



A Case of Thoracic Facet Arthropathy Treated with Radiofrequency Ablation under Ultrasound Guidance

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Introduction

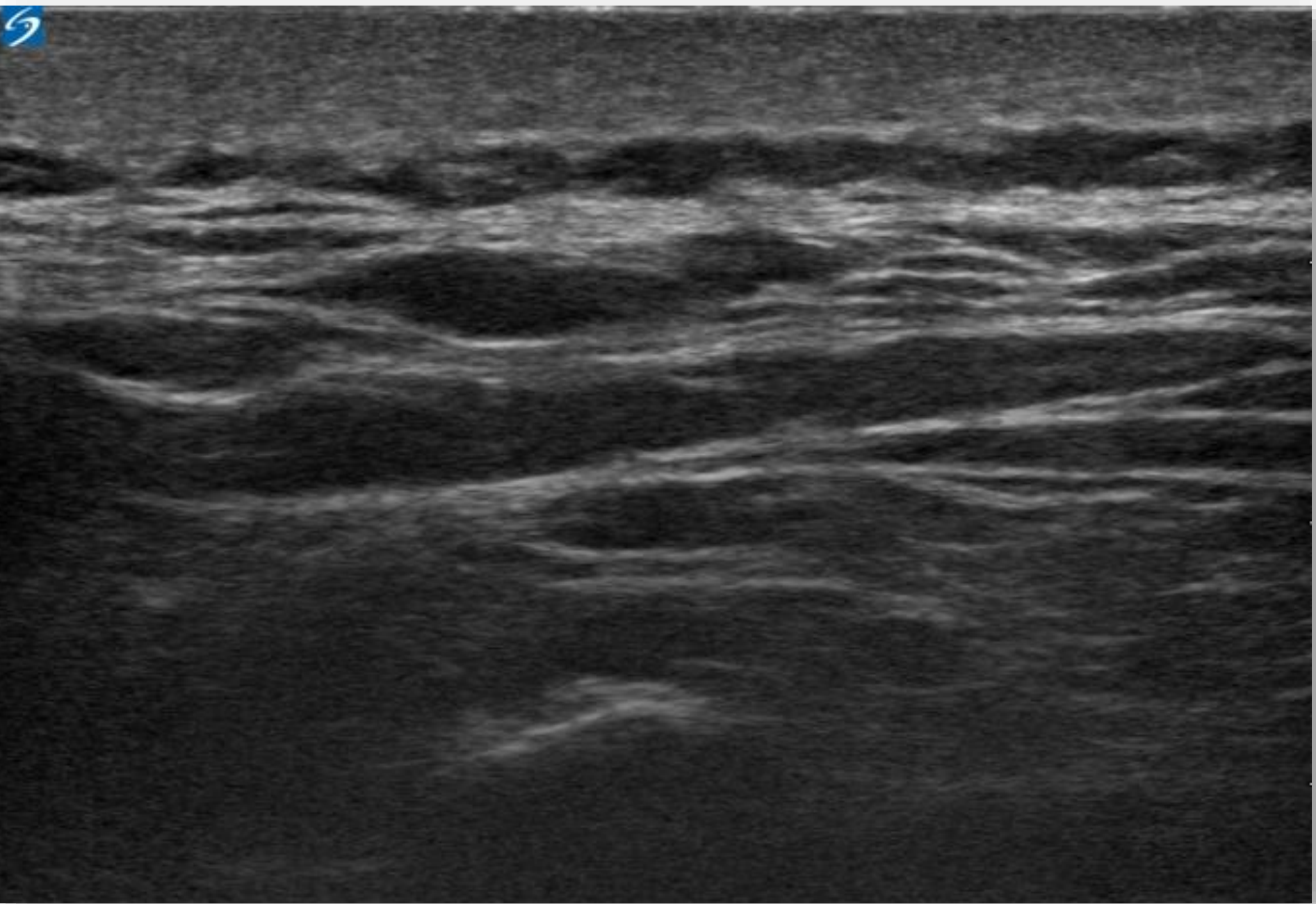
- Chronic back pain is an illness that can be debilitating and impair activities of daily living and reduce quality of life. In the United States, up to 1 in 5 adults experience chronic back pain.
- Thoracic spine pain is less common than lumbar or cervical pain but still affects 13% to 15% of the population.
- Thoracic region pain is multifactorial in origin, but a major source is the thoracic facet joints – ranging in prevalence from 34% to 42%.
- It is well understood that in the cervical and lumbar spine, the facet joints are innervated by the medial branch (MB) of the dorsal rami. Compared to the cervical or lumbar spine, the MB of the thoracic spine varies depending on the level of the target thoracic spine.
- Ultrasound use in spinal procedures has rapidly evolved and it has been shown that thoracic radiofrequency ablations (RFA) can significantly improve function and relieve pain in the thoracic region.
- Although ultrasound is not yet the preferred method for many thoracic procedures due to its limitations and its technical challenges, we demonstrate a successful technique using ultrasound guided RFA in treating low thoracic facet arthropathy.

Case Report

- 56-year-old male with a multitude of musculoskeletal injuries secondary to a history of a blast injury who presented with chronic low thoracic facet syndrome.
- Presented with right sided mid back pain that was worsened with movements such as bending, twisting, and lifting along with prolonged or repetitive activities.
- Due to his injury, he had undergone many interventions to treat various pain symptoms. Based on patient's symptoms and imaging findings, patient underwent diagnostic medial branch block of his right T10, T11, T12, and L1 under fluoroscopic guidance with significant relief of symptoms.
- Proceeded with RFA at the same levels under fluoroscopic guidance with significant relief of symptoms for about 6 months.
- Patient was able to be more functional with significantly less pain and carry out the activities of daily living with less assistance than before.
- Patient presented 6 months after his initial thoracic RFA for a repeat procedure under ultrasound guidance at the same levels. Patient tolerated the procedure well under ultrasound guidance with similar efficacy of relief of symptoms as under fluoroscopic guidance.

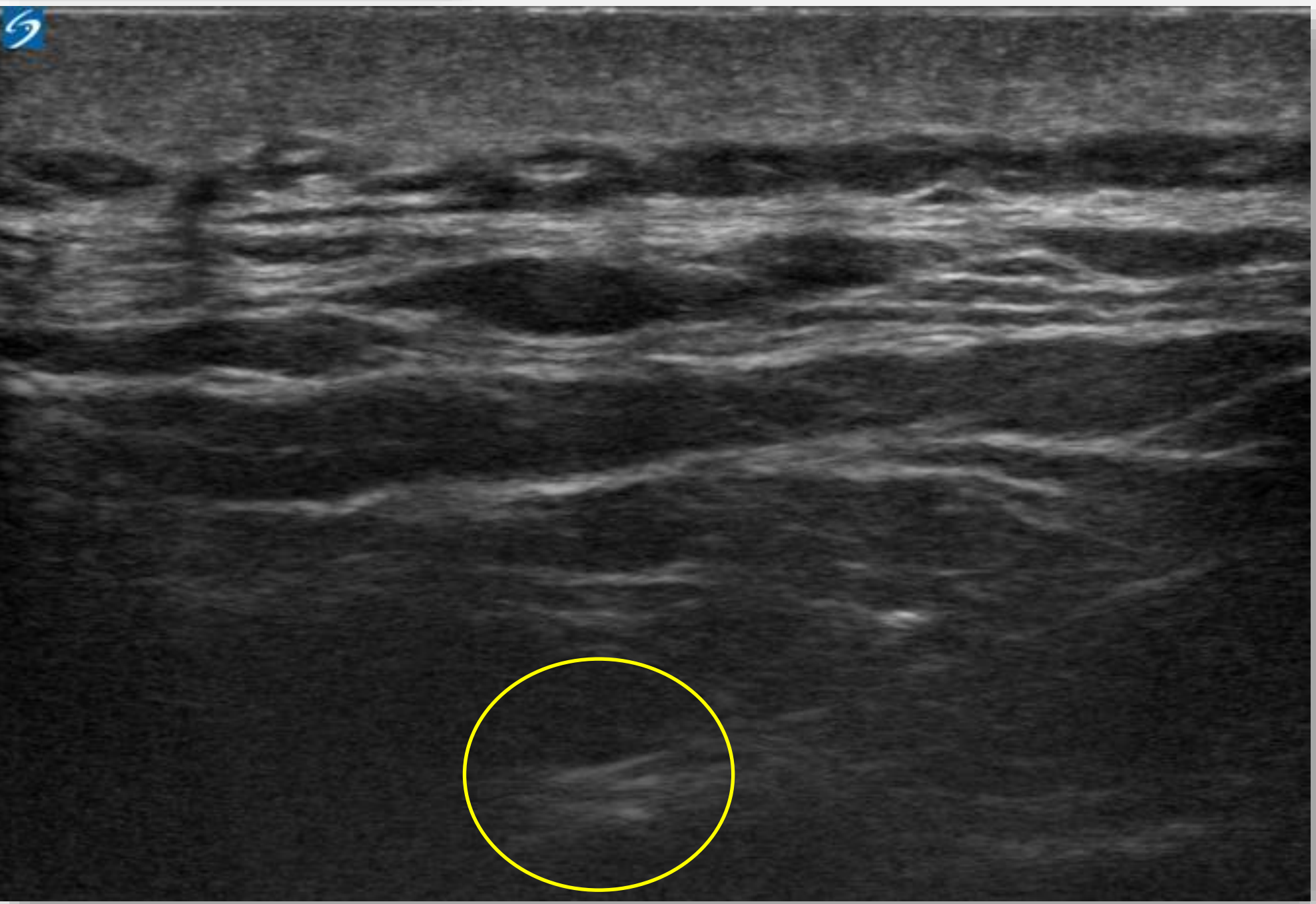
Procedure

Patient was positioned comfortably in the prone position and skeletal landmarks were identified under ultrasound guidance. At all insertion sites the skin were anesthetized with 1% lidocaine. The ultrasound transducer was placed to visualize the target areas that the medial branches would be located. RFA was performed using standard insulated RF probes. RF probes were advanced in-plane to the target from a lateral-to-medial trajectory. Proper placement was determined with both ultrasound and with both sensory and motor testing. Pre-ablation blockade was performed with 1mL of 2% lidocaine. RFA was performed at each site for 80 seconds at 80 degrees Celsius, followed by post-ablation injection of bupivacaine and corticosteroid.



Variable course of the MB at different levels of the thoracic vertebrae can lead to different osseous targets. In general, for T1 to T4 and T9/T10, the target area is at the superolateral edge of the transverse process vs from levels T5 to T8, the MBs are suspended in the intertransverse space.

T11 and T12 MBs are similar in location to L1 to L4 MBs. They are traditionally found at the junction of the transverse process and the superior articular process.



Discussion

- There is limited literature surrounding the use of thoracic MB RFA is relatively scarce in comparison to the cervical or lumbar spine.
- Thoracic facet joint pain is a disease that is estimated to be present in 34% to 48% of people with chronic midback and/or upper back pain.
- Literature surrounding the use of thoracic RFA is relatively scarce when compared to other levels of the spine, and in comparison, to using fluoroscopy, there is even a smaller number of cases of ultrasound guided thoracic RFA.
- Advantages of ultrasound include visualizing soft tissue anatomy, vascular supply, nerve structures, portability, ability to be used in environments with limited resources, and the limitation of radiation exposure to both healthcare providers and patients. There are also many approaches that can be fit to each individual's anatomy.
- Disadvantages include limited visualization of the field, user dependability, lengthy learning curve, potential for inadvertent vascular uptake, and impaired needle visibility secondary to obesity, prior interventions, and depth to target.
- Another drawback of ultrasound is the possibility of inaccurately targeting a segment without fluoroscopic confirmation. In the thoracic spine, misidentification of the targeted spinal level occurred between 16% and 43% of the time depending on the scanning technique with <50% accuracy in patients with obesity.

Conclusion

There is limited evidence in examining thoracic facet interventions under ultrasound. There are no studies that report safety outcomes for ultrasound-guided thoracic facet joint interventions or studies that have reported on the efficacy outcomes for ultrasound-guided interventions. Our case showcases one technique of using ultrasound guidance to target the patient's thoracic MBs to allow a more convenient needle insertion compared to the traditional fluoroscopic method. As the use of ultrasound is becoming more prevalent, different approaches/techniques in the use of ultrasound guided thoracic level procedures should continue to be explored.

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