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# DIFFERENTIATING CHRONIC NEUROPATHIC RIB PAIN: A CASE REPORT

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**Background:** Rib cage pain can be challenging to diagnose due to a wide variety of etiologies in the area. Intercostal neuromas are a potential source of pain in the thoracic region. In the setting of blunt intercostal trauma, intercostal neuromas should be higher on the differential.

**Case Report:** We describe the case of a 69-year-old man with severe thoracic pain for 10 years due to intercostal neuroma who had extensive medical workup over the course of 10 years prior to the diagnosis causing his chronic pain. He received definitive treatment with surgical resection of his intercostal neuroma.

**Conclusions:** This article highlights the need to consider neuroma formation in the setting of blunt trauma and the benefits of diagnosis provided by musculoskeletal ultrasound.

**Key words:** Neuroma, intercostal, rib pain, ultrasound, case report

## BACKGROUND

Rib pain can be challenging to diagnose due to the many etiologies that can cause such pain and the variability of presentation between patients. However, intercostal neuromas are a potential source of pain in the thoracic region, often resulting from iatrogenic causes (1-4), and less commonly caused by trauma (5). Intercostal neuromas form when there is damage to a peripheral nerve, and disorganized regeneration occurs (1). It is theorized that neuromas generate pain due to a hypoxic environment surrounding the damaged nerve due to scar tissue and poor vascularization triggering painful impulses (4). In the setting of blunt intercostal trauma, neuromas should be included on the list of differential diagnoses for chronic thoracic pain along with rib fracture, anterior cutaneous nerve entrapment syndrome (ACNES), painful rib syndrome, costochondritis, and visceral etiologies. ACNES and intercostal neuromas can present very similarly and can lead to misdiagnosis and delays in treatment (6). Diagnosing an intercostal neuroma can be lifealtering for patients, as they can be resected and alleviate pain potentially leading to a full resolution of the complaint.

Herein we describe the case of a 69-year-old man with severe thoracic pain for 10 years due to intercostal neuroma who had extensive medical workup prior to the diagnosis and treatment of his intercostal neuroma. The patient provided informed consent to share his clinical case report.

## CASE DESCRIPTION

A 69-year-old man with a complex medical history was evaluated in the Osteopathic Manipulative Medicine (OMM) clinic at the Philadelphia College of Osteopathic Medicine for left-sided rib pain that started 10 years prior. The patient's medical history included polymyalgia rheumatica, hypertension, hyperlipidemia, coronary artery disease, and a history of a cerebrovascular accident. In 2013, the patient was hit with a scaffolding pipe in a "battering-ram" fashion right at the level of the tenth rib. He had immediate, severe pain and was evaluated in the emergency department. He does not remember whether or not he was diagnosed with fractured ribs or even if he had any ecchymosis after the initial incident. He rested for several days before returning to work, but

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he has had focal, nonradiating, sharp, gripping pain since this incident.

The patient reported pain aggravated by all movement, most notably when walking and moving his left arm. He experienced pain relief with sitting still or not moving his left arm. The pain would come on suddenly with the introduction of an inciting factor, lasting for seconds to minutes as long as the inciting factor is still present. He denied any numbness or burning to the area, rashes, skin lesions, weakness, or bowel or bladder dysfunction.

Over the past 10 years, he saw several physicians and had an extensive medical workup. He had a computed tomography scan in March 2022, which showed lung nodules, but no evidence of rib fracture or any other obvious pathology. The treatment that he received prior to being seen in the OMM clinic included physical therapy, lidocaine patches, fentanyl patches, medical marijuana, 2 intercostal blocks, and chiropractic work, without any relief. Despite not seeing improvement with intercostal blocks, 2 radiofrequency ablations were also performed in an outside practice prior to patient presentation. The patient was also treated with steroids for his polymyalgia rheumatica for one to two years without any relief of his rib pain. The only relief he experienced was with oxycodone (7.5 mg).

On presentation to the OMM clinic, his physical examination was significant for a focal area of tenderness to palpation about the width of a thumb pad along the lateral aspect of rib 7, including the serratus anterior musculature. There was no evidence of any rash or skin lesion associated with the pain. Musculoskeletal ultrasound examination in the office showed tendinosis and chronic changes associated with the attachment of the serratus anterior, as well as an intercostal neuroma.

The patient was treated with osteopathic manipulative treatment and had significant symptomatic relief, but returned to baseline pain after 3 days. He was referred to a musculoskeletal ultrasound specialist for further evaluation. Musculoskeletal ultrasound specialist confirmed there was a neuroma of the intercostal nerves over the patient's area of chief complaint, and he recommended surgical excision. The patient had excision performed by a thoracic surgeon. Approximately one month after surgery, the patient had 80% overall improvement and was no longer requiring narcotic pain management. His functional level of improvement was much beyond his level of expectation and is able to perform previously exquisitely painful activities with minimal pain. At a later appointment for a separate complaint, the patient reported total resolution of his left-sided rib pain. The patient has remained pain free 6 months after excision.

## DISCUSSION

This patient experienced 10 years of chronic pain, prior to identifying the true source of his pain. It is likely that when he was hit by the scaffolding pipe, the crush-type injury that resulted allowed for intercostal nerve branch damage and subsequent neuroma formation due to abnormal axonal regeneration.

The prevalence of chronic thoracic pain in the general population is estimated to be around 15%, with a variety of different etiologies (7). Thoracic injuries are the third most common injuries for trauma patients, with rib fractures being the most prevalent (8-10). However, intercostal neuromas are a potential source of pain in the thoracic region, often resulting from iatrogenic causes, such as thoracic surgery, and less commonly caused by blunt trauma (1-4,11). In cases of thoracic wall trauma, intercostal neuroma should be considered as a differential diagnosis, especially as the pain persists and is not ameliorated with common musculoskeletal treatment modalities, such as physical therapy and pharmacologic measures.

First-line treatment for rib pain is generally conservative. Due to the small number of cases in the literature, intercostal neuroma is not generally one of the primary differentials, and many of these cases are often identified late once the individual experiences continued pain after conservative therapy has been attempted. That being said, treatment generally starts with conservative measures, such as heat, ice, and over-the-counter medications. Pain caused by etiologies, such as intercostal muscle strain, costochondritis, or thoracic and rib somatic dysfunctions, should resolve with conservative treatment. If the pain persists, move to treatment with physical therapy, transcutaneous stimulation, or cryotherapy. If pain persists after conservative therapies have been tried, the patient should be referred for musculoskeletal ultrasound to determine if there is an identifiable underlying etiology that was missed during the onset of thoracic pain, such as intercostal neuroma. Magnetic resonance neurography is another imaging modality that can be considered at this point; however, it is not as widely accessible and is more expensive compared to musculoskeletal ultrasound (12). Once identified, the definitive treatment for

intercostal neuroma is surgical removal (13,14). Some individuals may opt for less invasive interventions first, such as systemic medications, topical or invasive nerve blocks, cryoablation, and radioablation, but surgery is considered to be a curative treatment (1). It is important to note that there are various visceral and infectious pathologies that can produce thoracic rib or flank pain. At the initial onset of pain, visceral pathologies, such as gonadal torsion, appendicitis, nephrolithiasis, and pyelonephritis, should be considered as they require urgent intervention to prevent poor outcomes. In terms of infectious causes, herpes zoster should be high on the differential. It is estimated that 28% of thoracic pain is due to viral or postviral pain from herpes zoster (11). Identification of this early on can lead to intervention and treatment with antivirals.

Understanding the causes and treatment options of intercostal neuromas can help prevent significant delay in successful treatment, which can improve patient quality of life and limit unnecessary testing and treatments for patients. Musculoskeletal ultrasound is an imaging modality that can be helpful in diagnosing intercostal neuroma and allowing for timely surgical excision. Ultrasound is a cost-effective, fast, noninvasive, relatively safe modality to examine for the presence of intercostal neuromas (15).

## CONCLUSIONS

As demonstrated in this patient, understanding of injury type and available imaging modalities allowed for swift diagnosis and treatment for his ongoing chronic pain. Musculoskeletal ultrasound provided necessary diagnostic information quickly and cost-effectively allowing for appropriate excision of the intercostal neuroma and subsequently total symptomatic relief. Successful diagnosis and treatment resulted in improved quality of life, as well as decreasing unnecessary spending and treatment for the patient and health care system.

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