8TH - 10TH NOVEMBER, 2024 | GRAND HYATT MUMBAI

Registration number: 533

Title of the presentation:CT-GUIDED PERCUTANEOUS BIOPSY USING COSTOVERTEBRAL APPROACH IN A SUSPECTED CASE OF SPINAL TUBERCULOSIS

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Introduction/ Review of Literature:

- There are multiple approach-based techniques for CT-guided biopsy of vertebral lesions. These techniques depend on multiple factors including the following: location of the lesion within the vertebrae; focal or diffuse lesion; location within the spinal column.

- Most commonly used transpedicular approach have few limitations as the transverse diameter of the thoracic pedicle is smaller than that of the lumbar pedicle, leaving less room for error when placing a large-caliber needle through the pedicle [1,2] ,difficult penetration of the bony cortex, the possibility of injury to the spinal canal structures, nerve roots and inability to reach the intervertebral disc [3].

- Modification of the costotransverse approach, costovertebral groove (located immediately above the level of the transverse process) approach in which, the needle is advanced in the groove between the vertebral pedicle(upper portion) and the head of the rib, entering the posterolateral edge of the vertebral body provides more room for needle angulation and allowing easy access to larger areas of the vertebral body, including the anterior half of the vertebral body on the ipsilateral side [4].

Aims/ Objectives:

- Provide a valuable alternative biopsy approach for obtaining biopsies in the thoracic region.

- Allowing for targeted sampling with minimal disruption to surrounding tissues.

- Overcome limitations of other techniques, for example [4]:

➢ Small size of the pedicle restricting the entry angle of the biopsy needle in transpedicular approach.
➢ Inability to access lesions involving the ipsilateral anterior portion of the vertebral body in costotransverse approach.
➢ Injury to the intercostal vessels or paraspinal veins in posterolateral intercostal approach.

Methodology:

The key principles for successful and safe CT-guided vertebral biopsy are denoted in form of 3 Ps [5] :

- **P**lanning of successful biopsy through shortest possible feasible route,
- **P**ositioning: CT-guided percutaneous vertebral biopsy for thoracic vertebrae are usually performed in a prone position
- **P**rotection of the vital vascular and neural structures in the trajectory of a biopsy needle.

- A 24 year old male patient presented to our institution with lower back pain since 2 months. Based on MRI findings and clinical history, spinal tuberculosis was suspected. CT guided percutaneous vertebral biopsy was performed with patient in prone position under local anesthesia using a 14G Jamshidi needle. Costovertebral groove approach was used to perform biopsy at T9-T10 level.

Results:

- Adequate sample was obtained with no post-biopsy complications.
- Culture and CBNAAT assay came positive for M. tuberculosis, not rifampicin resistant.
- This approach keeps the needle away from the pleura or lung laterally and exiting nerve roots and pedicle medially.

Representative images:

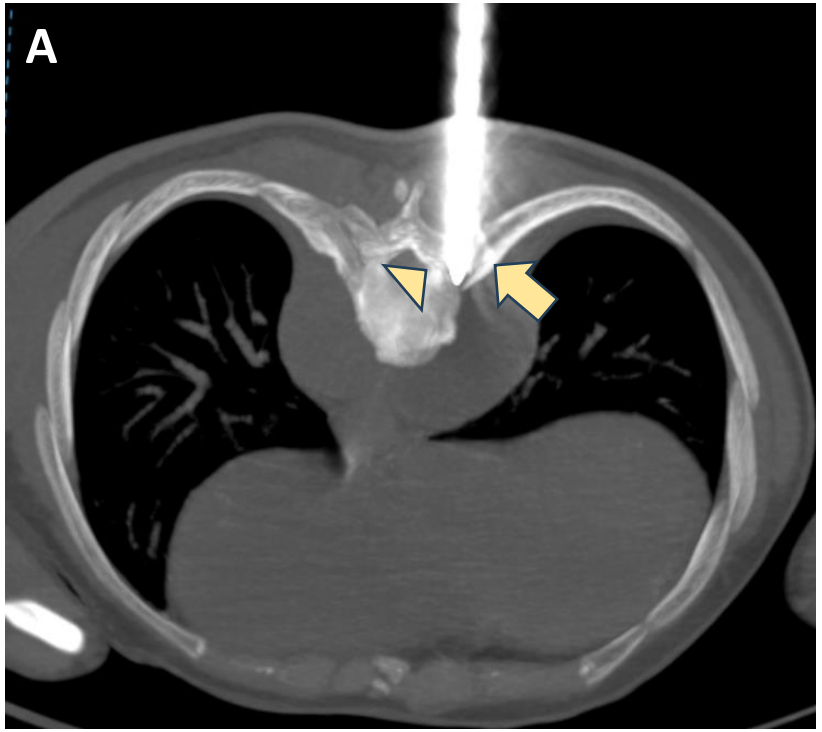

Image (A) Axial CT image demonstrates 14G Jamshidi needle in the groove between the vertebral pedicle (arrow head) and the head of the rib (arrow), entering the posterolateral edge of the vertebral body.

Image (B) Sagittal reformatted CT image demonstrates the needle trajectory just above the transverse process (asterisk) of T9 vertebra

Conclusion:

- Vertebral anatomy varies across different spinal levels, and understanding these anatomical differences, along with the advantages and limitations of each CT-guided approach is essential for guiding the operator to a safe and effective biopsy technique.

- Costovertebral approach can be used as an alternative in thoracic vertebral biopsy where lesion is in anterior or anterolateral part of vertebral body. Cranio-caudal angulation can also allow access to lesions in the middle or lower part of the vertebral body with low risk of injury.

References:

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