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Case Report

Concomitant primary peritonitis, septic shock and empyema thoracis in a young girl: a rare case report

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ABSTRACT

Primary peritonitis is a condition in which there is no intraabdominal source of infection demonstrated during laparotomy. It is uncommon and can affect any age group from childhood to the elderly. We report here a case of Primary peritonitis with septic shock as a presenting feature, associated with empyema thoracis. This combination was not reported previously in the literature. Our patient was a 15-yr old girl with a ten day history of fever, cough, dyspnea, abdominal pain and loose stools initially treated elsewhere. She was brought to the emergency in a gasping state, bradycardia, hypotension, tachypnoea and a distended abdomen. She was intubated, resuscitated and a bedside ultrasound revealed free fluid present all over peritoneal cavity. Emergency laparotomy under general anesthesia showed extensive thick yellow coloured nonfoul-smelling purulent fluid all over the peritoneal spaces with distended bowel loops. A thorough search confirmed no evidence of hollow-viscus perforation, peritoneal lavage, appendicectomy and laparostomy were done. Postoperatively she was ventilated electively and managed in a high dependency care unit with broad spectrum antibiotics and respiratory supportive measures. However she continued to have high fever, tachycardia, tachypneic and developed left massive pyothorax. Thoracoscopic drainage of the flakes of pus in the pleural cavity with extensive decortication done. Then, once her sepsis was well controlled, underwent laparostomy closure. However, post laparostomy-closure had signs of LV dysfunction with respiratory failure and managed with cardiac drugs. She had a turbulent postoperative course, gradually recovered, and was discharged home after nine weeks of admission.

Keywords: Primary peritonitis, Septic shock, Empyema thoracis

INTRODUCTION

Primary peritonitis (PP) due to pneumococcal infection was reported a century back.[1,2] Earlier, it was thought to be caused by gram-negative bacterial infections, however, now gram-positive organisms are also reported.[3,4] Echovirus and corona virus are also reported to be associated with PP.[5] It can also target healthy individuals without any definite predisposing causes. Our patient was a school going student with ten day history of respiratory illness who presented as primary peritonitis with septic shock, developed empyema thoracis and left ventricular dysfunction. A comphrensive search of the literature through Google Scholar and PubMed was made and no such combined presentation of primary peritonitis with septic shock and empyema thoracis was found to be reported.

CASE REPORT

A 15-year old school going girl presented to the emergency department in a gasping state, bradycardia, hypotension and a distended abdomen. Her parents gave a history of fever with cough of ten days duration associated with abdominal pain, vomiting and loose stools of 2 days. Treated by native medicines and no other details of treatment were available. On examination, patient showed Hippocratic facies, pulse rate 60/mt, blood pressure 80/60 mmhg, saturation 90% on air, abdomen distended, generalized guarding of the abdomen and bowel sounds were absent. Crystalloids, vasopressors, urgent endotracheal intubation, and a bedside focused assessment of sonography for trauma (FAST) done. FAST detected massive free fluid all over the peritoneal spaces. A clinical diagnosis of generalized peritonitis with septic shock was made.

Blood tests showed raised WBC-28,000 c/cu.mm, hemoglobin 7.9 Gms%, C-reactive protein (CRP) 19 mg/blood lactate 8 mmol/l. Patient was resuscitated and taken up for emergency surgery. Exploratory laparotomy revealed grossly distended bowel loops with 1.5-2 litres of thick non-foul smelling yellow coloured purulent fluid present all over the peritoneal cavity as shown in Figure 1.

Figure 1: Large amount of pus in the peritoneal cavity.

A thorough search of the gastrointestinal tract was done and did not show any evidence of hollow-viscus perforation. Rest of solid viscera like liver, spleen, uterus, both tubes and ovaries were grossly normal. Appendix was also normal. Peritoneal lavage was done using copious saline. Appendicectomy done, two tube drains kept in the subhepatic area and pelvic cavity. A transparent custom made protective laparostomy sheet placed on top of the distended bowel loops in view of anticipated intraabdominal compartment syndrome. The supraumbilical incision was closed with intermittent polypropylene suture material and infraumbilical incision was made as a laparostomy wound. The laparostomy sheet was anchored to the peritoneum as shown in Figure 2 using intermittent nylon sutures to prevent slippage, malposition and subsequent prolapse of bowel loops.

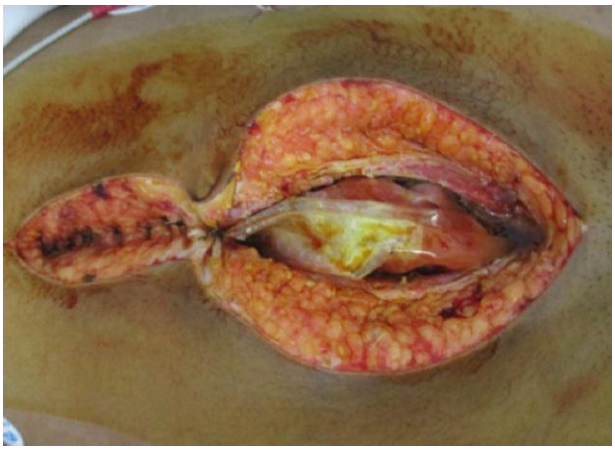

Figure 2: Laparostomy wound on 28th POD.

The patient was then managed with inotropes, broad-spectrum antibiotics and other supportive measures. She was in state of septic shock with multi-system organ failure namely acute kidney injury, acute respiratory distress syndrome, hypotension and lactic acidosis. Urea, creatinine, levels were raised with dyselectrolytemia suggestive of acute kidney injury. On the third postoperative day, abdominal distension had reduced, peristalsis of pink bowel loops noted via the laparostomy and she passed stools. Peritoneal pus culture and high genital swab culture were negative for bacterial growth. She was weaned off ventilatory support. Injection ampicillin 2 gm q6h, meropenem 1 gm q8h, metronidazole 500 mg iv q8h were the antibiotics given empirically for 10 days and later switched over to piperacillin*tazobactam combination with clarithromycin. She also developed oral candidiasis and was treated with a short course of fluconazole. Multivitamins and trace elements were also supplemented intravenously.

However, continued to have raised temperature, tachycardia, and leukocytosis with high neutrophil count and increased respiratory rate. Serial clinical examinations, X-ray chest, bedside ultrasound of abdomen and chest were done. She developed bilateral pleural effusion, left-sided collection was more than the right sided one. Left intercostal chest tube placed, drained 75 ml of seropurulent fluid. She still continued to have fever, tachypnoea and tachycardia. CT chest showed evidence of multiloculated left pyothorax with collapsed lung fields. On 26th postoperative day, Video-assisted thoracoscopic decortication was done under general anaesthesia as shown in Figure 3. Purulent flakes removed from cavity didn't show any growth of bacteria. The pleural biopsy as well could not identity for the type of bacteria.

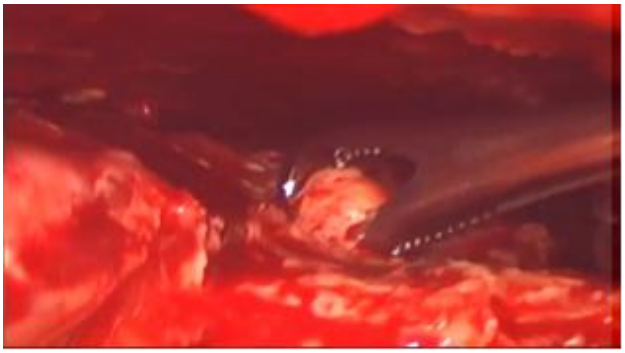

Figure 3: Thoracoscopic removal of pus flakes and decortication.

Figure 4: Linear midline scar of abdomen.

Neither mycobacteria nor atypical mycobacteria were demonstrated. CBNAAT (cartridge based nucleic acid amplification test) test also proved negative for tuberculosis. She was on ventilator support for three days and successfully weaned off the ventilator support on 29th postoperative day.

Her respiratory rate and temperature become normal and X-ray-chest showed expanded lung fields. She improved clinically and the deranged liver enzyme, renal parameters returned to normal. She was then posted for laparostomy-wound closure under general anaesthesia on 40th postoperative day. However, postoperatively she developed signs of left ventricular dysfunction and cardiac failure. She was reintubated and treated with cardiac failure medications.

On ICU day-46, she improved clinically, radiologically and biochemically as well. She was extubated, completely recovered and discharged home in a stable condition after nine weeks of stay in hospital. Wound had healed as shown in Figure 4. She has been coming for the follow-up outpatient clinic regularly for the past 3 months and remains symptom free. Histopathology of the appendix specimen reported as normal appendix with no evidence of inflammation.

DISCUSSION

Primary peritonitis can affect girls more than boys in the child age-group. Our patient belongs to adolescent group. Primary peritonitis can be caused by infection with *Enterobacteriaceae* (e.g. *Escherichia coli*, *Klebsiella spp.*), *Streptococcus pneumonia*, *haemophilus influenza* and *Enterococcus spp*.[6] The increased prevalence of primary pneumococcal peritonitis in females is due to ascending infection (commensals) from the genital tract reported by Hemsley & Eykyn.[7] *Pneumococci* may gain entry to the peritoneal cavity via the genital tract, the gastrointestinal tract, by hematogenous spread from the respiratorytract.[8,9] We suspect the etiology and spread of infection from respiratory tract to the abdomen by hematogenous route in our case. The reasons were that she had 7 days of cough with fever prior to the development of abdominal pain and onset of empyema thoracis in the postoperative period. These were the valid points toward the origin and virulence of bacteria from respiratory tract.

Most of the cases of primary peritonitis are diagnosed intraoperatively after an exploratory laparotomy or diagnostic laparoscopy. Our patient was also diagnosed preoperatively as well. There was no evidence of breach in the gastrointestinal continuity and the thick odourless nature of the pus was also the characteristic of primary peritonitis. About 90% of PP cases show evidence of bacteria in pus culture.[10] All the culture reports like blood, peritoneal-fluid, pleural flakes; sputum and high vaginal swab reports were negative in our patient.

It was really challenging to choose the right antibiotic and was empirically treated with broad spectrum antibiotics. We presume that prior antibiotic treatment elsewhere with alternative medicines would have altered the culture result.

Tuberculous peritonitis may present as primary perforative peritonitis in 31% of patients, however, there were no classical signs of abdominal tuberculosis like tubercles in the peritoneum, enlarged mesenteric lymph nodes or murky ascites in our patient.[11] Hence, tuberculous peritonitis was also excluded.

Appendicectomy was done to avoid future infection related diagnostic dilemmas and reoperation difficulties in a previously operated abdomen carry high morbidity and mortality. Our custom made transparent plastic laparostomy sheet prevented bowel perforation and fistulisation.

The primary objective of surgery in empyema thoracis are removal of the putrid flakes of pus from thoracic cavity, fibrous septa and adequate decortication.[12] The empyema thoracis is generally divided into three stages. Stage 1 is exudative phase, stage 2 is fibrino-purulent phase and last one is organization stage with thick fibrous peel formation. Stage 1 alone can be managed by intercostal chest tube placement. Stage 2 with multiloculated collection with thick purulent discharge and stage 3 with organized fibrous adhesions are better managed with thoracoscopic drainage procedure combined with decortication. The key aspects of empyema thoracis treatment are fluid drainage, antibiotics and nutrition.[13] Moreover, the timing of empymectomy is also very important. Those who were treated in less than 4 weeks of duration gives better outcome than one treated more than 4 weeks duration.[14] Our patient was operated in less than 4 weeks (26th pod) time. The common mistakes in the treatment of empyema thoracis are delay in recognition or diagnosis of empyema thoracis, failure to detect the multiloculation type collection and persistence of futile medical therapy.[15]

CONCLUSION

The management of colorectal cancer has progressed over primary peritonitis with septic shock and empyema thoracis is an uncommon entity. The treating surgeon should be aware of this life threatening condition in which prompt diagnosis and management can reduce the morbidity and mortality.

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