Sonographic Appearances in Cysticercosis

S. Boopathy Vijayaraghavan, MD, DMRD

Objective. To describe the sonographic appearances of cysticercosis. Methods. Sonography was performed with both convex and linear array transducers in 4 patients with different symptoms. Results. In 2 patients, an intramuscular fluid collection was seen with a cysticercus cyst in it. In 1 patient, an irregular cyst with a small fluid collection on 1 side was seen. In the last patient, multiple elliptical millet seed–shaped calcifications were seen in the liver, mesentery, and retroperitoneal fat. Conclusions. Four different sonographic appearances of soft tissue cysticercosis are described. Key words: cysticercosis; intramuscular; liver; mesentery; retroperitoneum; sonography.

Cysticercosis is an infection with the larval (cysticercus) stage of *Taenia solium*. It is seen as cysts in various human tissues, more commonly in the brain and the orbit. Here the sonographic features of 3 cases of isolated cysticercus cysts in muscles and 1 case of disseminated cysticercosis are reported.

Case Descriptions

Case 1

A 9-year-old girl was referred for sonography because of swelling in her right arm of insidious onset. She did not give a history of fever or pain. On examination, swelling of the anterior aspect of the distal third of the right arm was evident. It was not tender, and there were no signs of inflammation. There was limitation of extension movement of the elbow. Sonography was performed with an HDI 5000 system (Philips Medical Systems, Bothell, WA) using a 5- to 12-MHz linear probe. A large irregular collection of fluid with internal echoes was seen in the right brachialis muscle. The appearance suggested an intramuscular abscess. However, there was a well-defined round cyst of 9 × 6 mm in the upper part of the collection, with a brightly echogenic protrusion from the wall (Figure 1). At surgical exploration, dark-colored fluid exuded from the cavity in the muscle, and a grape-like cyst popped out. Histopathologic examination confirmed cysticercosis.
Case 2
An 11-year-old boy was referred for sonography, for evaluation of parietal swelling in the right hypochondrium. He had no pain or fever and did not give any history of trauma. Sonography revealed a loculated collection of fluid with internal echoes, measuring 51 × 23 mm, in the internal oblique muscle. Within this collection there was a well-defined round cyst of 15 mm with an eccentric echogenic protrusion from the wall, representing the scolex, in it (Figure 2). The cyst was confirmed to be cysticercosis on histopathologic examination.

Case 3
A 29-year-old man had a painful lump on his left thigh that had been present for 2 days. Sonography revealed an oval cystic lesion of 15 × 5 mm within the vastus lateralis muscle of the left thigh (Figure 3). The walls were irregular. There was no echogenic protrusion of scolex in it. There was an irregular thin fluid collection extending inferolaterally from this cyst. This fluid contained an echogenic focus, which may have been the extruded scolex. At exploration, there was an irregular cavity in the muscle, which was excised. Histopathologic examination confirmed cysticercosis.

Case 4
A 45-year-old man with dyspeptic symptoms was referred for sonography of the abdomen. Sonography was performed with an HDI 5000 system and 2- to 5-MHz convex and 5- to 12-MHz linear probes. Numerous small elliptical calcifications of 9 to 11 mm each were seen in the liver (Figure 4), mesentery (Figure 5), and retroperitoneal fat (Figure 6). A similar lesion in the chest wall was excised and confirmed to be cysticercosis on histopathologic examination.

All 4 patients were treated appropriately for cysticercosis.

Discussion
Cysticercosis in humans is infection with the larval form (cysticercus cellulosae) of the pork tapeworm *T solium*. It is endemic in Southeast Asia, Mexico, Central and South America, and Africa. Humans normally act as definitive hosts. Ingestion of inadequately cooked infected pork, the intermediate host, leads to the development of the adult worm in the small bowel of humans. The eggs of the worm are excreted with the feces, which are ingested by the pig, the intermediate host. Once ingested, the eggs hatch in the small intestine and result in the cysticercosis, completing the cycle. However, humans can occasionally be intermediate hosts, manifesting cysticercosis. It is transmitted to humans by ingestion of eggs from contaminated water or food, such as vegetables, or by internal regurgitation of eggs into the stomach due to reverse peristalsis, when the intestine harbors a gravid worm. The eggs hatch in the small intestine, releasing oncospheres that penetrate the bowel mucosa and enter the bloodstream to reach var-
ious tissues, where they develop to form a cysticercus cellulosae, which is the encysted larval form of *T. Solium*. These can remain viable in this stage for as long as 10 years in humans. Living larvae evade immune recognition and do not elicit inflammation. When the larva dies, it induces a vigorous granulomatous inflammatory response that may produce symptoms, depending on the anatomic location.

In the muscular form, 3 distinct types of clinical manifestations have been described: the myalgic type; the masslike, pseudotumor, or abscesslike type; and the rare pseudohypertrophic type. During the death of the larva, there is leakage of fluid from the cyst. The resulting acute inflammation may result in local pain and myalgia, as seen in case 3 of this report. Alternatively, degeneration of the cyst may result in intermittent leakage of fluid, eliciting a chronic inflammatory response, with collection of fluid around the cyst, resulting in the masslike, pseudotumor, or abscesslike type, as seen in cases 1 and 2 of this report. Alternatively, the cyst retracts, its capsule thickens, and the scolex calcifies. Later on, the cyst is completely calcified. When multiple, they give a “starry night” appearance on computed tomography. These are seen as multiple millet seed–shaped elliptical calcifications in the soft tissues on plain radiography. This is the type of appearance seen in case 4 of this report. Although most reported cases of cysticercosis involve the brain and orbit, the general belief is that the subcutaneous and muscular forms are as common as or more common than the other forms. However, most cases of subcutaneous and muscular cysticercosis are asymptomatic.

Sonographic features of cysticercosis of eye and extraocular muscles are well reported. There are only 2 earlier reports of sonographic features of muscular cysticercosis. One of them described the lesion as a soft tissue mass centered on a small, well-defined elliptical cystic lesion of 10 × 4 mm with an eccentric, echogenic, pedunculated structure inside, in the musculature of the abdominal wall. The second report described a homogeneous hypoechoic soft tissue lesion of 21 × 15 mm within the masseter muscle with a well-defined cystic area of 6 × 4 mm containing a small calcified scolex in it. These 2 reports described one of the sonographic appearances of cysticercosis, namely, the cysticercus cyst with an inflammatory mass around it, as a result of the death of the larva. Here, 3 other appearances of cysticercosis are described. The second type, as seen in case 3, is an irregular cyst with very minimal fluid on 1 side, indicating a leakage of fluid. The eccentric echogenic protrusion from the wall due to the scolex is not seen within the cyst. It may be due to escape of the scolex outside the cyst or partial collapse of the cyst. The third appearance is a large irregular collection of exudative fluid within the muscle with the typi-
cal cysticercus cyst containing the scolex, situated eccentrically within the collection. This may be due to chronic intermittent leakage of fluid from the cyst, leading to florid inflammatory exudates. This appearance is similar to an intramuscular abscess, but the visualization of the cysticercus cyst within it clinches the diagnosis.

In all 3 of these types of appearances, the salient diagnostic feature is that of the cysticercus itself, which appears as an oval or round well-defined cystic lesion with an eccentric echogenic scolex in it (Figure 2). The fourth sonographic appearance is that of calcified cysticercosis, as seen in case 4. It appears as multiple elliptical calcifications in soft tissue similar to the pathognomonic millet seed–shaped elliptical calcifications in soft tissues described on plain radiography. In the case reported here, they were seen in the liver, the mesentery, and the retroperitoneal fat.

In conclusion, 4 different sonographic appearances of muscular cysticercosis are described. These appearances on high-resolution sonography are pathognomonic of cysticercosis, and a definitive diagnosis can be made with greater confidence.

References


