

Case Report

Unilateral accessory scapular ossicle with Sprengel deformity in a trauma patient: A case report

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Abstract

Herein we present a rare anatomic variation of unilateral accessory scapular ossicle in a trauma patient and its rare association with a common scapular anomaly, Sprengel deformity. Foci that appear near the inferior angle of the scapula due to failure of bony fusion during bone maturation are called accessory scapular ossicles. Sprengel deformity is defined as the congenitally high position of the scapula. The recognition of the normal variants of scapula is important, since they could be confused with other pathologies, such as fracture and pulmonary nodule in a trauma patient. Therefore, radiologists should be familiar to these entities even rarely seen.

Keywords: Accessory Ossicle, Anatomic Variation, Fracture, Scapula, X-ray**Introduction**

The maturation of the skeleton of the shoulder, and therefore of the scapula, takes place sequentially from birth. The scapula is ossified from seven or more centers including one for the body, two for the coracoid process, two for the acromion, one for the vertebral border, and one for the inferior angle. While the body of the scapula is osseous at birth, the rest of the scapula contains the glenoid cavity, the coracoid process, the acromion, the vertebral border, and the inferior angle are still cartilaginous. Between the 15th and 18th months after birth, ossification occurs in the middle of the coracoid process and is joined about the 15th year. In the period of 14-20 years, ossification is completed in the remaining parts of the scapula: the root of the coracoid process, near the base of the acromion, in the inferior angle, and contiguous part of the vertebral border, near the outer end of the acromion, in the vertebral border, respectively¹⁻³.

After, the cartilaginous precursor apophyses and epiphyses form multiple secondary ossification centers

that fuse with the primary ossification centers, forming the mature form of the scapula. Rarely, separate foci in the form of ossicles are observed at the inferior angles of the scapula due to the failure of a bony union during this maturation.

Sprengel deformity, or congenital elevation of the scapula, is a common congenital abnormality of the shoulder. Abnormalities of the vertebrae and ribs are often accompanied by Sprengel deformities. However, to our knowledge, the co-occurrence of unilateral accessory scapular ossicle and Sprengel deformity has not been reported in the literature.

This case report aims to emphasize the importance of this rare anatomic variation of the scapula, unilateral accessory scapular ossicle, that can lead to confusion with ununited scapular fractures, especially in trauma patients, even on CT examination or misinterpreted as a pulmonary nodule on chest radiographs, and its rare association with Sprengel deformity.

Case Presentation

An 82-year-old female patient, with a history of trauma 20 days prior to the presentation was admitted to the emergency department of our university hospital with complaints of shortness of breath and back pain. Physical examination revealed slight elevation of the left shoulder and tenderness of the periscapular region. Auscultation of the lungs was normal. Due to the trauma protocol, the patient was referred to the radiology department for the initial imaging method, a posteroanterior chest X-ray. A round lesion with sclerotic and regular margins, suggesting

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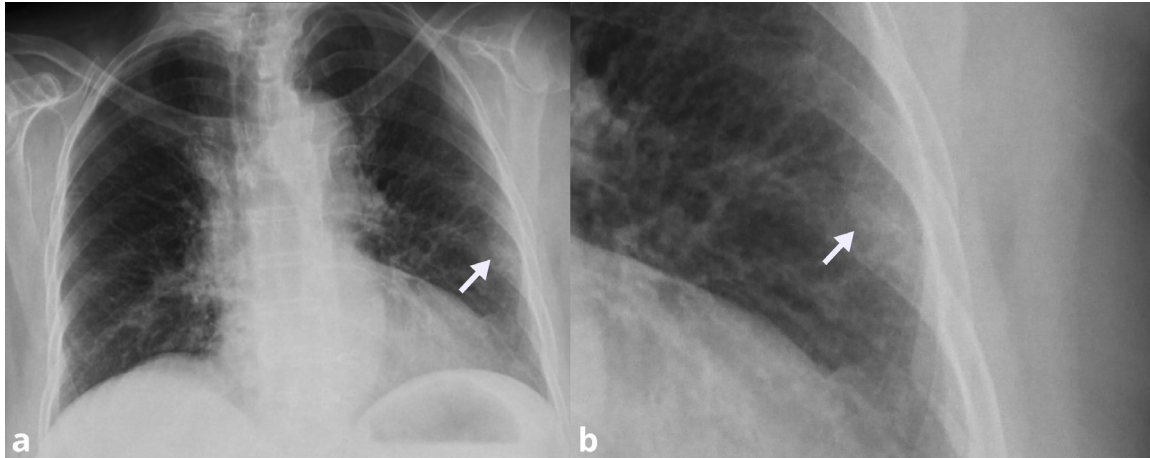


Figure 1. a. Chest X-ray shows nodular opacity under the left scapula (arrow). b. In the magnified image of the same radiograph, the ossicle, which can be confused with the pulmonary nodule, is observed more clearly.

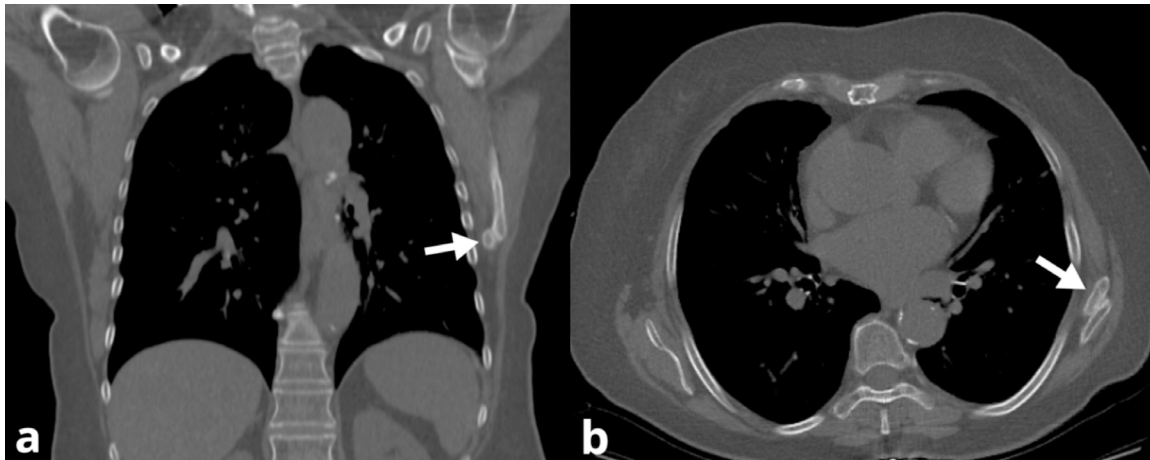


Figure 2. Coronal (a) and axial (b) CT images of the chest show a separate ossicle at the lower angle of the left scapula (arrow). Smooth and sclerotic contours distinguish it from fracture.

pulmonary nodule or a possible occult fracture in the lower zone of the left lung, adjacent to the lower pole of the scapula on chest X-ray (Figure 1). Differentiation of this suspected lesion was needed to confirm with chest CT. A round-shaped accessory ossicle with a 2 cm diameter, corticated and smooth contours, separately located was detected at the anterior part of the inferior angle of the left scapula in the bone window setting of chest CT (Figure 2). Additionally, mild elevation of the left shoulder was confirmed as a Grade 1 Sprengel deformity according to the Rigault classification. The association of these findings was also confirmed by 3D

volume rendering images (Figure 3). Follow-up evaluation is not recommended.

Discussion

The scapula begins to ossify in the eighth week of embryological life. The scapula is mainly formed by intramembranous ossification. The body of the scapula is initially precartilaginous, whereas the acromion and coracoid processes appear as areas of mesenchyme. In newborns, most of the scapula is ossified, however, the remaining parts are not.

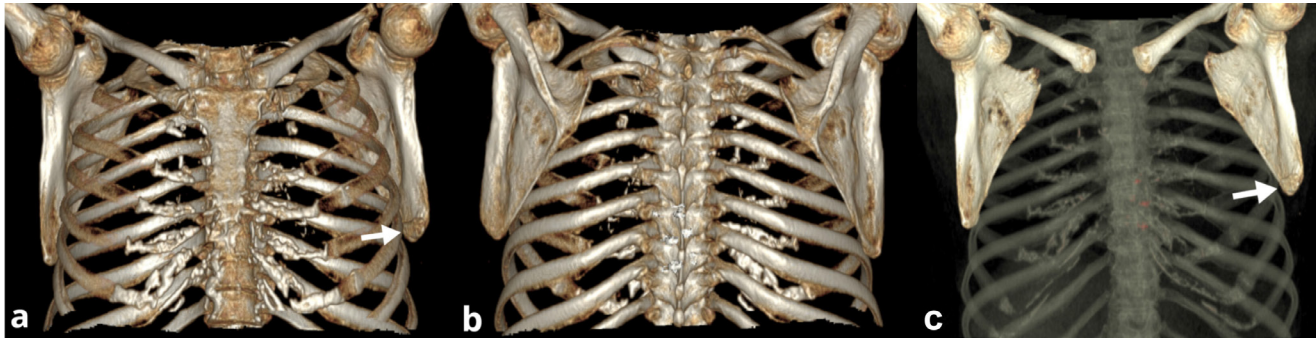


Figure 3. 3D reconstructions of thorax CT images. a. Anterior view showing elevated left scapula due to Sprengel deformity with inferior angle ossicle (arrow). b. Posterior view showing elevated left scapula. c. In the anterior view with the transparent ribs, elevation in the left scapula and the accessory scapular ossicle (arrow) is clearly observed.

In adults, the scapula is formed by the fusion of these multiple ossification centers. In the lower angle, secondary ossification begins at approximately 15 years of age⁴. Failure of one of these ossification centers to fuse seems that the cause of the accessory scapular ossicle. Normal variational ossicles of the scapula can often be seen, however, to the best of our knowledge only 2 cases have been reported as inferior angle ossicles^{5,6} and there is no information on their prevalence. In these rare 2 cases, ossicles were reported bilaterally, it was emphasized that it was a source of pain in one of the cases, and the other case was detected incidentally^{5,6}. Unilateral localization of accessory scapular ossicle and concomitant Sprengel deformity is the difference in this case.

The most important pitfall of the anatomical variations of the scapula is that they can be confused with a fracture in a trauma patient, as in this case. Since there is a tendency to be cautious and overtreatment due to increasing forensic cases, radiologists should gain a greater appreciation of how to distinguish between unfused fractures and normal variants. The localization of the discrete bony lines and their smooth regular contours or slightly jagged nature can help distinguish this normal variation.

Another pitfall of the ossicles is that accessory scapular ossicles can mimic the pulmonary nodules⁷. A round opacity located separately from the scapula and superposed with the lung parenchyma on the chest radiography may lead to misinterpretation as a solitary pulmonary nodule. Chest radiographs can sometimes be perplexing in the determination of anatomical variations since typically located bilateral accessory ossicles can be identified more easily, while unilaterally located variations, as in this case, cannot. Lateral radiography or CT should be performed for confirmation.

The Sprengel deformity is defined as the high appearance of the scapula as a result of the failure of the scapular descent during the fetal period. This common congenital deformity has various morphological implications and deteriorates the function of the glenohumeral joint. Radiographic Rigault

classification is used for grading three different scapular positions. Grade I is defined as a superomedial angle lower than T2 but above T4 transverse process, grade II as a superomedial angle located between C5 and T2 transverse process, and grade III as a superomedial angle above C5 transverse process⁸. In this case, Grade I Sprengel deformity, the mildest form, was observed. However, in the case of concomitant shape and rotation anomaly, the elevation of the scapula may be overestimated. Although measuring the height of the glenoid may cause similar errors, it is accepted as the most accurate evaluation method. CT with 3D reconstruction can be used to evaluate scapular dysplasia and malposition, and for preoperative planning, if performed. The Sprengel deformity is often (50% to 100%) seen together with other deformities⁹. However, its association with inferior scapular ossicles has not been reported yet.

Conclusion

In conclusion, anatomical variations of the scapula should be aware since inferior angle ossicles can be mistaken for ununited fracture fragments or pulmonary nodules. In this case co-occurrence of unilateral inferior angle ossicle and Sprengel deformity is defined, but its prevalence and clinical importance should be confirmed by other studies. Radiologists should familiarize themselves not only with pathologies but also with these anatomical variants, to avoid overdiagnosis or misdiagnosis.

Ethics approval

All procedures performed in studies involving the human participant were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Consent to publish

Written informed consent was obtained from the patient for publication.

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