

Physician Roundtable - Neuroscience

Cervical Spine Disease Can Be A Pain In The Neck



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The anatomy of the cervical spine generally permits a good range of flexibility and motion under normal circumstances. Unfortunately, it is also vulnerable to unforeseen physical forces. Whether sitting, driving or using a phone or computer, our cervical spines are subject to unusual positions. Sudden trauma and the aging process also contribute to degenerative spine diseases that affect people, sometimes in highly debilitating ways.

A group of Eisenhower Medical Center physicians recently sat down to discuss an overview of cervical spine disease — various degenerative diseases, diagnosis, pain management, treatment and surgery. The participants were Eisenhower Neurosurgeon Farhad Limonadi, MD, Neurologist Bishoy Labib, MD and Anesthesiologist/Pain Medicine Specialist Lee Erlendson, MD. Cardiologist Philip Shaver, MD moderated the discussion.



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Dr. Shaver : We are going to speak tonight about a very common condition: neck pain. It is estimated on the American Academy of Orthopaedic Surgeons® Web site that over 85 percent of patients over 60 years of age are affected by some degree of cervical spondylosis or degenerative disease. It might be best to differentiate what conditions require a specialist or what steps a person with neck pain should take to get an accurate diagnosis of their condition. Some people may experience neck pain that is muscular in nature rather than degenerative disease.

Dr. Labib: In younger patients, we see more muscle strain than cervical spine disease. But in our older patient population here in Palm Springs, we see degenerative arthritis and degenerative disc disease, cervical radiculitis, radiculopathy and myelopathy. It is important to differentiate what is the underlying etiology to pain and which approach to pursue to get to the right diagnosis and treatment accordingly to relieve pain.

Dr. Erlendson: A lot of the muscle symptoms are a reaction to what's going on in the spine, the facet joints, the uncovertebral joints (bone spurs), and spinal stenosis, so you have the reaction of a muscle group reacting to nerve impingement or something similar to that going on in the spine.

Dr. Limonadi: The appropriate approach would be to see a good primary care physician first and an expedient referral to an excellent neurologist as a second step to get a comprehensive evaluation of the patient. From there, the patient can be referred to a pain management doctor, neurosurgeon or physical therapist as needed.

Dr. Shaver : With that as our basis for appropriate first steps, let's discuss degenerative disease and the term cervical spondylosis. What does that mean exactly?



"It is important to respect the process of aging and understand that just as your fingers are going to be in pain as you get older, you may experience some pain in your neck as well." — Dr. Limonadi

Dr. Limonadi: Cervical spondylosis is a term that is used to describe degenerative spine disease — essentially changes that are part of the normal aging process. Some of them can cause specific pathology, such as cervical radiculopathy, myelopathy, cervical disc disease, facet joint syndrome, subluxation, loss of alignment to the cervical spine, and the list goes on.

Dr. Shaver : **Despite the statistic of how many people are affected by cervical spondylosis, that doesn't mean they are all going to need therapy. Dr. Labib, when you see patients who have neck pain, is there often something that seems to provoke this during their lifetime, or is this a common thing that you see as a neurologist?**

Dr. Labib: The older a person gets, the more likely he or she will develop degenerative disc disease. Profession can play a role. For instance, boxers and football players are more at risk of developing neck pain and low back pain among athletes. Boxers are required to be seen by a neurologist regularly to make sure they are safe to continue competing. Patients who work in manual labor are at risk of developing neck pain and low back pain and hence, rapid progression of degenerative disc disease, whether lumbar or cervical.

Dr. Limonadi: There has also been a significant number of patients who have engaged in the popular sports of triathlon and cycling who are afflicted with neck pain, which is attributed to microtrauma and macrotrauma of the cervical spine. There are many factors that are associated with accelerated spondylitic disease process of the cervical spine; however, three of them have been shown to cause accelerated spondylitic disease. Number one is microtrauma and macrotrauma to the cervical spine. Number two is osteoporosis and number three is smoking. All three have been shown in an evidence-based manner to cause acceleration of the aging process.

Dr. Shaver: What symptoms would tell you it's something more benign like muscle strain versus something for which you need to be more aggressive or do imaging studies?

Dr. Erlendson: If symptoms are radicular [radiating] or myelopathic [relating to spinal cord disease or injury] rather than simply localized to the neck, and if they are chronic and don't respond to conservative treatment, then consideration for imaging and referral is appropriate. You have to understand the underlying problem. Is there is a cervical disc and spinal joint disc contributing to a patient's symptoms? We start with conservative therapy, and if it continues to be a problem or progresses and evolves more like other ailments, like cervical radiculopathy, we do more.

Dr. Shaver: What is radiculopathy?

Dr. Erlendson: That refers to a cervical nerve root that is being irritated or symptomatic and/or having pain, not just neck pain, but pain that goes down an extremity. It's commonly a syndrome where a patient has no symptoms, say in the neck, but then [pain] starts radiating down the entire arm. That might be consistent with a radiculopathy.



"If the patient has myelopathy or spinal cord compression, the patient needs to go to a neurosurgeon right away." — Dr. Labib

Dr. Labib: And it follows a cervical dermatome, meaning sensory distribution. It makes a big difference how the patient describes the pain. For instance, if pain is starting in the neck, going down the lateral aspect, medial aspect, or posterior aspect of the arm to a specific digit, then we can determine which nerve root is involved and determine the necessity of ordering imaging studies to see if the nerve is compressed at that spine level.

Dr. Shaver: There are, in all, seven cervical vertebrae and there are eight nerves, so you would use the terms C6, C7, C8, for instance, to identify which vertebra and nerve is associated.

Dr. Labib: Exactly. For instance, if a patient says, "I have numbness in my thumb coming down from the neck region," then I know that he might have a C6 radiculopathy. When we do an MRI scan of the cervical spine and nerve conduction study/electromyogram of the upper extremity, I am mainly focusing on C6 innervated muscles groups to correlate to the patient's symptoms.

Dr. Shaver: Dr. Limonadi, please explain the term myelopathy.

Dr. Limonadi: The cervical spine can be impinged upon in two ways. One is called myelopathy, which is when cervical spinal cord is actually compressed. The other one, radiculopathy as Dr. Labib and Dr. Erlendson were pointing out, is when the nerve root, as it leaves the spinal cord, is impinged. Myelopathy causes a number of problems which are typically characterized as atrophy and weakness of the hand muscles, sometimes numbness of the fingers, loss of manual dexterity — for example, difficulty buttoning one's buttons. Myelopathy commonly happens when about 30 percent of the cervical canal has been compressed.

Dr. Shaver: Buttoning shirts seems to be one of the keys.

Dr. Limonadi: Quite a bit. Patients with myelopathy may also experience weakness of the proximal muscles of lower extremities, meaning they may have difficulty with hip flexion and also at times feel numbness and tingling, especially numbness to the vibratory stimuli of the lower extremities.

Dr. Shaver: You may see patients with balance and gait issues. How do you assess those?

Dr. Limonadi: Older patients may have combined syndromes. These patients have peripheral neuropathy, superimposed on myelopathy, which makes the diagnosis more challenging. The difficulty with gait and balance can be caused by spasticity, which in turn is a consequence of myelopathy. Vertigo and heart disease should also be considered. It's important that a good neurologist, neurosurgeon and pain management discerns precisely, and separates which symptoms are caused by normal aging — what constitutes myelopathy and who has peripheral neuropathy? That is where besides a good clinician, studies such as electromyography (EMG), nerve conduction study, and electronystagmography [or ENG, used to test patients for vertigo] come into play, to sort these out.

Dr. Shaver: It's interesting that the skull and its contents weigh slightly more than a gallon of milk. If I gave you a bowling ball to carry around all day and you kept it in the same position, your arm would probably be pretty sore. In theory, we're asking our neck muscles to carry around a 10- to 12-pound bowling ball all day and not get sore. Let's say I woke up with a crick in my neck that really hurt and it didn't go away in one day — should I treat it with ice or heat? Should I call you for a prescription?



It's appropriate to consider interventional pain therapies... if conservative therapies... have failed." — Dr. Erlendson
Dr. Erlendson: Ice and heat have different treatment direction therapies. Ice would be used in situations where you think there's an inflammatory process. Heat might be used if you think there's a muscle spasm occurring. Use ice for acute inflammation; heat for muscle spasm. We tell our patients, 20 minutes on, 20 minutes off, so they don't get a burn. You can get burns from both heat and ice to the skin tissues. Overuse of ice and overuse of heat will scar and damage your soft tissue and skin.

Dr. Labib: The use of anti-inflammatory medications and muscle relaxants is the simplest initial step. If that does not work then a short course of steroid might be helpful. Physical therapy comes next.

Dr. Shaver: Explain to me what happens with our discs as we get older. Our discs are basically the shock absorbers between our vertebral bodies.

Dr. Limonadi: A disc is composed of two very critical structures: in the center, nucleus pulposus which is similar to gel form, very elastic and transparent in a young person if you held it against light. It's covered with a fibrous structure called annulus fibrosus, which is harder. As we age, that harder substance may have some tears, and you may have protrusion of this disc material through some of those tears, which in turn may cause radiculopathy as the result of pinching the nerve root, or myelopathy if the cord is compressed. The disc fragment that we retrieve during the operation is a diseased disc that's pushing on the cervical spinal cord or nerve roots.

Dr. Shaver: What about facet joints? I think it might surprise people to know they have joints in their neck. It's not like a joint in our hip or elbow, but there are joints, otherwise we couldn't turn our head or flex without some movement of the vertebral bodies over each other.

Dr. Limonadi: A vertebral body is almost like a tripod. It sits on three different resting places. In the front is the disc that acts as a shock absorber, between the two vertebral bodies and then in the back, posteriorly, it sits on those two facet joints. What happens is that as patients age, the disc becomes dehydrated, desiccated, and the height of the disc decreases. The load of the weight of our head passes on in the back to the facet joints, which results in degenerative changes as consequence of increased load. With the aging process facet joints become larger which may cause facet joint syndrome and/or narrowing of the cervical canal.

Dr. Shaver: I think our patients realize when they see their hands getting arthritic, and see bony changes and hypertrophy, that the same things happens to these joints. The only way the joints have to respond to inflammation and stress is to grow, and to get gnarly and bony.

Dr. Erlendson: As the disc deteriorates, so does the back part of the facet joints in the back of the spine. When the front goes, the back side goes, and you get a spine that is having degenerative changes in both the front and back, and eventually these people are going to have limited range of motion and pain.

Dr. Shaver: I'd like to talk a little bit about pain management specialists. Dr. Erlendson, is it still true that you have to be an anesthesiologist, a physiatrist or a neurologist to sit for the American Board of Pain Medicine?

Dr. Erlendson: That is correct. A lot of the pain fellowships now require interventional therapies, where we stick needles in the spine, particularly in the cervical spine, and it requires a certain amount of fellowship training credential to do those types of higher risk procedures. We have pain doctors who are interventionalists who have to put needles in the spine, and we have pain doctors that are non-interventionalists; they do not do needle procedures.

Dr. Shaver: When do you consider those interventional therapies?

Dr. Erlendson: It's appropriate to consider interventional pain therapies like cervical epidural or cervical facet injections if conservative therapies like rest, anti-inflammatories or maybe mild pain killers have failed. For cervical radiculopathy, you might do wonders by putting steroids around the epidural space in the nerve root that is affected, because radiculopathy caused by certain problems results in inflamed nerve root. There is edema and swelling of the nerve root, and a steroid, directly applied to that epidural space, can shrink that down very effectively.

Dr. Shaver: It's a pretty narrow space, how big is the epidural space around the nerve?

Dr. Erlendson: It's in the order of millimeters. I would not do a cervical epidural steroid injection in someone who has critical cervical spinal stenosis or a serious disc herniation. That might require surgical decompression rather than me injecting more volume into a compressed space, but if the MRI scan is consistent with an adequate space there, an epidural can be done.

Dr. Shaver: Where do spinal cord stimulators come in?

Dr. Erlendson: Spinal cord stimulators are probably the most appropriate for people who have post cervical laminectomy syndrome. That means they've had some type of surgery before; there was chronic damage to tissues there with scar tissue, and they are left with chronic neck and arm pain. Stimulation has a role — precisely delivered electricity to certain parts of the dorsal column and spinal cord, through the epidural space or from the epidural space. We're trying to mask the pain of a chronic nature that is related to previous cervical pathology and chronic neck pain and arm pain.

Dr. Labib: If an epidural injection is indicated, Dr. Erlendson, do you do a series, two or three weeks apart?

Dr. Erlendson: I do it based on symptoms and the appropriate pathology. The patient doesn't get an epidural at all unless they have the appropriate physical findings, MRI findings, or CT scan findings. If they get better with a cervical epidural steroid injection, and they are able to function, I don't do a series of any; I do one and then watch them. Typically, two or three would be maximum therapy. There are side effects to getting repeated steroid injections, and they include osteoporosis, thinning skin, bruising, and adrenal suppression, like John F. Kennedy had. He had so many shots of cortisone, so many steroid [injections], that his adrenal glands were nonfunctioning. Adrenal glands produce stress hormones like cortisol and you need to make your own cortisol to handle the day to day stresses of getting up in the morning. You don't want to have multiple steroid injections because you'll suppress those adrenal glands in your kidneys.

Dr. Shaver: Dr. Labib, at what point do you call Dr. Limonadi, a neurosurgeon, about a patient?

Dr. Labib: If I have a patient who failed conservative treatment, such as medical treatment initially, pain management, antiinflammatory medications, epidural injections, physical therapy, and nothing is working, then that's the time that they need to see a neurosurgeon. If I have two different modalities, such as an MRI scan of the cervical spine showing there is a clear etiology to their symptoms, and I do neurodiagnostic testing and I see that there is denervation in the muscles and there is weakness on the exam to correlate with it, I will not wait long to send the patient for surgical intervention. I will send the patient to Dr. Limonadi right away and would not wait on conservative treatment. Another scenario: If the patient has myelopathy or spinal cord compression, the patient needs to go to a neurosurgeon right away.

Dr. Shaver: Neurosurgery is another therapeutic option. Dr. Limonadi, what are your thoughts on how to approach the decision point?

Dr. Limonadi: The best thing would be no surgery; that is by far your best option unless you absolutely need it to preserve function. It's so critical to go through the appropriate steps. Once you've had an operation, and continue to have problems, then your evaluation becomes quite complex thereafter due to a number of factors. It could be that certain symptoms are just part of the process of aging in which case that person is going to continue to have problems despite the operation. It could be that surgery was inappropriate. It could be that surgery was unsuccessful. It is important to resort to the surgery as the last option and with a realistic expectation of the outcome of the surgery. You do not want to go into an operation with an unrealistic expectation, not knowing what the pathophysiology of the disease is and what the future holds.

Unfortunately, sometimes we see patients who are referred to us after having had multiple fusions in the neck, front, back, left and right and they are still in pain. It is important to respect the process of aging and understand that just as your fingers are going to be in pain as you get older, you may experience some pain in your neck as well. Respect that and understand that you can take proper steps to ameliorate the pain, but they have to be appropriate. You should not immediately request or undergo an operation with unrealistic expectations.