



## Sacral rib : A rare congenital anomaly

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A 45-year-old patient reported for a follow-up visit after a motor vehicle accident with a history of vague right flank pain. He underwent a pelvic radiograph which revealed a long bony protuberance arising from the right sacral region ; the appearance was consistent with a sacral rib. However due to the limited nature of his complaints the patient denied any surgical treatment.

**Keywords :** sacral rib ; congenital.

### INTRODUCTION

Sacral rib is a rare congenital anomaly consisting of a bony formation that arises in soft tissue around the sacrum ; radiologically it resembles a rib or a phalanx (2). It is often an incidental finding and, in absence of symptoms, no specific treatment is required. It is important to identify this asymptomatic variant on radiography to avoid unnecessary additional investigations.

### CASE REPORT

A 45-year-old patient reported for a follow-up visit after a motor vehicle accident with a history of vague right flank pain. His clinical examination was unremarkable except for deep tenderness in the right flank. A radiograph of the pelvis was made (fig 1) which showed a large bony protuberance arising from the right sacral region. This appearance was consistent with a sacral rib, which is a rare normal variant, and is usually asymptomatic.

Surgical intervention was offered to the patient. However, due to the limited nature of his complaints, he did not opt for intervention. For this reason, a histopathologic examination could not be performed.

### DISCUSSION

In the spinal column, many anomalies related to formation or segmentation defects have been reported (11,13). Bony anomalies that have a cortex and develop in the soft tissues around the vertebral column are very rare, and radiologically they look like ribs or digits (9). When seen within the pelvis or abdomen these anomalies are known as pelvic/sacral ribs or pelvic digits (2,3,14).

Sacral rib is a rare congenital anomaly in which bone develops in soft tissue adjacent to normal skeletal bone (2). On plain radiograph it typically appears as a rib- or a phalanx-like bone with a clear

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**Fig. 1.** — Anteroposterior radiograph of the pelvis showing a finger-like bony protuberance arising from the lower part of the sacrum on the right side.

cortex and medulla connected to the pelvis, often with a characteristic pseudoarticulation at the base (9).

The development of costal elements in humans takes place from a common primordial mass, with ribs progressing to full development in the thoracic region, whereas in the cervical, lumbar and sacral regions they fuse with the lateral masses or transverse processes during the fourth to twelfth week of development. Any defect in fusion may cause the rib to keep growing and form a supernumerary rib (8,14). McGlone *et al* postulated that in the pelvis the costal processes become incorporated into the sides of the sacrum and coccyx (9) and more laterally and anteriorly, the costal process mesenchyma normally degenerates and is lost – a process known as apoptosis (9). Failure of apoptosis may allow differentiation of costal process mesenchyma to form rib tissue (9). Clinically, cervical supernumerary ribs may cause neurovascular symptoms or thoracic outlet compression syndrome whereas pelvic ribs are usually asymptomatic and, in most cases, are found incidentally during examinations for other problems (8,12). In those rare cases in which sacral ribs cause symptoms, there is typically discomfort

and diminished mobility during movement of the ipsilateral hip, and they can possibly cause compromise of the birth canal in females (4). Standard radiographs and computed tomography provide the best diagnostic information.

The differential diagnosis includes myositis ossificans, avulsion injuries, heterotopic bone formation, Fong's disease, and osteochondroma. Pelvic rib can usually be radiologically differentiated from posttraumatic myositis ossificans and from heterotopic bone formation by its well corticated appearance and the absence of a history of trauma (3,5). CT of pelvic rib confirms the presence of cortical bone (7) and is useful in equivocal cases (10). Myositis ossificans is characterized by a radiolucent core with a calcified periphery, which is clearly separated from adjacent bones (7). Avulsion injuries of the pelvis commonly occur during athletic activity, with peak incidence in adolescents and teenagers (1). Pain, diminished motion, and soft tissue haematoma correlate with a bony fragment (1). In some cases, new bone formation after surgery or ossification of the sacrotuberous ligament can resemble a pelvic rib (2). Fong's disease is characterized by bilateral iliac horns arising posteriorly and centrally from the ilia (7). Osteochondroma is continuous with underlying bone (2) and a cartilaginous cap may be present (10). Pelvic rib is usually an asymptomatic, benign condition and is discovered incidentally (9). In the absence of symptoms, surgical excision is not required (5). Pelvic ribs are suggested as a rare cause of foetopelvic disproportion, and a case of scoliosis and hypoplasia of the ipsilateral gluteal musculature arising from a pelvic rib was previously described (6,8).

In conclusion, it is important to recognize and distinguish the pelvic rib from posttraumatic ossification and avulsion injuries and thus avoid unnecessary additional investigations. The radiographic entity of pelvic/sacral rib should be known by every radiologist as an incidental finding for which no further action is required.

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