

Clinical Image

Incidental Finding of Lumbar Rib

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An incidental finding of “thirteenth” or “lumbar” rib was discovered upon radiological imaging. An oblique radiograph shows the costo-vertebral articulation (Figure 1., white arrow) between the first lumbar vertebra and the rib. Axial CT also demonstrates the articulation as well (Figure 2., white arrow). Three-dimensional volume rendered CT provides a clear view of the bony architecture of the spine (Figures 3 and 4). This congenital anomaly is typically asymptomatic and of little clinical significance; however, lumbar rib can create confusion during radiological interpretation and spine surgery. It is important for physicians to be aware of this common anomaly.

Supernumerary ribs are ectopic ribs present in the cervical or lumbar spine. Cervical ribs are more common than lumbar ribs and often evoke symptoms by compressing adjacent neurovasculature.(1, 2) Lumbar ribs are less common and almost always asymptomatic.(2) The reported prevalence of lumbar ribs ranges from 1-5.8%.(1, 3) Lumbar ribs can present bilaterally or unilaterally, usually on the first lumbar vertebra, although lower lumbar levels have been reported.(4,5)

Several factors have been implicated in the formation of lumbar ribs. Altered Hox gene expression and FDG1 mutation have been implicated as underlying genetic factors.(1, 5) Maternal stress and several teratogenic chemicals, including salicylic acid, valproic acid and bromoxynil, have been shown to possibly cause these genetic alterations. (1)

It is imperative for radiologists to recognize and actively communicate the findings of lumbar rib. However, recognizing this anomaly can be difficult. Lumbar rib is often mistaken for kissing osteophytes, abdominal blood vessel abnormalities and transverse process pathology.(2, 4, 5) Computed tomography (CT) is the preferred imaging modality for diagnosis because it demonstrates costovertebral joint spaces.(1) Lumbar radiography introduces the potential for miscounting the vertebra. It is common to identify the last rib-bearing-vertebrae and label it T12, a method that will fail to identify lumbar rib.(3) Alternatively, many begin counting vertebrae from the sacrum and progress cephalically. To account for supernumerary ribs, it is recommended to obtain a whole spine radiograph, label vertebra starting at C2 and progress caudally.(3)

There is a high association between lumbar rib and lumbarization of the S1 vertebra; in an analysis of 226 cadavers, Nakajima et al demonstrate 13 cases of lumbar ribs (5.8%), 11 of which occurred with lumbarization. Concomitant S1 lumbarization with lumbar rib further confounds the radiological diagnosis, giving the lumbar spine a nor-



Figure 1: Oblique radiograph demonstrating the thirteenth lumbar rib encircled by the white oval. The costovertebral articulation is visible as well, as demonstrated by the white arrow.

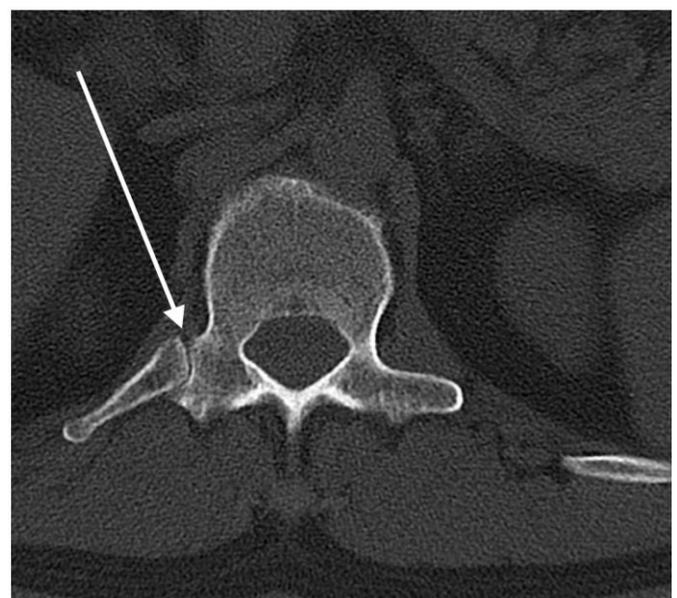


Figure 2: Axial CT demonstrating the costovertebral articulation, as pointed out by the white arrow.

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Figure 3: Oblique volume rendered 3-D CT image demonstrating the thirteenth rib, as denoted by the white oval.

mal appearance by shifting the vertebra down one level.(3)

Lumbar rib complicates interventions in the lumbar region, including spinal surgery, steroid injections, and renal procedures.(4, 6) Interventionalists commonly use the 12th rib as a guide for navigating the lumbar spine, a problematic practice with lumbar rib.(6) Although lumbar rib does not cause clinical manifestations, it may complicate treatment, leading to wrong level surgery or difficulty accessing the retroperitoneum.

Radiological recognition and communication of lumbar rib is essential for avoiding errors in treatment. Perhaps it should be recommended that the dictating radiologist specifies the vertebral counting method employed to avoid confusion.

Reference

1. Aly, I., Chapman, J. R., Oskouian, R. J., Loukas, M., & Tubbs, R. S. (2016). Lumbar ribs: a comprehensive review. *Child's Nervous System*, 32(5), 781-785. doi:10.1007/s00381-015-2904-2
2. Anap, D., Kachewar, S., Prabhakar, A., Diwate, A., & Ganvir, S. (2013). LUMBAR RIB: AN UNCOMMON CAUSATION OF A COMMON MANIFESTATION. *Roamanian Journal of Physical Therapy*, 19, 19-21.

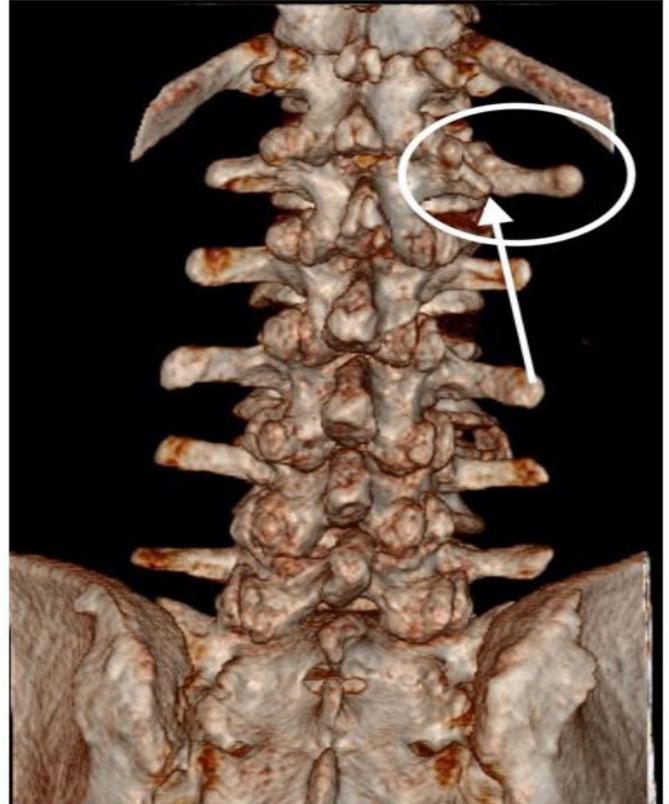


Figure 4: Posterior volume rendered 3-D CT image demonstrating the thirteenth rib, as denoted by the white oval. Note the distinct transverse process posterior to the thirteenth rib, as denoted by the white arrow.

3. Nakajima, A., Usui, A., Hosokai, Y., Kawasumi, Y., Abiko, K., Funayama, M., & Saito, H. (2014). The prevalence of morphological changes in the thoracolumbar spine on whole-spine computed tomographic images. *Insights into Imaging*, 5(1), 77-83. doi:10.1007/s13244-013-0286-0
4. Sujatha K, Dhamodaran K. A case report of bilateral lumbar ribs. *Stanley Med J* 2016;3:94-5.
5. Chengetanai, S., Nchabeleng, E. K., Bacci, N., Billings, B. K., & Mazengenya, P. (2017). Supernumerary lumbar ribs: a rare occurrence on an adult African male skeleton. *Anat Cell Biol*, 50(2), 155-158. doi:10.5115/acb.2017.50.2.155
6. Lee, J. H., Lee, K. J., Ki, M., Kim, M., Doo, A. R., & Son, J. S. (2019). The abnormality of the number of ribs misleading incorrect vertebral segment identification during lumbar intervention: Two cases report. *Anesth Pain Med*, 14(3), 331-334. doi:10.17085/apm.2019.14.3.331