



Evaluation of an unusual ossicle by multi-detector computed tomography: Oppenheimer's ossicle

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Variations and anomalies of the neural arch result from alterations in the ossification process. Absence of lumbar articular process is a rare anomaly which most commonly involves the inferior articular process of the L4 or L5 vertebrae. Non-union at the tip of the articular process is a more common variation, known as Oppenheimer's ossicle. In this case report, we present multi-detector computed tomography findings of Oppenheimer's ossicles in 2 separate cases.

Keywords: Inferior articular process; multi-detector computed tomography; Oppenheimer's ossicle.

Variations and anomalies of the neural arch result from alterations in the ossification process. Patients presenting with these conditions usually remain asymptomatic; however, a small number of these variations and anomalies may cause painful syndromes and/or fractures. Dislocations may be considered in differential diagnosis.^[1–3] Absence of lumbar articular process is a rare anomaly which most commonly involves the inferior articular process of L4 or L5 vertebrae.^[4,5] Non-union at the tip of the articular process is a more common variation,^[6] known as Oppenheimer's ossicle.^[7]

In this article, our aim was to evaluate radiological—especially multi-detector computed tomography (MDCT)—findings of this variation in order to make accurate diagnosis and direct patients to appropriate treatment. Herein, we present MDCT findings of Oppenheimer's ossicles in 2 separate cases.

Case report

Case 1– A 47-year-old male patient was admitted to the

orthopedic outpatient clinic with a complaint of lower back pain. After detailed physical examination, the patient was referred to the radiology department for radiological evaluations. First anterior-posterior and lateral direct roentgenograms were obtained. At the bilateral inferior articular process of the L2 vertebra, 2 8 mm ossicles were discovered. In light of these findings, the patient was evaluated with lumbar MDCT examination. In MDCT evaluation, 2 ossicles were discovered at the L2–3 intervertebral level and the bilateral inferior articular process of the L2 vertebra (Figure 1). Additionally, the ossicles had their own cortices.

Resultant of the radiological and clinical findings, the ossicles were diagnosed as bilateral Oppenheimer's ossicles. The patient was referred the orthopedic outpatient clinic for further evaluation and treatments.

At follow-up, the lower back pain did not decrease. Thus, the patient was operated on, and the ossicles at the L2 disc material and posterior elements of this level were excised. Following surgery, the patient had no fur-

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Fig. 1. (a) Axial, (b) sagittal, (c) coronal lumbar MDCT images. There are 2 millimetric ossicles compatible with bilateral failure of union of ossification centers for the inferior articular process of the L2 vertebra (arrows). These ossicles are compatible with bilateral Oppenheimer's ossicle.

ther complaint of pain.

Case 2– A 79-year-old male patient was admitted to emergency services with complaints of dyspnea and acute chest pain. After detailed physical examination and electrocardiogram (ECG), no acute myocardial infarct was found. Therefore, aortic dissection was considered, and the patient was referred to the radiology department for thoracoabdominal MDCT evaluation. The evaluation was performed with computed tomography (CT) angiography protocol. In thoracoabdominal MDCT evaluation, however, no aortic dissection was found. A small round ossicle was found at the left side of the L4 inferior articular process (Figure 2). The diameter of the ossicle was approximately 6 mm. The findings of the ossicle were similar with those of the 1st case, and it was diagnosed

as unilateral Oppenheimer's ossicle. The patient had no complaint or clinical finding of Oppenheimer's ossicle. Consequently, no additional treatment was performed.

Discussion

A vertical cleft through the superior articular process may occur.^[8] It can be associated with a hypoplastic pedicle or a dysplastic facet joint. Oppenheimer's ossicle, which may be mistaken for a facet fracture, originates from a horizontal cleft through the inferior articular process. Accessory ossicles at the superior joint facet may also occur.^[3] Articular processes may be hypoplastic or absent. Fused facet joints may be seen in segmental anomalies and various neural arch malformations.^[9] Absent facet joints may be associated with a conjoined



Fig. 2. (a) Axial, (b) sagittal, (c) coronal abdominal MDCT images. There is a millimetric ossicle compatible with left side unilateral Oppenheimer's ossicle at the inferior articular process of the L4 vertebra (arrows).

nerve root and cause lower back pain.^[10]

Non-union at the tip of the articular process is a more common variation which is seen in 1–7% of lumbar spines.^[6] However, most researchers implicate it as non-union of the secondary growth center, as the origin of this variation is unclear.^[7] In approximately 95% of cases, inferior articular processes are involved. Although it can be observed in multiple levels, single-level predominance is common. In 80% of cases, this variation is seen bilaterally.^[11,12] The L2 (45%), L3 (45%), L1, and L4 are the most common segments involved. L5 segment involvement is very rare. The variation is 6 times more prevalent in males than females.^[12]

Oppenheimer's ossicles range between 0–1 mm in size. They can be round, oval, or triangular, with smooth corticated margins at the site of separation.

The most significant clinical finding of these ossicles is lower back pain. This pain is caused by stenosis of the spinal canal. Notably, if the ossicles are bilateral, the diameter of the spinal canal narrows, and the ossicles compress the spinal cord. In the 1st case presented, the patient was admitted with the primary complaint of lumbalgia. Another finding of clinical significance is acute fracture. However, the ossicles may not yield findings such as in our 2nd case.

As mentioned above, patients with this type of ossicle may experience severe lower back pain. If the presence of this ossicle is excluded, accompanying pathologies such as lumbar disc hernia could be the primary problem, and basic treatment cannot be applied. Additionally, Oppenheimer's ossicles can be mistaken for fractures of the articular processes. Especially in posttraumatic back instances, these ossicles should be diagnosed correctly for appropriate treatment.^[13] As a result of this condition, patients suffer from chronic back pain and disability of considerable ergonomic significance. These patients can be treated by facet joint blockage. This treatment method may be performed for palliation of pain.^[14]

In both cases, Oppenheimer's ossicles were detected incidentally. Patients, especially those with lower back pain, should be evaluated carefully in respect to Oppenheimer's ossicle. Radiological evaluations can be of assistance in obtaining accurate diagnosis, as the ossicles can often be seen in anterior-posterior, oblique, and lateral radiographies. The separating cleft often communicates with the joint surface. MDCT may confirm these findings more accurately and is very useful for excluding fracture. Furthermore, spinal canal stenosis may be identified. MDCT scanners allow multiplanar reconstruction

of images, leading to increased diagnostic accuracy.^[15,16]

Conflicts of Interest: No conflicts declared.

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