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# Chronic Pelvic Paragonimiasis: Radiological Findings#

Seung Hyup Kim[1], Byung Ihn Choi, Jung Gi Im,
Myeong Cherl Kook[2], Kyung Mo Yeon, Je Geun Chi[2]

*From the Departments of Radiology and Pathology[2] Seoul National University College of Medicine , Seoul 110-744, Korea*

= Abstract = **Two cases of ectopic paragonimiasis involving pelvic peritoneal cavity and omentum were confirmed surgically and pathologically. The lesions were manifested as nodules of faintly calcified periphery on various imaging modalities. Ectopic paragonimiasis should be included in the differential diagnosis of nodular calcifications in the pelvic cavity.**

Key Words: *Parasites, Pelvic organs, abnormalities, Pelvic organs, CT, Pelvic organs, MR*

## INTRODUCTION

Human paragonimiasis is caused by ingestion of improperly cooked crustaceans infected with metacercaria. The parasites penetrate the intestinal wall and enter the peritoneal cavity. Then, they proceed to the diaphragm, pleural cavity, and the lung (Yokogawa, 1965). Although the lung is the primary site of infestation, other organs including the central nervous system and abdominal organs may be involved (Shim et al. 1991).

The radiological findings of pleuropulmonary and cerebral paragonimiasis have been well described (Shim et al. 1991; Im et al. 1992; Im et al. 1993; Singcharoen and Silprasert 1987; Singcharoen et al. 1988; Udaka et al. 1988) as have the computed tomography (CT) findings of acute disseminated paragonimiasis involving the lung, brain, and abdomen (Singcharoen et al. 1988).

Ectopic paragonimiasis in the chronic state can manifeste as calcified nodular lesions in the pelvic cavity. Although this lesion may be clinically inconsequential, familiarity with the radiological finding of this condition will be helpful in the differential diagnosis of pelvic calcifications.

## CASE REPORTS

### 〈Case 1〉

A 62-year-old woman was hospitalized for staging of uterine cervical carcinoma. She had no other abnormal medical history except for mild hypertension. On physical examination, ther was a 2.5 × 3.0 cm uterine cervical neoplasm involving

[1]Author for correspondence
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서울대학교 의과대학 진단방사선과교실, 병리학교실
: 김승협, 최병인, 임정기, 국명철, 연경모, 지제근

the left vaginal fornix.

Plain abdominal radiograph (Fig. 1A) showed multiple, faintly radiopaque, 1~3 cm, nodular lesions in the left pelvic cavity. Pelvic CT (Fig. 1B, 1E) demonstrated calcified nodular lesions in the left paravesical space. Spin-echo magnetic resonance imaging (MRI) performed at 0.5-T demonstrated the uterine cervical mass with full-thickness cervical stromal invasion. The left pelvic nodular lesions had a low intensity periphery and relatively high intensity center on both T1- (Fig. 1C, 1F) and T2-weighted (Fig. 1D, 1G) images; the lesions were not enhanced after intravenous gadopentetate dimeglumine.

Radical hysterectomy with pelvic lymph node dissection was performed. There were four nodular masses, 1 × 1 cm to 3 × 2 cm in size, two in the greater omentum and two in the rectal mesentery. At pathologic examination, the nodular masses were unilocular cystic lesions filled with yellow-brown cheesy material. These materials consisted of amorphous necrotic debris, cholesterol clefts and occasional parasitic eggs. There were scattered ova of *Paragonimus westermani* and calcifications in the wall of the cystic lesions. Adult worms was not found at any lesion.

〈Case 2〉

A 36-year-old woman presented with abdominal pain and urticaria for recent four years. She had history of taking the immersion of raw fresh water crab in soy bean sauce.

Plain radiograph (Fig. 2A) showed numerous nodular radiopacities in the right pelvic cavity. CT (Fig. 2B) revealed multiple high attenuated nodular lesions adjacent to the right ovary and

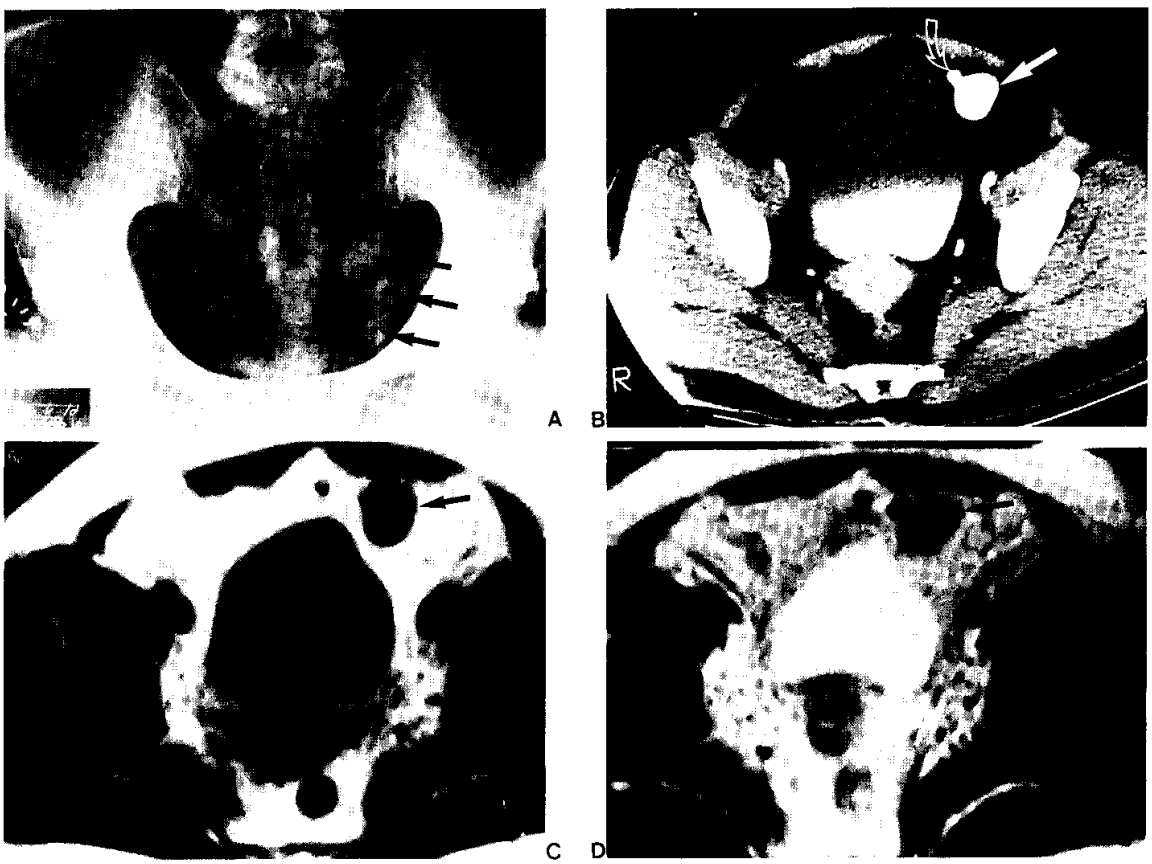

Fig. 1. (Case 1). **A.** Plain film of the pelvic cavity shows multiple, faintly calcified nodular lesions in left pelvic cavity (arrows). **B.** Contrast enhanced CT scan of the pelvic cavity shows a round, homogeneously hyperdense lesion in left anterior pelvic cavity (arrow). Note another small adjacent lesion (open arrow). **C, D.** T1-weighted (**C**) and T2-weighted (**D**) MR images at similar level to B demonstrate that the lesion has low intensity periphery and sli-ghtly higher intensity center (arrow) on both pulse sequences. **E.** Pelvic CT at the level of uterine cervix shows another ho-mogeneously high attenuation lesion (arrow) at left pelvic cavity immediately posterior to the left ureter (arrowhead). Note low attenuated tumor in uterine cervix (asterisk). **F, G.** T1-weighted (**F**) and T2-weighted (**G**) MR images at the same level to E again show low intensity periphery and higher intensity center of the lesion (arrow). Note that the uterine cervical carcinoma involves left half of the uterine cervix (asterisk).

right rectouterine pouch. CT also demonstrated a 2.5 cm sized cyst in the right ovary and small amount of fluid in rectouterine pouch. The patient did not receive any specific treatment. Right ovarian cyst disappeared on follow-up ultrasonography which was taken one month later, but a 3 cm sized cyst was newly found in the left ovary. Ultrasonography also demonstrated multiple echogenic lesions with posterior sonic shadowing representing calcified nodular lesions (Fig. 2C).

Exploratory laparotomy was performed. There were multiple, well-encapsulated, small bean sized, cystic lesions in rectouterine pouch. The cystic lesions were removed and left ovarian wedge resection was also performed. On pathologic examination, the cystic lesions had smooth pinkish surface, yellowish white cut surface with central cystic area filled with yellow-brown grumose material. The pathologic diagnosis was ectopic paragonimiasis with fibrotic wall with scattered calcification. Ova of *P. westermani* were found intact or embedded in fibrotic wall of the lesion (Fig. 2D, 2E). Left ovarian lesion was simple cyst with single epithelial lining of unidentified nature.

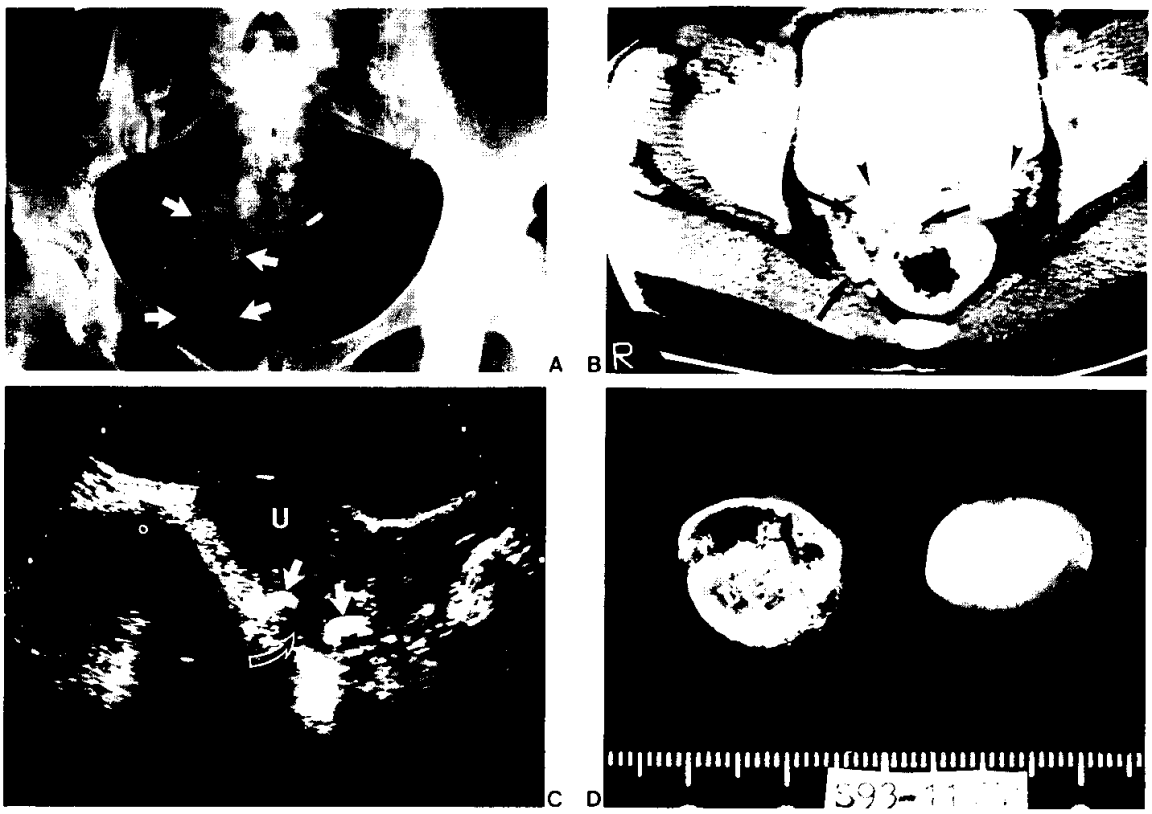


Fig. 2. (Case 2). **A.** Plain film shows numerous, faintly calcified nodular lesions in right pelvic cavity (arrows). Note intrauterine device. **B.** Contrast enhanced CT scan shows multiple round, homogeneously dense calcified nodules in right pelvic ca-vity between uterine cervix and rectum (arrows). Note bilateral ureters (arrow-heads). **C.** Longitudinal ultrasonogram of the pelvis demonstrates multiple calcified nodules with posterior sonic shadowing (arrows). Also note small amount of fluid in rectouterine pouch (open arrow). **D.** Photograph of outer surface (right) and cut surface (left) of one of the removed nodules shows a cystic lesion filled with yellow-brown cheesy material. **E.** Photo-micrograph of the lesion demonstrates fi-brotic wall with scattered calcification and ova of *Italic* (arrow). Hematoxylin and eosin staning (× 40).

## DISCUSSION

Paragonimiasis is a parasitic disease caused by the trematode *Paragonimus westermani* or other species of Paragonimus. Paragonimus is a lung fluke of carnivorous mammals, such as

tigers, cats, dogs, foxes, weasels, and opossums (Yokogawa 1965; Shim et al. 1991). It is endemic to East Asia, but several cases have been reported in North America (Taylor and Swett 1982 ; Johnson and Johnson 1983). Humans become part of the enzootic cycle by eating raw or incompletely cooked fresh water crustaceans or wild boars infected with metacercaria.

Once the crustaceans containing metacercariae are eaten, the encysted larvae excyst at the duodenum and penetrate the small-intestinal wall immediately. In the peritoneum, the juvenile worm wanders around the cavity or temporarily invades the muscles of the abdominal wall or abdominal organs for 3 to 4 weeks as it enlarges. Young worms of this age begin to penetrate the diaphragm and reach the pleural cavity. After repeated puncture of the visceral pleura, the adult worms finally enter the lung parenchyma (Yokogawa 1965; Shim et al. 1991).

Paragonimiasis usually involves lung or pleura, but often causes an ectopic infection in other organs, most often in brain. Abdominal involvement usually manifestes as a mass in the omentum, psoas muscle, intestinal wall, or genital organs such as fallopian tubes (Shim et al. 1991). Singcharoen et al. (1988) reported CT findings of paragonimiasis disseminated throughout lung, brain, and abdomen in a relatively acute state. In their report, abdominal CT showed multiple cystic masses in the chest wall, paravertebral region, and splenic hilum. Lesions within the abdomen or pelvic cavity are probably not uncommon but are rarely recognized because they usually do not cause symptoms, as was also true in our cases.

There are innumerable causes of abdominal and pelvic calcifications. The majority of these calcifications are of little clinical significance; however, some indicate specific pathology or histology by their radiologic appearance, such as location. number, size, shape, distribution, or density. In our two cases of ectopic paragonimiasis, the lesions had a well defined nodular appearance with relatively faint opacity for their size on plain film. The appearance of these calcifications of pelvic ectopic paragonimiasis are somewhat different from calcifications caused by other common causes, such as phleboliths or lymph node calcifications. The appearance is similar to the calcifications in cerebral paragonimiasis, so-called "soap bubble" appearance on plain film of the skull [7].

On CT scan, they appear as relatively homogeneous calcified nodular lesions on a usual soft tissue window setting. Although not available in our cases, the peripheral location of the calcifications would have been identified if we had obtained CT images with a bone window setting. MRI clearly demonstrated a peripheral rim of low signal intensity and a higher intensity center on both T1- and T2-weighted spin-echo images in the first case.

Our two cases suggest that ectopic paragonimiasis should be included in the differential diagnosis for pelvic calcifications, especially if the calcifications are large, faint, and peripheral.

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