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Case Report

Sacral rib: an uncommon congenital anomaly

Naohisa Miyakoshi, MD, PhD[a,*], Akira Kobayashi, MD, PhD[b], Michio Hongo, MD, PhD[a], Yoichi Shimada, MD, PhD[a]

[a]*Department of Orthopedic Surgery, Akita University Graduate School of Medicine, 1-1-1 Hondo, Akita 010-8543, Japan*
[b]*Honobono-en Long-Term Care Health Facility, 92-1 Kaidoshita, Showa-Okubo, Katagami 018-1401, Japan*

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Abstract

BACKGROUND CONTEXT: Sacral rib represents an uncommon pathology in which rib-like structures arise from the sacrum. Supernumerary ribs may occur at any level of the spine, but supernumerary ribs in the sacrococcygeal area are extremely rare.
PURPOSE: To present the case of a patient with sacral rib and to discuss this entity with reference to the literature.
STUDY DESIGN: A case report and literature review.
METHODS: A 17-year-old girl presented with low back pain and discomfort in bilateral gluteal regions. Radiographs and computed tomography (CT) of the pelvis showed a smooth-surfaced, rod-like bony structure attaching to the sacrum on the left side. The appearance was consistent with sacral rib. The sacrum was hypoplastic and deviated to the right. Magnetic resonance imaging (MRI) showed insertion of the gluteus maximus (GM) onto the coccyx only on the right side. The sacral rib existed beneath the left GM muscle and received a partial insertion from the left GM muscle. No ligamentous continuation between the sacral rib and coccyx was observed.
RESULTS: Conservative treatment relieved symptoms, so no surgical intervention was performed.
CONCLUSIONS: Sacral rib is a rare congenital anomaly for which surgical intervention is usually unnecessary. However, appropriate workups with CT and/or MRI should be considered for women, because sacral rib may cause complications during childbirth. In the literature, sacral/coccygeal rib is sometimes called "pelvic rib." However, sacral/coccygeal rib should be distinguished from pelvic rib, because pelvic rib originating from the ilium is considered to represent a different entity.

Keywords: Congenital anomaly; Pelvic rib; Sacral rib; Supernumerary rib

Introduction

Supernumerary ribs may occur at any level of the spine, but are most commonly observed in the cervical and lumbar areas [1]. Among them, cervical rib is clinically important because of the potential clinical manifestations, including thoracic outlet syndrome.

Supernumerary ribs in the sacrococcygeal area are extremely rare. To the best of our knowledge, only nine cases of sacral rib and two cases of coccygeal rib have been described in a total of nine reports in the English literature [1–9]. We present here an additional case of sacral rib and discuss this rare entity with reference to the literature. The present report shows for the first time in the English literature three-dimensional (3D) computed tomography (CT) of a sacral rib. Magnetic resonance imaging (MRI) also demonstrated the anatomical location of the sacral rib in the present case.

Case report

A 17-year-old girl with a history of brace therapy for adolescent idiopathic scoliosis presented with a 3-month history of low back pain and discomfort in bilateral gluteal regions. She did not recall any specific trauma. She noticed that symptoms exacerbated with long periods of sitting. Neurological examination showed no abnormalities with regard to deep tendon reflexes, both motor and sensory.

FDA device/drug status: Not applicable.

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* Corresponding author. Department of Orthopedic Surgery, Akita University Graduate School of Medicine, 1-1-1 Hondo, Akita 010-8543, Japan. Tel.: (81) 18-884-6148; fax: (81) 18-836-2617.

E-mail address: miyakosh@doc.med.akita-u.ac.jp (N. Miyakoshi)

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Fig. 1. Anteroposterior radiograph of the pelvis showing a smooth, rod-like bony structure attached to the middle of the sacrum on the left side.

Ranges of motion for the spine and hip were normal and no pain was induced with motion. Routine radiographs of the spine revealed a right thoracic curve of 11° from T5 to L1 and a left lumbar curve from L1 to L5 measuring 6°. A radiograph of the pelvis revealed a smooth, rod-like bony structure attached to the middle of the sacrum on the left side (Fig. 1).

Confirmation of an additional bone on the left side of the sacrum was seen on 3D-CT of the pelvis (Fig. 2). This bony structure, creating a small joint with the sacrum, arose from the level of the 4th sacral vertebra and extended obliquely toward the left ischial spine, measuring approximately 55×25×15 mm in its largest dimensions. Given the results of 3D-CT, the bony structure was diagnosed as a sacral rib. In addition, 3D-CT revealed that the inferior half of the sacrum was hypoplastic and deviated laterally to the right side. MRI showed that the sacral rib existed beneath the left gluteus maximus (GM) muscle, showing a normal cortical lining and homogeneous signal intensity identical to the bone marrow of adjacent bones. Axial MRI at coccyx level showed insertion of the GM onto the coccyx only on the right side (Fig. 3). On the left side, the coccyx received no insertion from the GM, but the left side of the sacral rib received an insertion from part of the left GM. No ligamentous continuation was observed between the coccyx and sacral rib.

Because symptoms for this patient subsided with administration of a nonsteroidal anti-inflammatory drug, no surgical intervention was performed. At follow-up 2 years later, she remained symptom-free.

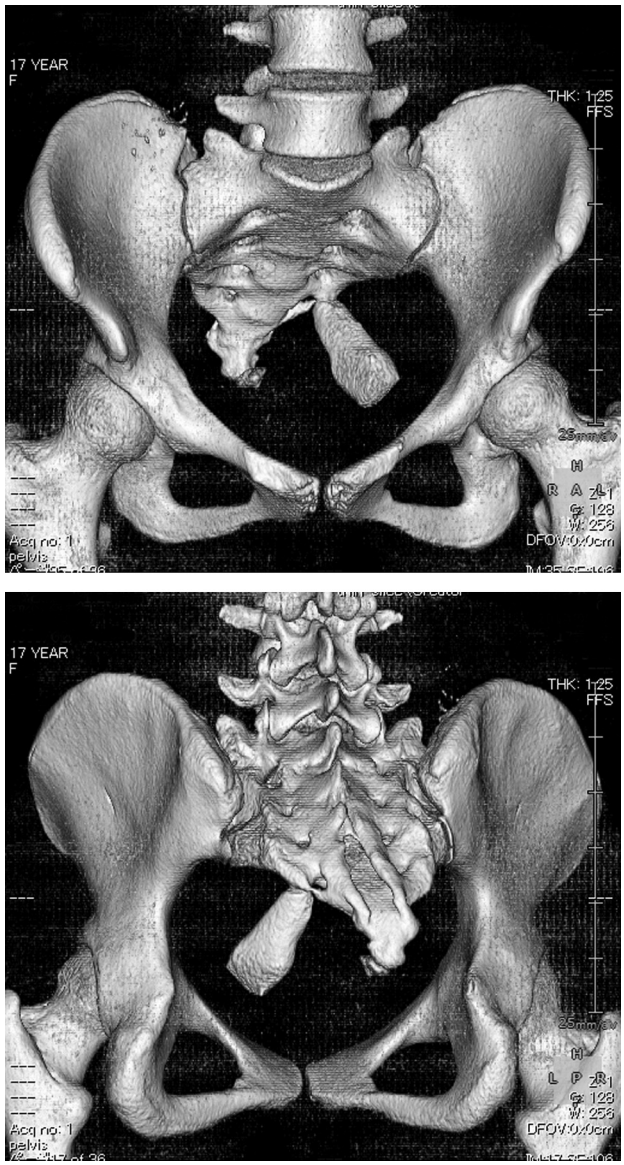

Fig. 2. Three-dimensional computed tomography of the pelvis. The sacral rib is attached to the sacrum on the left side with a small articulation, and the inferior half of the sacrum is hypoplastic and deviated to the right side. (Top) Anterior view; (Bottom) posterior view.

Discussion

In human and mammals, the ribs and vertebrae develop from a common primordial mass that passes through successive stages of membranous, chondrogenous, and osteogenous development [1,3,5]. During the earliest membranous stage, mesenchymal cells migrate toward the notochord to form the vertebral column anlage [1]. Chondrifications in parts of these blastemal masses are destined to become costal processes, neural arches, and ribs, but in all except the thoracic vertebrae, these structures ordinarily become fused with their respective vertebral centers by the seventh fetal week [1,5,8]. Any defect in fusion may cause the rib to keep growing and form a supernumerary rib [3]. Sacral ribs develop as a consequence of failure of the rib primordium to fuse with the vertebral centers of the sacrum [1,2,7].

Two-thirds of reported cases (8 of 12) with sacral/coccygeal ribs, including the present case, involved females, and