

Dual Fluid Levels in an Aneurysmal Bone Cyst: Sonographic Features

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Although ultrasound has not been used to clarify bone lesions because of their high acoustic impedance and attenuation coefficient, an aneurysmal bone cyst of the pelvis was imaged with ultrasound. Dual fluid levels and multiple loculations were discovered by ultrasound imaging through thin cortical bone. Ultrasonography is a simple, non-invasive method which can be utilized to detect bony lesions of an expansile nature and reveal characteristic findings in an aneurysmal bone cyst.

Key Words: Aneurysmal bone cyst, bone tumor, ultrasonography, angiography

Although an aneurysmal bone cyst of the ilium is not common, occasionally one is encountered.

On conventional radiograph the aneurysmal bone cyst described herein presented a well defined, large area of osteolytic destruction with partial sclerotic margin in the right ilium. The CT findings revealed a ballooning mass with dual-fluid levels that were thought to be layers of blood.

This report describes the ultrasonographic findings of the aneurysmal bone cyst, which were horizontal linear echos within multi-loculated cystic lesions, and which to our knowledge have not been reported in the literature.

CASE REPORT

A 17-year-old Oriental female presented to her physician with pain in the right buttock of 5 months' duration. Physical examination revealed a nontender mass in the right lower abdominal quadrant. A limitation of motion of the right hip was found, especially on flexion of the right hip. Routine radiographs demonstrated a large, expansile osteolytic lesion in the right ilium with equivocal cortical disruption on

the infero-lateral aspect of the ilium (Fig. 1).

Real-time ultrasonography was performed with a 3.5 MHz focused linear array transducer (Toshiba SAL 30A). When the patient was in the supine position, multiple, horizontal echo-reflected lines were seen within the mass, and they were noted again with the repositioning of the patient (Fig. 2).

In addition, CT with contrast infusion revealed dual fluid levels within the soft tissue mass arising from the right ilium. The upper most, apparently 'floating' areas were measured at 27-35 H.U. (Hounsfield Unit), and the dependent measured 53-84 H.U. (Fig. 3). Preoperative embolotherapy was performed through the superselection of the right superior gluteal artery and the introduction of gel-foam (Fig. 4), which resulted in the use of only 4 pints of blood during surgery. The mass was excised and multiple small cancellous allografts were performed. The mass contained dark red unclotted blood and loculated cystic spaces, and the histopathological appearance was compatible with a benign aneurysmal bone cyst.

DISCUSSION

Aneurysmal bone cyst is a benign bone lesion, and its plain radiographic features have been well described (Dahlin *et al.* 1982; Capanna *et al.* 1985).

Recently, characteristic dual fluid levels on CT scan have been reported in aneurysmal bone cyst, telangiectatic osteosarcoma and giant cell tumor. The large fluid-filled spaces of these tumors contain fluids of variable composition (Hudson *et al.* 1984; Resnik

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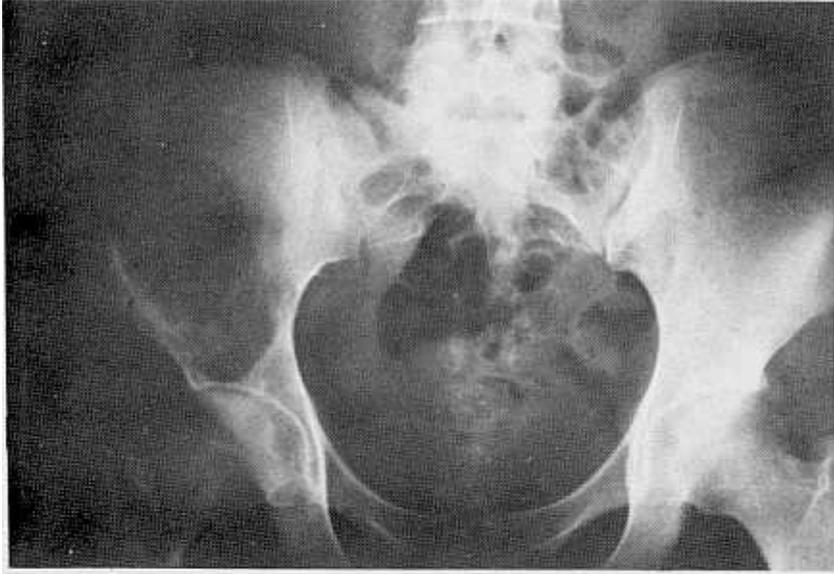
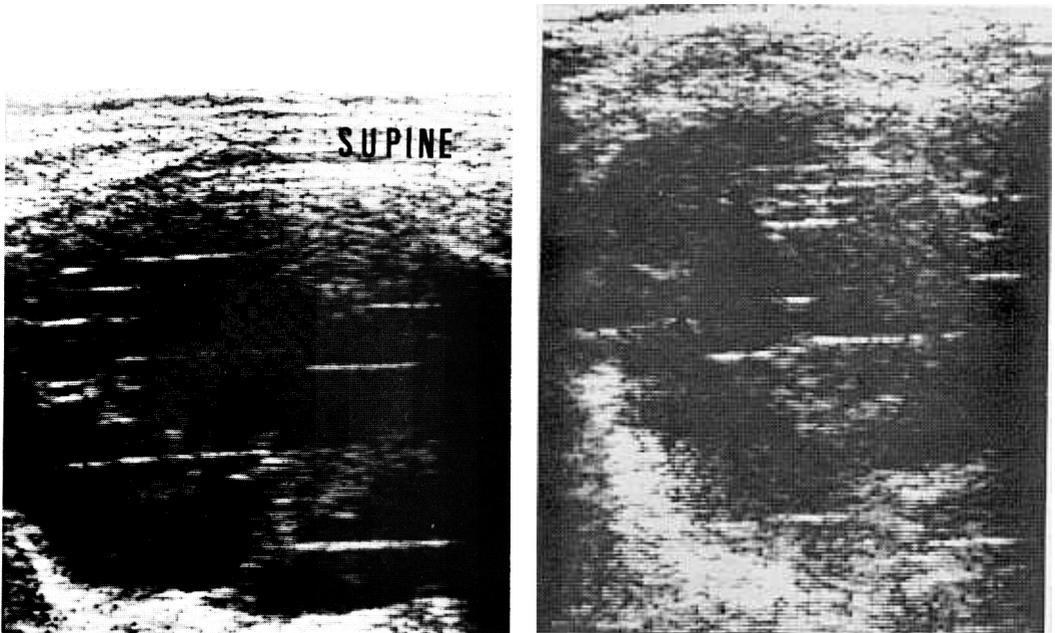


Fig. 1. A pelvic radiograph shows a large, expansile osteolytic lesion in the right ilium. The endosteal margin is partially sclerotic.



*Fig. 2. a) Ultrasonogram in the spine position. Multiple dual fluid levels (arrows) are noted in the mass.
b) In the decubitus position, multiple horizontal lines parallel to the table are seen again.*

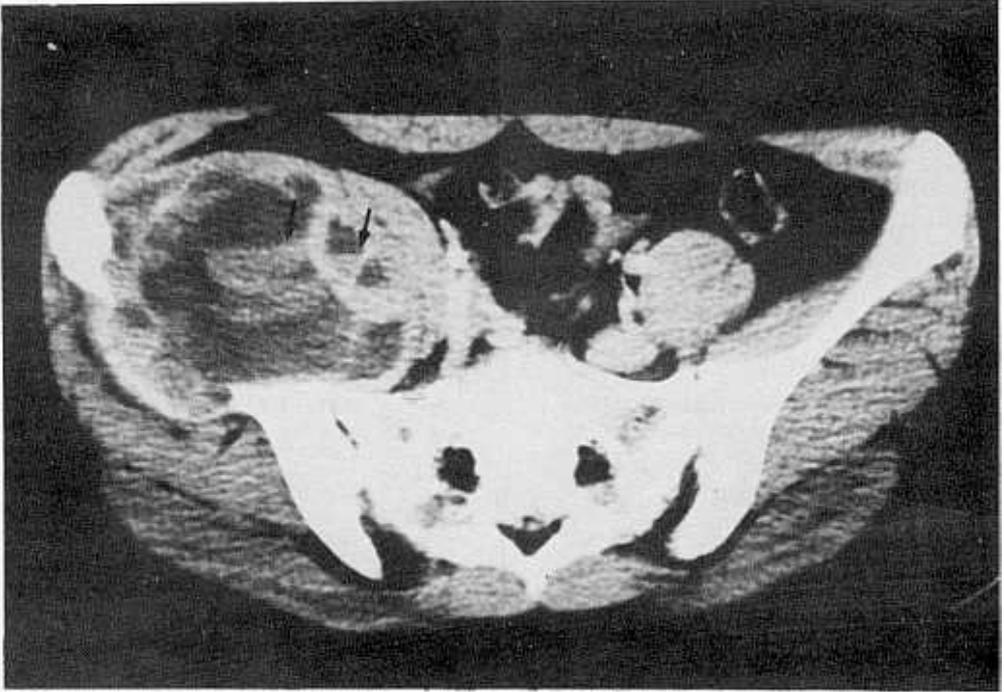


Fig. 3 CT scan reveals multiple fluid levels (arrows) in the mass. Expansile pelvic lesion with no bone shell visible anteriorly.

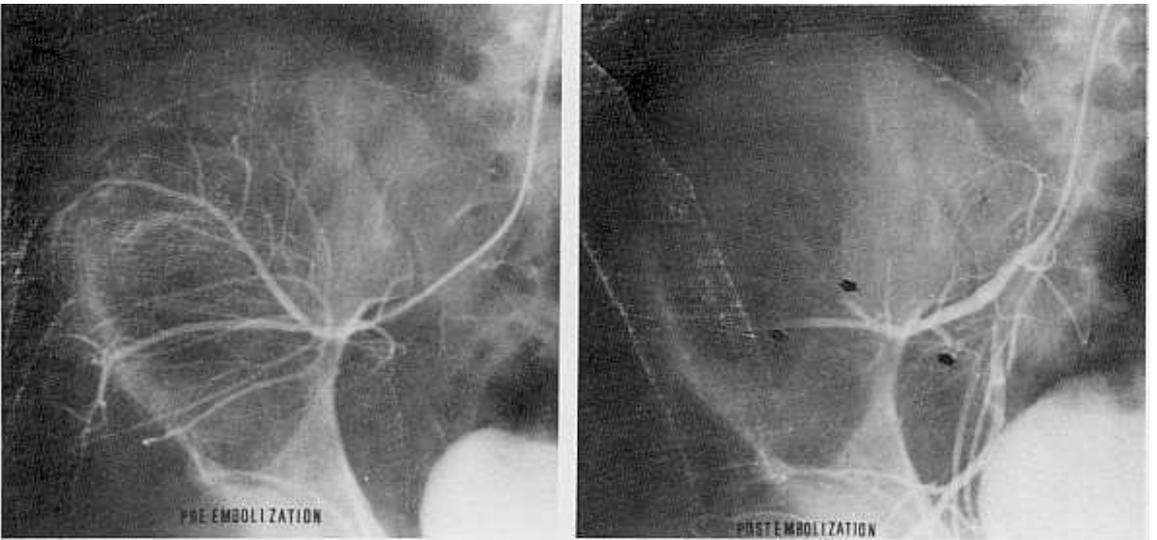


Fig. 4. a) Right superior gluteal arteriogram. Tumor stain is minimal and stretching of muscular branches.
b) After selective embolization of the right superior gluteal artery with Gelfoam, complete obstruction was achieved.

et al. 1986; Hertzanu *et al.* 1984). Hudson suggested that it was useful to hold a patient motionless for at least 10 minutes and to make the image at narrow window in order to lay out the fluid components. The CT scan of our patient also showed multiple fluid levels within the mass, however we did not perform CT on the state of reposition of the patient.

Fluid levels have been also demonstrated in aneurysmal bone cyst with magnetic resonance imaging (Hudson *et al.* 1985; Beltran *et al.* 1986).

It has been reported that an aneurysmal bone cyst could be examined through a thin cortex by modern ultrasound equipment (Nakuno *et al.* 1986). Until now there have been no reports describing the ultrasound features of the dual fluid levels of an aneurysmal bone cyst. The ultrasonogram demonstrated multiple horizontal lines parallel to the table, which could be due to differences in acoustic impedance. As compared with CT, more numerous and apparent horizontal lines were easily detected in the supine position, even when the patient's position was changed to the right anterior oblique position. We suggest that the multiple horizontal lines within the mass are consistent with the findings of the dual fluid levels in the CT and MR images, and their presence could lead to the diagnosis of an aneurysmal bone cyst by

ultrasonogram.

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