Case Reports

A Case of Cornstarch Granuloma

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A 57-year-old female was diagnosed as having asymptomatic cornstarch granuloma. The disseminated small nodules over the peritoneum were incidentally discovered at operation for cholelithiasis, when she was misdiagnosed as carcinomatosis peritonei. Histological observations revealed a characteristic finding of tuberculoid granuloma with caseous necrosis, a rather rare histological type of cornstarch granuloma. Polarized light microscopic examination of biopsy specimens is particularly important for the diagnosis. We emphasize that cornstarch granuloma should once be considered when tuberculoid or unknown abdominal granuloma are observed in patients with history of abdominal surgery.

Key Words: Cornstarch granuloma, Carcinomatosis peritonei, Tuberculous peritonitis

Cornstarch granuloma is generally diagnosed as peritonitis three to four weeks following operation. This disease is probably an immunological hyperreaction to cornstarch granules used as lubricant powders for operating gloves. However, the exact cause is not presently understood. The main pathological findings are phagocytic foreign body granuloma and tuberculoid granuloma with or without caseating necrosis.

We have recently experienced a case of cornstarch granuloma without clinical symptoms who was incidentally discovered at operation for cholelithiasis. The precipitating operation may have been an appendectomy 30 years before. The characteristic pathological finding in this case was tuberculoid granuloma associated with caseous necrosis. The present report describes light, electron and polarized light microscopic findings of this unique granuloma.

CASE REPORT

A 57-year-old female was diagnosed as having cholelithiasis in 1977. When the patient was

operated for cholelithiasis in June 1981, the surgeon found a tumor in the uterus and multiple small nodules disseminated over the surface of the peritoneum. Carcinomatosis peritonei derived from uterine cancer was suspected, and the abdomen was closed without treatment. However, this tumor was diagnosed as uterine myoma in the gynecological clinic of Okayama University Hospital, and the small nodules in the peritoneum were biopsied at that time. These nodules were histologically very similar to tuberculous peritonitis. Thus, she was treated with anti-tuberculosis agents. In October, she complained again of severe right hypochondric pain and was admitted to our clinic. Relevant medical history was limited to an appendectomy of 30 years ago. On admission she presented neither fever nor jaundice. Abdominal findings were negative for hypochondric pain, ascites and palpable tumor. Peripheral blood analysis presented white blood cells $4400/\text{mm}^3$ with normal distribution, ESR 21 mm/hour and CRP negative. Serum total bilirubin was 0.71 mg/dl, GPT 72 IU/l, ALPase 78 IU/l, LAP 42 IU/l, γ -GPT 31 IU/l, total cholesterol 157 mg/dl and

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total protein 7.39 g/dl. The slightly elevated GPT activity improved when pain disappeared. Abdominal computed tomography, ultrasonography and drip infusion cholangiography detected multiple gallstones without dilatation of the biliary tract. Excretion of B bile was not obtained even after stimulation of gallbladder contraction. Chronic cholecystitis with cholelithiasis was diagnosed.

The diagnosis of the tuberculous peritonitis seemed unsuitable with the medical history,

physical and laboratory data. A primary focus of tuberculosis was not found by chest X-ray, abdominal X-ray, barium enema and drip infusion pyelography. Moreover, Mantoux reaction was negative, and *Mycobacterium tuberculosis* was absent from sputum, bile, feces and urine. Therefore, the small nodule specimens were re-examined. Many cornstarch granules were discovered in the caseating granuloma.

For the treatment of multiple cholelithiasis and re-examination of the small nodules, she

Fig. 1. Cornstarch granuloma with caseous necrosis. Light microscopy, H&E, $\times 250$.

Fig. 2. A. Starch-containing giant cell, H&E, $\times 250$.
B. "Maltese-cross birefringence" of cornstarch granules, H&E, $\times 250$.
Polarized light microscopic observation.

Fig. 3. Various shapes of granules. Electron microscopic observation, $\times 5,000$.

was operated in December 1981. There was no ascites. The gallbladder was resected. Miliary, white nodules were disseminating throughout the middle to lower abdominal cavity, especially in the ileocaecal region and the Douglas's lumen. Several nodules were biopsied. Culture and Ziehl-Neelsen staining for *Mycobacterium tuberculosis* were negative. The light microscopic evaluation of these nodules demonstrated inflammatory granulomas composed of fibrous, epithelioid and polynuclear giant cells. The granuloma showed caseous necrosis in the center with unstained semitransparent, round particles of 5–10 μm in diameter (Fig. 1). The polarized light microscopic observations presented typical "Maltese cross birefringence", a characteristic pattern of cornstarch in the granuloma (Fig. 2). These particles stained with periodic acid-Schiff. The electron microscopic observations detected round or polygonal particles of homogenous low electron density (7.5 μm maximal diameter) with radial osmiophilic septa in epithelioid cells (Fig. 3).

With these observations it was concluded that the small peritoneal nodules were cornstarch granuloma.

DISCUSSION

Only five cases of cornstarch granuloma have been reported in Japan; all presented signs of peritonitis¹⁾. The disease without signs of peritonitis is very rare, and the diagnosis is very difficult. Subclinical cases may exist among patients who have surgical intervention of the abdomen. The diagnosis of cornstarch granuloma is usually based upon symptoms of peritonitis. However, this case was incidentally diagnosed during an asymptomatic stage. The initial insult occurred during appendectomy performed 30 years ago. No other explanation was present. However, use of cornstarch granules as lubricating powders for surgical gloves began in 1957 in Japan²⁾; the reason why cornstarch entered the abdominal cavity of this patient was not clear. Moreover, this case presented caseating granuloma; thus, the initial diagnosis was tuberculous peritonitis. Histological observations of cornstarch granuloma identifies two types; phagocytic foreign body type and tuberculoid granuloma with or without central necrosis³⁾. The former type was noted frequently in previous reports. The latter, as shown in this case, is very rare and frequently misdiagnosed as carcinomatous peritonei or

tuberculous peritonitis⁴⁾. The final diagnosis was based upon finding cornstarch granules in the granuloma³⁾. Polarized light microscopic observations are most useful as the granules present as brilliant white four-leaves clover particles, "Maltese cross birefringence". When tuberculous granuloma or unknown abdominal granuloma, for which primary foci cannot be established, are observed, cornstarch granuloma should be considered, and a history of laparotomy is to be sought. In such cases, polarized light microscopic examination of biopsy specimens is very important for diagnosis.

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