Chondrosarcoma is very rare in children. We present a case of a 3-year-old boy with a pelvic chondrosarcoma incidentally discovered on a plain abdominal radiograph. Pelvic computed tomography (CT) and magnetic resonance imaging (MRI) showed a lobulated bone tumor with chondroid components in the left iliac bone. The child underwent wide excision of the tumor. Pathology examination confirmed a final diagnosis of low-grade conventional chondrosarcoma. When a large mineralized tumor with a chondroid component involves the pelvic bone, chondrosarcoma should be considered in the differential diagnosis even in a child, despite the low incidence of the tumor in young children. To our knowledge, this is the first case report of CT and MRI evidence of a low-grade iliac chondrosarcoma in a patient under the age of 5 years.

CASE REPORT

A previously healthy 3-year-old boy presented to the hospital with vomiting and loose stool for 3 days. The past history and physical examination were noncontributory. A plain abdominal radiograph, ordered for evaluation of apparent gastroenteritis, incidentally showed a large tumor with a mixed osteolytic and osteosclerotic appearance involving the left iliac wing (Fig. 1). Pelvic computed tomography (CT) showed a mildly enhanced, expansile soft tissue mass about 3.0 X 3.2 X 4.7cm in size with endosteal scalloping of the cortex in the left iliac bone (Fig. 2). Pelvic magnetic resonance imaging (MRI) showed a left iliac tumor showing the similar signal intensities as the cartilages of bilateral hips joints and right iliac crest apophysis in all sequences which represented chondroid origin tumor (Fig. 3a-3d).

The patient underwent wide excision of the tumor with a limb-sparing procedure. The pathology report was grade one conventional chondrosarcoma (Fig. 4a, 4b). There was no evidence of local recurrence on MRI one year after surgery, and the boy continued to do well when last seen more than 2 years after the operation.
DISCUSSION

The striking feature of this case is the young age of the patient. While the disease may be asymptomatic, it may also present with a palpable mass, pain, discomfort secondary to a mass effect, or a pathologic fracture [1, 4]. Conventional chondrosarcomas are usually large, generally greater than 4 cm in diameter [1]. Because the prognosis is better with lower-grade lesions, it is fortunate that our patient’s chondrosarcoma was found incidentally at an early stage.

These cartilage producing tumors are typically lobular, usually result in endosteal scalloping, and they sometimes erupt through the cortex and invade the soft tissue [4]. On plain films, conventional chondrosarcomas characteristically appears as a large expansile lesion in the long bones or pelvis with both osteosclerotic and osteolytic features, which is caused by chondroid matrix mineralization and bone destruction. CT scans may show lower attenuation of the nonmineralized component and chondroid mineralization. In our case, the plain radiograph showed the classic appearance of a large lobulated mass in the pelvis, and the CT scan demonstrated the characteristic endosteal scalloping of the cortex. MRI, however, is the best tool for assessing the intraosseous and soft-tissue extent of the tumor. The lesions usually have intermediate signal intensity on T1-weighted imaging and high signal intensity on T2-weighted imaging. It is difficult to categorize the pathology type or grade radiologically. As seen in our case, low-grade conventional chondrosarcomas typically have widespread calcification which presents as low signal intensity on both T1-weighted and T2-weighted MR imaging. High grade lesions have less calcification and may extend into the soft tissue [1, 5].

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![Figure 1. Plain abdominal radiograph showing a large lobulated mass in the left iliac wing with mixed osteolytic and osteosclerotic features.](image1)

![Figure 2. a. Contrast-enhanced abdominal CT showing a mildly-enhanced lobulated tumor with irregular bony erosion. b. In the bone window setting, endosteal scalloping of the cortex and faint intraosseous matrix mineralization are visible.](image2)
Low-Grade condrosarcoma in a 3-year-old boy

Figure 3. a. Coronal T1-weighted MR image 550/14 (TR/TE) showing the left pelvic mass has the same iso-signal intensity as the tri-radiate hyaline cartilages of bilateral hips. b. Axial T2-weighted MR image 3000/83 shows moderate high-signal intensity of the left pelvic mass. Areas of low-signal intensity of the tumor indicate calcifications. c. Coronal proton-density MR image 3716/26 shows massive cartilage component of the tumor without definite invasion to the adjacent structures. d. Axial gadolinium-enhanced T1-weighted MR image 550/14 with fat saturation demonstrates peripheral enhancement of the tumor.

Figure 4. a. Low-power photomicrograph (original magnification, X40; hematoxylin-eosin stain) shows bulky growth of the cartilage composed tumor with bone destruction and marrow infiltration. b. High-power photomicrograph (original magnification, X200; hematoxylin-eosin stain) demonstrates grade 1 conventional chondrosarcoma with enlarged nuclei with binucleate cells.
case included other cartilage-containing tumors such as chondroblastoma and enchondroma. Chondroblastoma is a rare benign bone tumor of cartilaginous origin, usually found in young patients, in which the tumor is typically small and arises in extra-axial bones [6]. Enchondroma is a common benign tumor which has been reported in the pelvic bones. Endosteal scalloping of enchondromas is usually less prominent than that seen in chondrosarcomas [1].

Chondrosarcomas are graded histologically from grade one, the slowest growing type, through grade four, with prognosis worsening as the grade increases [4, 7]. High-grade sarcomas are more likely to occur in older patients, with low-grade tumors more often seen in younger patients [8]. Gadwal et al. reported excellent long-term prognosis for pediatric patients with chondrosarcoma in the head and neck [9].

Complete surgical resection offers the chance of cure. Limb-sparing procedures are preferred in patients with low-grade chondrosarcoma in the pelvis or scapula. If wide excision is expected to result in morbidity, intralesional curettage, followed by phenolization or cryosurgery, and finally filling the cavity with bone graft can be considered. Radiotherapy is appropriate adjuvant therapy if resection is incomplete; it may be used for curative or palliative purpose. Based on current evidence, chemotherapy has no role in treatment of chondrosarcoma [7].

Given that our patient’s tumor was low-grade histologically and was completely resected, he appears to have a very good prognosis. This case is a reminder that children can have chondrosarcomas, even though this tumor is much more commonly encountered in adults. The imaging characteristics appear to be similar, however, regardless of the patient’s age. The diagnosis should certainly be considered in a pediatric patient who has a bone tumor with chondroid component.◆

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軟骨肉瘤在兒童的發生率非常低。我們提出一位3歲男童，在腸胃炎住院期間，腹部素片意外發現左側腸骨軟骨肉瘤的案例。骨盆腔電腦斷層攝影及磁振造影顯示在左側腸骨有一個含有軟骨成分的多葉狀腫瘤。病患接受了腫瘤廣泛切除，病理組織檢查的最終診斷為低度傳統軟骨肉瘤。即使一個兒童者，在腸骨出現一個大型的礦化腫瘤，並有軟骨成分時，軟骨肉瘤應列入鑑別診斷中。據我們所知，這是第一個包含電腦斷層攝影及磁振造影像，討論五歲以下病患低度軟骨肉瘤的病例報告。