

Ultrasonographic Findings of Subcutaneous and Muscular Sparganosis¹

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Purpose: This study was designed to evaluate the ultrasonographic findings of subcutaneous and intramuscular sparganosis.

Materials and Methods: Nine cases of histologically proven subcutaneous and intramuscular sparganosis lesions in seven patients (mean patient age, 59 years; M:F = 6:1) were reviewed retrospectively. Two patients had recurrent sparganosis. A color Doppler examination was performed in all cases.

Results: A prior history of ingestion of raw snake meat was noted for two patients. Patients presented with a palpable mass and induration ($n = 7$) and dull pain ($n = 4$). Lesion locations were in the thigh ($n = 4$), lower leg ($n = 2$), chest wall ($n = 1$), an inguinal location ($n = 1$) and the neck ($n = 1$). Five lesions were in the subcutaneous fat layer and four lesions had intramuscular locations. Calcification was noted in two cases. All cases showed heterogeneous hypoechoic serpiginous tubular-and-oval lesions. The lesions were conglomerated or discrete in appearance. All nine cases showed the presence of lesions with a multi-layered wall with variable intraluminal echogenicity, at least in one segment of the lesion. Increased vascularity was noted on color Doppler examinations in two patients with pain.

Conclusion: Subcutaneous or intramuscular sparganosis should be included in the differential diagnosis when a serpiginous tubular-and-oval lesion is noted that is seen with a multi-layered wall with variable intraluminal echogenicity.

Index words : Soft Tissues
Sparganosis
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Sparganosis is a rare parasitic infection of humans caused by the larval form of an animal tapeworm of the genus *Spirometra* (1). The definite host is a carnivorous

mammal, such as a dog or cat and intermediate hosts are a wide spectrum of vertebrates that include amphibians, reptiles, birds and mammals (2). Humans are usually a paratenic host (3). The route of infection is ingestion of raw meat of snakes or frogs, or drinking contaminated water (3). The clinical finding of sparganosis is the presence of migrating subcutaneous nodules in the abdominal wall, scrotum, lower extremities, chest wall, breast and brain where the parasites cause seizure, headache, and paraplegia (4). Brain and breast sparganosis have been reported previously but only a

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few cases of subcutaneous and intramuscular sparganosis have been described. We report the ultrasonographic findings of nine lesions of surgically confirmed subcutaneous and intramuscular sparganosis.

Materials and Methods

Nine histologically proven subcutaneous and intramuscular sparganosis lesions in seven patients, including two recurrent cases, were reviewed retrospectively. The patients consisted of six men and one woman, with a mean age of 59 years. One musculoskeletal radiologist performed all of the ultrasonographic examinations using an HDI 5000 unit (Philips, Bothell, WA U.S.A.) or an IU 22 unit (Philips, Eindhoven, The Netherlands) equipped with a linear 7–17 MHz probe. Color Doppler examinations were performed for all cases. Our institutional review board approved this retrospective study.

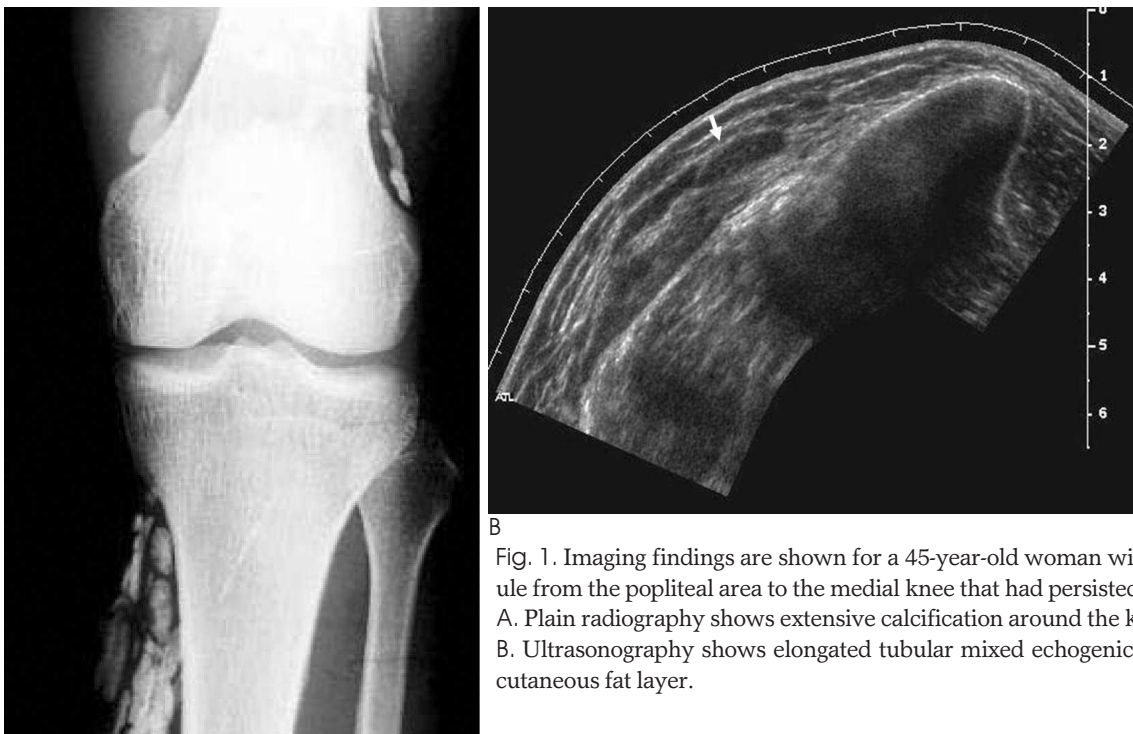
Results

A history of ingestion of raw snake meat was noted for two patients. Clinical presentations included the presence of a palpable mass and induration in all patients and dull pain in four patients. Lesion locations were in the thigh ($n = 4$), lower leg ($n = 2$), chest wall ($n = 1$), an inguinal location ($n = 1$) and the neck ($n = 1$). Five le-

sions were located in the subcutaneous fat layer and four lesions showed intramuscular locations. Calcification was noted in two cases. All cases showed heterogeneous serpiginous tubular-and-oval lesions surrounded by poorly defined increased echogenicity (Figs. 1–3). The masses were conglomerated or discrete in appearance. All nine masses were seen with a multi-layered wall with variable intraluminal echogenicity, at least in one segment of the lesion. Increased vascularity was noted on color Doppler examinations in two patients (Figs. 2, 3) with pain.

Discussion

Locations of sparganosis lesions include the subcutaneous tissue of the abdominal wall, chest wall, thigh and scrotum. Lesions are seldom found in the nasopharynx, orbital cavity, abdominal cavity, urinary tract, brain and breast. Only one sparganum has been noted in more than 70% of cases (3). A subcutaneous mass and migrating nodules can be seen (5). All of our cases showed the presence of a palpable mass or induration and pain was combined in two cases. The most common route of infection is ingestion of raw meat of snakes or frogs and drinking of contaminated water (3). Two patients ingested raw snake meat. One female patient had no history of leg trauma and had denied the ingestion of raw snake



B

Fig. 1. Imaging findings are shown for a 45-year-old woman with a migrating nodule from the popliteal area to the medial knee that had persisted for 10 years.

A. Plain radiography shows extensive calcification around the knee.

B. Ultrasonography shows elongated tubular mixed echogenic lesions in the subcutaneous fat layer.

A

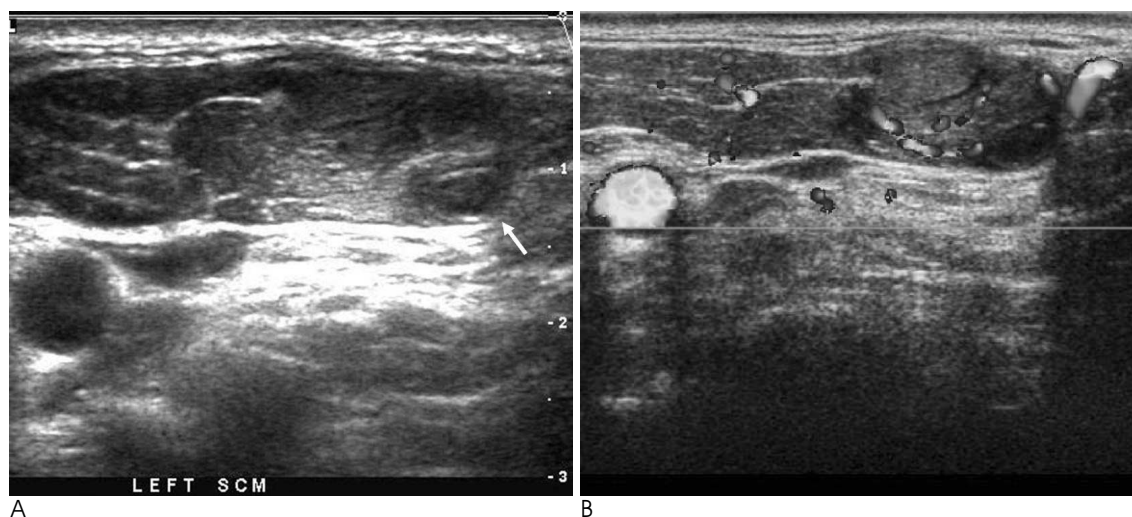


Fig. 2. Imaging findings are shown for a 60-year-old man with a painful neck mass that had persisted for one month.

A, B. Ultrasonography shows hypoechoic tubular and oval lesions in the muscular layer (arrow). A mild vascular increase on a color Doppler examination is seen.
C. A neck CT image shows intramuscular rim enhancement (arrow).



C

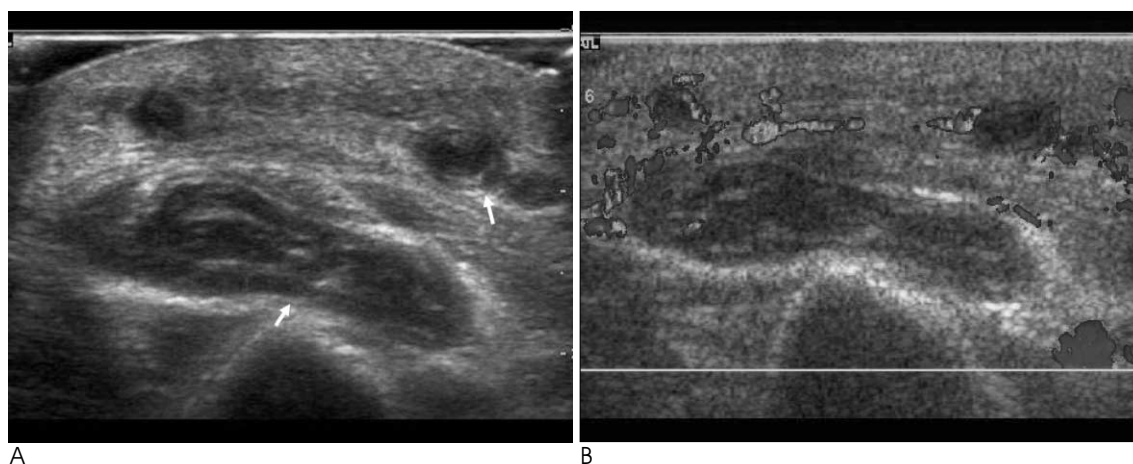


Fig. 3. Imaging findings are shown for a 42-year-old man with a varicose vein like lesion in the leg.

A, B. Ultrasonography shows serpiginous tubular hypoechoic lesions in the subcutaneous fat layer without luminal vascular flow (arrows). A discrete multi-layered wall was noted, but the initial diagnosis was thrombophlebitis due to a varicose vein. Sparganosis was the final diagnosis.

Table 1. Summary of the Data of the Patients and the Lesions

No.	Age/ Sex	Site	Location	Clinical Manifestation
1	44/F	lower leg	subcutaneous	pain, swelling recurrence
2	64/M	thigh	subcutaneous	pain, mass history of snake ingestion
3	60/M	neck	intramuscular	2 cm sized neck mass
4	71/M	inguinal	subcutaneous	pain
5	47/M	thigh	subcutaneous	swelling
6	76/M	chest wall	intramuscular	pain
7	54/M	thigh	intramuscular	recurrence

or frog meat; however, the patient drank water from a spring occasionally when the patient had been climbing in mountain areas for exercise. Cho et al. have described the prevalence of the disease by sex (6). In that study, men were infected five times more often as compared to women. In our study, men were infected two times more often as compared to women. Older subjects have a higher prevalence of the disease (6). The histopathological findings include necrotic and granulomatous inflammation and inflammatory cell infiltration such as with eosinophils and lymphocytes and tunnel-like structures surrounded by histiocytes (5). As described by Cho et al. (3), most of the musculoskeletal sparganosis lesions were found in the proximal medial thigh and the investigators suggested that this finding was attributed to the proximal medial thigh being one of the nearest locations to the dependent portion of the peritoneal cavity. In our study, four cases were found in the thigh (Table 1). Cho et al. (3) indicated that the sonographic findings of musculoskeletal sparganosis were similar to that of breast sparganosis, where linear echogenicity with a 'dot and dash' pattern was seen in some portions of the tract. Our cases demonstrated heterogeneous hypoechoic serpiginous tubular-and-oval lesions surrounded by poorly defined increased echogenicity (Figs. 1–3). Kim et al. (5) suggested that a low echogenic tubular lesion was due to the echogenicity of the worm itself and increased echogenicity of the surrounding structures was due to

combined chronic granulomatous inflammation, a finding in accord with our study results. In our study, lesions were demonstrated to have multi-layered walls, presumably caused by the presence of the worm (Figs. 2, 3). For intramuscular lesions of the neck, it is difficult to differentiate sparganosis from soft tissue tumors based on the preoperative CT appearance (7). In such cases, the characteristic ultrasonography findings can be sufficient for the differential diagnosis.

Other diseases for the differential diagnosis include superficial varicose veins of the lower leg and hemangioma. Lower leg varicose veins with thrombophlebitis (two cases) and hemangioma (one case) were initially diagnosed (Fig. 3). Koo et al. (8) reported that serpiginous tubular tracts were characteristic findings and we believe the unique wall shape may be helpful in differentiation. The presence of peripheral eosinophilia is also a helpful finding.

In conclusion, this study suggests that subcutaneous or intramuscular sparganosis should be included in the differential diagnosis when a serpiginous tubular-and-oval lesion is noted that shows a multi-layered wall with variable intraluminal echogenicity.

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피하 및 근육내 스파르가눔증의 초음파소견¹

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목적: 피하 및 근육 내 스파르가눔증의 초음파소견을 분석하고 초음파 소견이 진단에 도움을 줄 수 있는 특징적인 소견을 알아보고자 하였다.

대상과 방법: 조직학적으로 피하 및 근육 내 스파르가눔증으로 진단된 7명의 환자에서 재발한 2예를 포함한 9개의 초음파 소견을 분석하였다. 모든 예에서 칼라 도플러검사를 시행하였다.

결과: 2예의경우 익히지 않은 뱀을 섭취한 병력이 있었고 그 외는 명백한 병력이 없었다. 전 예에서 만져지는 종물과 경결이 있었고 4예에서 묵직한 통증이 있었다. 병변의 위치는 정강이(4예), 장판지(2예), 서혜부(1예) 흉벽(1예) 그리고 목(1예)였다. 5예는 피하 지방층에 그리고 4예는 근육 내에 병변이 있었다. 2예에서 석회화가 관찰되었다. 전 예에서 불균일한 저에코의 사행성의 관상 또는 난원 상의 병변이 관찰되었다. 뭉쳐지거나 단단한 양상을 보여 다른 정상조직과 쉽게 구분되었다. 병변들은 9예 모두 여러 겹의 벽과 적어도 한 군데 이상에서 다양한 내강 내 에코를 보였다. 칼라 도플러 상에 혈관증가가 2예에서 관찰되었다.

결론: 피하 지방층이나 근육 내에서 불균일한 저 에코의 사행성 관상 또는 난원상의 병변이 비교적 명백히 초음파상 관찰될 때 병변 내부의 소견이 여러 겹의 벽과 적어도 한군데 이상에서 다양한 내강 내 에코를 보인다면 스파르가눔증을 감별진단에 포함해야 할 것으로 생각한다.