

die within a year. Local invasion can occur into contralateral ethmoid, orbit, nasopharynx and intracranially. Metastases can occur into draining lymph nodes, lungs, brain and other bones. In general, primary osteosarcoma of ethmoids is a rare tumor with poor prognosis. A combined approach using postoperative radiotherapy and adjuvant chemotherapy is likely to improve the survival rates.

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Intraperitoneal Abscess due to Infection with *Salmonella typhimurium*

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Salmonella typhimurium infections are prevalent world-wide and cause disease ranging from a benign self limiting gastroenteritis to generalized and severe infections such as septicemia and meningitis(1). Majority of patients infected by this organism are children. Localized infections with *S. typhimurium* commonly involve organs such as bone, joints, gall bladder and urinary tract. Involvement of peritoneal cavity is a rare occurrence and intraperitoneal abscess has not been often reported. We describe a case of *S. typhimurium* intraperitoneal abscess in an infant following gastrointestinal illness.

Case Report

An eleven-month-old boy was admitted with a history of high grade fever, progressive distension of abdomen, constipation and bilious vomiting of one day duration.

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This illness was preceded by an episode of acute gastroenteritis which lasted for six days. The child was febrile, toxic and moderately dehydrated. There was marked abdominal distension and tenderness, absent bowel sounds and evidence of free fluid in the peritoneal cavity. No lump or organomegaly could be detected; per rectal examination was normal. The hemoglobin level was 8.0 g/dl, total leucocyte count 18,600/cu mm and the differential count showed 80% polymorphs and 20% lymphocytes. An erect skiagram of the abdomen showed a homogeneous opacity on the right side (Fig. 1). On sonographic examination, a large unilocular cavity occupying almost whole of the abdominal cavity was seen (Fig. 2).



Fig. 1. Erect skiagram showing homogeneous opacity on the right side of the abdomen.

A diagnostic aspiration of the cyst cavity showed thick pus. The child was subjected to an emergency laparotomy and a large intraperitoneal abscess with well defined walls occupying almost whole of peritoneal cavity was identified. About 1.5 L of pus was drained from this unilocular abscess cavity. The remaining portions of abscess cavity were washed with povidine iodine solution. Abdomen was closed after leaving a drain. *S. typhimurium* was grown from the pus and showed sensitivity to only cefatoxime, amikacin and norfloxacin. The blood and stool cultures were sterile. The child was treated with intravenous cefatoxime and amikacin in dosage of 100 mg/kg/day and 20 mg/kg/day respectively. The general condition of the child improved dramatically after surgical intervention. Antibiotic therapy was continued for two weeks. Repeated sonographic examination of the abdomen showed gradual resolution of the abscess



Fig. 2. Ultrasound examination showing unilocular cavity occupying almost whole of the abdomen.

cavity. Complete resolution occurred by the end of four weeks.

Discussion

Non-typhoidal salmonellosis commonly presents as self-limiting gastroenteritis, transient bacteremia with or without localization, typhoid-like disease or the carrier state. Dissemination of infection usually manifests as osteomyelitis, arthritis, septicemia, meningitis and pneumonia. However, endocarditis, pericarditis, sinusitis, aortic aneurysms, endophthalmitis and abscesses of parotid gland, psoas and breast have also been described(2-5). Localized infection due to these organisms usually occurs after an overt or subclinical attack of gut infection and spread can occur either directly or through blood stream. The common sites of localisation in the abdomen are gall bladder, urinary tract and appendix. Liver and splenic abscesses have also been reported(6). The occurrence of peritonitis caused by this organism is by itself a rare event. It could be caused by transmural passage of bacteria with peritoneal multiplication and reaction. The reported cases are of generalized peritonitis occurring in conjunction with other intraabdominal focal lesions. Isolated intraperitoneal abscess caused by *S. typhimurium* has not been reported in the literature, to the best of our knowledge.

The case being described in this report had an attack of gastroenteritis followed by marked abdominal distension. The diagnostic consideration in such cases are adynamic ileus due to sepsis, hypokalemia or drugs or mechanical obstruction occurring due to intussusception. The presence of free fluid in the peritoneum, abdominal tender-

ness and high grade fever prompted us to consider the possibility of peritoneal involvement. Ultrasound examination and diagnostic aspiration showed collection of pus which was subsequently confirmed on laparotomy.

Disseminated infections due to multi-drug resistant *S. typhimurium* can lead to life-threatening situations with mortality ranging from 20-80%(7). The treatment includes selection of most appropriate antibiotics along with drainage of the infective focus. The timely identification of disseminated *S. typhimurium* infections and prompt institution of therapy are the keys to improving the final outcome.

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