Granulomatous peritonitis: An under suspected entity in children

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ABSTRACT

Post-operative granulomatous peritonitis is a rare entity in children. It is a post-operative complication that should be differentially diagnosed in patients who present with abdominal pain, tenderness, and fever after surgery. It closely mimics tuberculosis in both clinical and operative findings and requires histopathological and microbiological examination. Etiologically, post-operative granulomatous peritonitis is observed in patients with a history of surgery, hypersensitive to cellulose fibers, starch, or vegetable matter. Management is done by steroids and anti-inflammatory drugs.

Key words: *Granulomatous peritonitis, Histopathology, Post-laparotomy, Post-operative complication, Tubercules*

Post-operative granulomatous peritonitis in children is a rare post-operative complication which should be considered with high suspicion in all post-laparotomy patients who develop post-operative obstruction. It is a post-operative complication that should be differentially diagnosed in patients who present with abdominal pain, tenderness, and fever after surgery. The exact incidence of post-operative granulomatous peritonitis is unknown because a number of milder cases may go undetected. It bears a striking resemblance to abdominal tuberculosis and should be differentiated on histopathological, immunological, and microbiological assays [1]. Laboratory findings are often non-specific.

Clinical symptoms of post-operative granulomatous peritonitis are heterogeneous. The symptoms usually occur a few weeks after major abdominal surgery done under emergency conditions, triggered by foreign body contamination such as powder from gloves, cellulose cotton fibers from drapes, or undigested vegetable particles from accidental spillage of intestinal contents. This induces a delayed cell-mediated hypersensitive inflammatory response. There are several possible sources of cellulose contamination in the emergency operation setting. The cellulose fibers originate from disposable surgical fabrics such as gowns, drapes, or laparotomy pads, which have been used during the emergency laparotomy or from the digested chyme which was released from the intestinal lumen into the peritoneal cavity during resection. The potential complications are peritoneal adhesions with consecutive intestinal obstructions or intestinal fistula formation.

CASE REPORT

A 7-year-old malnourished male child presented in the emergency department of a tertiary hospital with the chief complaint of pain in abdomen, distension, and constipation for 1 day. The patient gave a history of emergency exploratory laparotomy for acute intestinal obstruction, Meckel's diverticulum, and band obstruction, 12 days before reporting. He had an uneventful postoperative course, was discharged on the 8th day post-operative (POD). The patient was on pantoprazole 20 mg OD and meftal spas ½ tablet was prescribed SOS.

On clinical examination, vitals were stable. Abdominal examination revealed soft distension with palpable bowel loops, though the child reported passing of flatus and stools and no history of vomiting. Per rectal examination revealed liquid fecal matter. X-ray abdomen revealed 2–3 large air-fluid levels in the left upper abdomen. Ultrasound suggested adhesion obstruction, with inflammation of mesentery.

The patient was put on conservative management for subacute intestinal obstruction. He responded partially for 3 days but later on developed fever and abdominal distension because of which reexploration was done with the possibility of some collection or gangrene, adhesions, or retained foreign body.

On reexploration, dense fibrous adhesions were noted throughout the abdomen, mainly involving the small intestine from duodenojejunal junction till ileocecal junction with a cocoon-like structure encasing the terminal ileum. Small nodules like those seen in tuberculosis were found studded all over the small intestine and mesentery (Picture 1). Adhesiolysis was done taking care to avoid enterotomy. Peritoneal fluid was taken for acid-fast bacilli (AFB) and cartridge-based nucleic acid amplification test (CBNAAT). Omentum was sent for biopsy with a probable diagnosis of flare-up of abdominal tuberculosis.

On POD 3, the patient developed distension. AFB and CBNAAT were reported to be negative. Omental biopsy suggested foreign body giant cell granuloma. Under polarizing microscopy, giant

cells appeared to contain foreign material resembling cellulose fibers or vegetable matter (Picture 2). Hence, a diagnosis of granulomatous peritonitis was made. The patient was put on oral ibuprofen, erythromycin in prokinetic doses. IV dexamethasone was administered and the patient responded positively and his distension improved. On POD 12, the patient was discharged. The medications were continued for 2 weeks. Regular follow-up was done for the patient and he was asymptomatic.

DISCUSSION

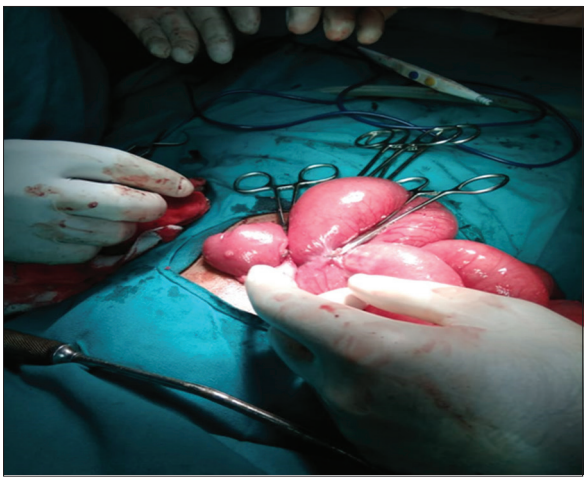
Granulomatous peritonitis is commonly caused by inflammatory, malignant, and idiopathic inflammatory autoimmune conditions (sarcoidosis, tuberculosis, and carcinoma peritonei). Post-operative granulomatous reaction of the peritoneum is a rare occurrence and is thought to be caused by exposure to starch, cellulose fibers from drapes, antiseptic solutions, gauge pieces, and spilled undigested fecal matter [2-4].

Cellulose granulomatous peritonitis was reported by Brittan *et al*. [5] which closely resembled tuberculosis. They reported it to be an underreported entity which was usually self-limiting. The use of polypropylene drapes was considered useful. Exogenous granulomatous peritonitis has been virtually ignored as a cause of post-operative intestinal obstruction. Contamination of the abdominal cavity at the time of surgery by cotton lint from disposable surgical drapes and laparotomy pads appears to be the etiological factor as identified by Liebowitz and Valentino [6]. They concluded that a few patients may require nonsteroidal anti-inflammatory drugs and steroids to prevent recurrence.

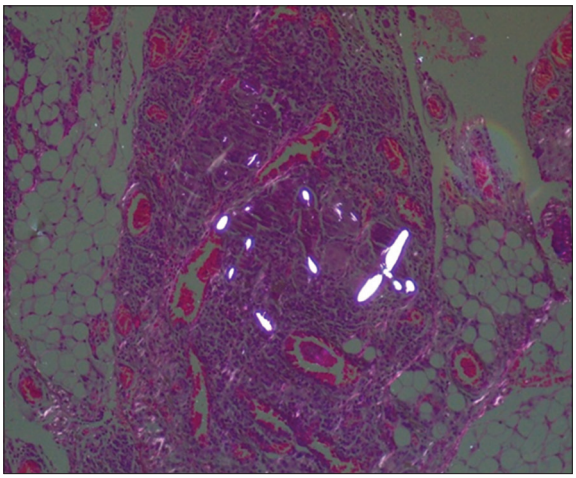
Granulomatous peritonitis due to starch on surgical gloves is difficult to diagnose and a low incidence. Histopathology shows inflammatory tissue with giant multinucleated cells containing birefringent cornstarch particles inside. Under polarized light, the typical maltase cross appearance of cornstarch is revealed. Corticosteroid treatment is an effective choice. Prevention is crucial and is based on the employment of starch-free surgical gloves [7]. In our case, the detected lesions closely resembled tuberculosis lesions, but were shown on microscopy to be granulomas containing foreign material – cellulose particles.

The pathophysiology of post-operative granulomatous peritonitis remains poorly understood. It is assumed that accidental intraperitoneal introduction of foreign material (e.g., cellulose fibers after intestinal perforation or cornstarch from surgical glove powder) induces a delayed cell-mediated hypersensitive inflammatory response with the formation of foreign body granulomas in susceptible individuals [8].

The blood samples could reveal leukocytosis with the left shift and acidosis. Imaging tests, including a plain abdominal X-ray, computerized tomography, or an ultrasound examination, can be performed to detect perforations of the intestinal tract, ascites, abscess formation, or peritoneal thickening. If ascites fluid is detectable, a diagnostic paracentesis should be performed. In the present case, X-ray abdomen revealed 2–3 large air-fluid levels in the left upper abdomen and ultrasound suggested adhesion obstruction, with inflammation of mesentery.



Picture 1: Intraoperative picture showing granulomas on intestinal surface mimicking tubercles



Picture 2: Histopathology showing fibers under polarizing microscopy

Microscopic examination of the granulomas may reveal a wall of epithelioid histiocytes, foreign body giant cells, enclosing either caseous material, masses of disintegrating nuclei, or foreign material particles such as cellulose fiber. Furthermore, multinucleate langhans or foreign body type giant cells containing foreign material particles, surrounded by eosinophils and lymphocytes, can be detected. Mononuclear macrophages and areas of interstitial focal fibrosis may also be traceable.

The most important differential diagnosis of post-operative granulomatous peritonitis represents tuberculous peritonitis and peritoneal carcinomatosis. Tuberculous peritonitis is frequently confused with post-operative granulomatous peritonitis as many clinical and histological features are almost identical. Tuberculous peritonitis is equally difficult to diagnose primarily due to its insidious onset and variability in symptoms. Some reports are also available which highlight flaring up of preexisting tuberculosis in post-operative period [9-11]. Etiologically, tuberculous peritonitis is common in the previous patients with an immunocompromised state.

In the present case, the detected lesions closely resembled tuberculosis lesions, but were shown on microscopy to be

granulomas containing foreign material – cellulose particles. The origin of the cellulose fibers was not entirely clear.

CONCLUSION

Granulomatous peritonitis is a rare occurrence and even more so in children. Due to tuberculosis being so common and rampant in our country, any laparotomy findings of florid yellow nodules, dense fibrosis, and cocoon formation make one suspicious of granulomatous peritonitis. A high index of suspicion and multidisciplinary approach is needed in such cases. Granulomatous peritonitis may respond to steroids and anti-inflammatory drugs.

REFERENCES

1. Kasper P, Pütz K, Fünger S, Suárez I, Jung N, Alakus H, et al. Postoperative granulomatous peritonitis mimicking abdominal tuberculosis. Clin Case Rep 2018;6:1810-4.
2. Hupuczi P, Papp Z. Postoperative ascites associated with intraperitoneal antiseptic lavage. Obstet Gynecol 2005;105:1267-8.
3. Famularo G, Remotti D, Galluzzo M, Gasbarrone L. Granulomatous peritonitis after laparoscopic cholecystectomy. JSLS 2012;16:481-4.
4. Janoff K, Wayne R, Huntwork B, Kelley H, Alberty R. Foreign body reactions secondary to cellulose lint fibers. Am J Surg 1984;147:598-600.
5. Brittan RF, Studley JG, Parkin JV, Rowles PM, Le Quesne LP. Cellulose granulomatous peritonitis. Br J Surg 1984;71:452-3.
6. Liebowitz D, Valentino LA. Exogenous peritonitis. J Clin Gastroenterol 1984;6:45-9.
7. Juaneda I, Moser F, Eynard H, Diller A, Caeiro E. Granulomatous peritonitis due to the starch used in surgical gloves. Medicina (B Aires) 2008;68:222-4.
8. Dobbie JW. Serositis: Comparative analysis of histological findings and pathogenetic mechanisms in nonbacterial serosal inflammation. Perit Dial Int 1993;13:256-69.
9. Dasgupta A, Singh N, Bhatia A. Abdominal tuberculosis: A histopathological study with special reference to intestinal perforation and mesenteric vasculopathy. J Lab Physicians 2009;1:56-61.
10. Krishnamurthy G, Rajendran J, Sharma V, Kumar H, Singh H. Incidental peritoneal tuberculosis: Surgeon's dilemma in endemic regions. Ther Adv Infect Dis 2018;5:97-102.
11. Singh A, Verma A, Shree S, Lal S. Postoperative flare-up of tuberculosis following vaginoplasty. Indian J Plast Surg 2014;47:470-2.

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