limb loss patients as well as our limb salvage patients and complex regional pain syndrome with good efficacy. And so it's probably being implemented in a lot of our patients routinely by our therapists without an additional request.
Biofeedback something. Our pain psychologist utilized as well as our therapist.
Transcriptomagnetic stimulation, I think for upper extremity they we've had some success with that, especially the way the homunculus is.
More accessible than lower extremity, even if the patient has comorbid depression.
That modality that you entertain and of course acupuncture, so.

Alright.
So.
With our peripheral neural clinic team, we mentioned kind of the pharmacology of therapist, the entire team.
Is controversially controversial initially to do any surgery on people with CRPS.
But I think what we found is if you can find a nerve injury, surgery may be reasonable.
Even doing an amputation, I think is a little less controversial now. If it's well thought out in the right patient, but you'll find a literature.
Some will advocate to never do surgery for CRPS.
Umm So what?
What they're able to do now.
In addition to targeted muscle, reinnervation is for some of these small peripheral nerves to include sensory they're able to do these regenerative peripheral nerve interfaces. They used to just put traction on the nerve and cut it, and then it would form a new neuroma.
So they try to place the nerve nerve to denervate it muscle so that when it regrows it kind of regrows into more organized fashion and they've had some success and reduction of pain. So they'll do this.
And Poly traumas, prophylactically sometimes, but also in patients with persistent complex regional pain syndromes.
So the first case we had.
That patient had the peripheral nerve stimulator we mentioned perioperatively, along with the surgical rpni or nerve surgery for her pain and.
She when we did some of the surgery, she remained with the numb area, but all the sensitivity was gone.
She had complete relief of her pain.
We followed her up to 12.
Months. But with our purple nerve clinic case manager, if they ever have any issues, they can contact us again.
And so the interesting thing is when you send these surgeries.
The areas of anesthesia can sometimes improve over time as well, with neighboring nerves. So, but all of our surgeons will tell you when they do these nerve surgeries they really want.
The acute care anesthesiology team, along with the chronic pain team, to

aggressively manage their pain because there can be a period of increased pain.
Before they have that reduction in our particular case, we had the nerve stimulator in at the same time, so there was no increase in pain after her surgery, so.
For coming up on 40 minutes.
So here's our summary slide here.
So just to take homes for this talk are that now we classify complex regional pain as type one or type 2 as defined by the IAS ISP criteria.
There are the older terms of RSD and CLAUSALGA, but keep in mind you don't necessarily have to have sympathetically mediated pain.
It could be sympathetically independent pain and it could still be classified as CRPS.
I think what's key, what I look for.
Is that central sensitization pain out of proportion?
What you'd expect a regionalization of the pane.
The diagnostic criteria I think are helpful.
So we can we go back and study these patients that we find the most effective treatments.
I'll say one more time. The interdisciplinary care is key.
Early education.
And you know, I'll put my bias in again.
I'll advocate for, you know, electrical testing, electrodiagnostic testing, and now the use of advanced imaging with ultrasound.
To define what the Nerva tree may have been, utilize our interventional techniques early and often.
And yeah, once again, just appreciate, you know, our support from our our colleagues, I think you know some of the studies we've done where you look at all the things we just cover the patients with the best outcomes are the ones that have good self efficacy have BI.
Support some of those factors I think can be the most significant and how they do ultimately in terms of return on to duty.
And return the function so so with that, I'll turn it over to group for any questions and look forward to any discussion.

HW **Hal Wain** 38:10
And any questions or comments?
If any do develop, please contact us later through e-mail and we will be very happy

to respond.
But I want to thank you, Doctor Mello, for an outstanding informative presentation.
You really covered a great gave us the history and it's very interesting that you started the history back during the Civil War back in the 1860s. And then you also ended with the Budapest, which is in the.
21st century.
So this has been a long line of injuries, both civilian wise and military wise.
You gave an outstanding presentation of looking at the diagnostic criteria, the pathophysiology of pain.
You talked about the evaluation of the patient.
You also gave us some hints about doing a bedside evaluation and doing in the office or at the bedside, which is very.
Comforting for all of us to recognize we may be able to start the evaluation.
And then you emphasize the importance of maybe early referral and if we do the evaluation early and we find we we have this disorder, we can then make the early referral to perhaps inhibit some of the side effects and the consequences that we see with chronic pain. Pat.
He also talked about myriad of treatments and and to include some of the advanced techniques.
In in Pain management talked about the pharmacological regimens, the intervention.
The blocks.
What they really mean, but you emphasize something very nicely.
You talked about three times.
You mentioned the importance and the evaluation from a biopsychosocial perspective.
So you said this may not be a unitary or unilateral approach, but if we're really looking for the complex aspect of looking at this patient and looking at the myriad ways of intervening, maybe contacting our colleagues in different disciplines can be very helpful.
In terms of the patient's benefit and helping them deal and cope with it with their disorder. So overall you gave us a wonderful talk, a wonderful references both from a biopsychosocial perspective, which allows us to gain information, utilize your slides as a reference for us, utilize your.
Talk as a reference, so I want to thank you and I'm looking forward to your talk next month.

With regard to addictions and again, Doctor Miller, thank you again for a outstanding presentation.

Miller, Matthew E LTC USARMY DHA NCR MEDICAL DIR (USA) 40:54
Thanks, doctor Wayne. Appreciate it.

Osik, Amy J CTR DHA WALTER REED MED CTR (USA) 41:02
Thank you, Doctor Wayne.
Doctor. Doctor Miller. Great presentation.
We really appreciate this. Just the final housekeeping items.
Please let us know your thoughts on using teams or Adobe Connect in the future.
There are some downfalls to each, but please let us know.
Also, join us next month for another round of webinars that we're really excited for.
Additionally, this session was recorded and will be available.
In four to six weeks on the www.ncrpi.org website with a password and I will leave that in the chat box and we will leave the room open for a few more minutes just to see if anybody has any more comments or questions.
But we did mostly hear agree.
Great review.
Thank you all and Doctor Wayne for your great summary. We had great lecture.
Thank you for the great review of the current information on CRPS.
And doctor Agnello said take took care of many of the Womack CRPS in my past career as being champion. Just presented this topic at Campbell University School of Osteopathic Medicine for the first year students. Nice to see our presentations completely match up and have some benefits with L.
In these patients, great job.
Well, thank you so much for that.
I'm going to leave the room open for a few more minutes and if anybody has any comments they can put in their chat.
Thank you so much and have a great day.

Labuguen, Carla B CTR DHA (USA) stopped transcription