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Protracted Chemical Peritonitis Following Laparoscopy for Dermoid Cyst

A management dilemma

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Abstract

Dermoid cysts are common benign ovarian tumors arising from totipotent germ cells. We report a rare case of chemical peritonitis and prolonged fever following laparoscopic salpingo-oophorectomy for torsion of a large ovarian dermoid and discuss the management of this patient with prolonged hospital stay, antibiotics and anti-inflammatory use, repeated drainage of the collection as well as re-laparotomy. The occurrence of this rare condition can be extremely distressing for the patient and treating surgeon alike, as the recommendations for management are limited. The management of chemical peritonitis may require one or more surgical procedures along with prolonged anti-inflammatory therapy.

Keywords: peritonitis, dermoid cyst, laparoscopy

Introduction

Dermoid cysts are common benign ovarian tumors arising from totipotent germ cells.[1,2] The contents are therefore, very diverse and commonly include sebum, hair, teeth, bone, cartilage, and thyroid tissue. The high fat content causes them to float freely in the abdominal cavity, promoting

torsion in 15% of dermoid cysts. Intraperitoneal rupture of a dermoid cyst may lead to chemical peritonitis. Although spillage of cyst contents is fairly common at laparoscopy (66-88%), [3,4] chemical peritonitis is very rare (0.2%). [5,6] The occurrence of this rare condition can be extremely distressing for the patient and treating surgeon alike, as the recommendations for management are limited. The management of chemical peritonitis may require one or more surgical procedures along with prolonged anti-inflammatory therapy.

Case Report

A 31-year-old woman, para1living1, who underwent a caesarean section two and half months before presented to the emergency department at Sultan Qaboos University Hospital, Muscat, Oman, in 2021 with two days history of abdominal pain, vomiting and diarrhea. On imaging, she was found to have bilateral dermoid cysts measuring 75.07mm x 59.69mm (figure1), with the right ovary showing evidence of torsion. Preoperative CRP was 4 mg/L. Emergency laparoscopy was performed. Intraoperatively, the right ovary was 80 mm in size and gangrenous, and left ovary had a smaller dermoid of 40 mm. The large dermoid was punctured with the trocar, to suck out the contents and enable retrieval of the specimen. Inadvertent intraperitoneal spillage of contents occurred, and the specimen (Right tube and ovary) were retrieved through Endobag. Left dermoid cystectomy was performed as well. In view of the peritoneal spill, thorough, repeated peritoneal lavage was done using three liters of saline. As the instilled saline was sucked out, no drain was inserted. Patient was discharged after 24 hours as there were no immediate complications. Histopathology was reported as mature cystic teratoma with hemorrhagic infarction.

The patient was re-admitted three days later with a history of high-grade fever and diarrhea of 1 day duration. On examination, she was dehydrated temperature 38.5^0C, heart rate of 110 beats/min and blood pressure of 110/70 mm Hg. The abdomen was soft, with no clinical signs of peritonitis. Septic work revealed, C-reactive protein (CRP) of 380mg/L, total white blood cell count$16.8X10^9$/L, COVID-19 RTPCR negative, no growth on blood and urine cultures. CT abdomen and pelvis revealed evidence of diffuse intraperitoneal inflammation, fat stranding of mesentery and enlarged mesenteric nodes, with no evidence of intraperitoneal or pelvic collection and no pneumoperitoneum to suggest injury of hollow viscous (figure 2). Mild bilateral pleural effusion was noted with minimal atelectasis of right lower lobe. It was decided to manage her conservatively with antibiotics (Tazocin 4.5 mg IV bid) and intravenous paracetamol only.

The diarrhea subsided over the next week, but high-grade fever persisted. Repeat CT abdomen four days after initiating antibiotics revealed a small sub-hepatic collection and slight worsening of the inflammatory process. The sub-hepatic collection was drained under ultrasound guidance, the aspirate was straw colored and sterile. The blood, urine and stool cultures were sterile. Inflammatory markers, CRP-373mg/L.

Ten days after re admission, patient developed chest pain in addition to persistent high-grade fever. Chest X-ray and CT chest revealed moderate pleural effusion with right lobe atelectasis. A pleural tap was done and a COVID test was repeated. About 580 ml of straw-colored fluid was drained and a pig- tail catheter was left in situ. The pleural fluid was also sterile and negative for acid fast bacilli. Fever persisted and she began to complain of generalized abdominal pain. On examination, a vague tender mass was palpable around the umbilicus.

A decision was taken for exploratory laparotomy and a thorough peritoneal lavage, after counseling the patient that the procedure may not assure complete resolution of symptoms. She underwent a laparotomy 20 days after admission. Intraoperatively, inflamed, thickened omentum was found, dense bowel adhesions were encountered which were separated with difficulty. Dermoid contents of hair and sebum were seen between bowel loops. The contents were cleared as much as safely permissible. The upper abdomen could not be accessed due to dense adhesions. During adhesiolysis, a small jejunal injury occurred, which was closed with vicryl no.3-0. Entire peritoneal cavity and bowel loops were inflamed and edematous. Uterus left tube and ovary were normal. Thorough peritoneal lavage was done with six liters of normal saline and intraperitoneal drain was inserted. Histopathology showed omentum with fat necrosis, microabscess formation and granulomatous inflammation around the content of dermoid.

She remained afebrile for 48 hours after the procedure. Total parenteral nutrition was started as her serum albumin was low (22gm/L) and her oral intake for the last 3 weeks was minimal. Two days post laparotomy, high spikes of fever returned reaching 39°C. Repeat imaging of the chest and abdomen showed a slight worsening of the right lower lobe atelectasis. No intra-abdominal collection or pneumoperitoneum was seen. She began tolerating orally and moved her bowel, the surgical wound was well healed, but the fever persisted. Systemic anti-inflammatory Diclofenac,

was given for four days post laparotomy as her renal parameters were normal. Fever gradually reduced but continued with a maximum temperature of 37.4°C. She was discharged on day 41 of admission, on regular oral paracetamol.

Eight weeks after discharge, she remained afebrile, but complained of nausea and occasional vomiting. She reported a weight loss of 10 kg over the last two months. Blood investigations as well as repeat CT abdomen and pelvis was ordered. Counts, liver function tests and CRP were normal. CT scan revealed multiple nodular deposits in the entire abdomen - mesentery, para colic gutters and sub-diaphragm. Radiologist suggested that disseminated carcinomatosis has to be ruled out, other possibilities being granulomatous peritonitis (inflammatory response to dermoid contents) or tuberculosis abdomen. Ultrasound guided biopsy revealed granulomatous inflammation. Systemic steroids were considered in case patient was not better symptomatically but fortunately she did not require it.

Patient consent was obtained for publication purpose.

Discussion

Dermoid cysts are common benign tumors of the ovary. 15% of dermoid cysts undergo torsion. Rupture of dermoids either spontaneous or iatrogenic may occur. The contents of dermoid, sebum and hair can be highly irritant to peritoneum, resulting in chemical peritonitis. Hence all attempts must be made to avoid or minimize spillage of contents. This may be difficult with large dermoids especially when laparoscopic retrieval is attempted. Studies have been directed to compare the outcomes of laparoscopy versus laparotomy, with regard to avoiding spillage in large dermoids. Laparoscopy is associated with a higher incidence of spillage, up to 88% with large dermoids, [4] but chemical peritonitis is rare.

A lot of factors may influence the development of this rare complication in certain individuals. The more likely ones being an exaggerated inflammatory response to the irritant contents, the volume of spillage and the thoroughness of the peritoneal lavage. Despite thorough peritoneal lavage at laparoscopy, after spillage of contents, our patient had a prolonged severe inflammatory response due to the spillage of the large dermoid content and her exaggerated inflammatory response causing dilemmas in management. Our initial strategy was to adopt a conservative approach, with broad

spectrum antibiotics and anti-inflammatory medications. As a thorough lavage was done at primary surgery, imaging not revealing any collection and no clinical signs of peritonitis, on initial presentation with post-operative fever.

We hoped that the fever would settle, after the paracentesis and pleural tap, but as high-grade fever continued into the 3rd week, and patient started having diffuse abdominal pain, and a tender vague mass became palpable around that umbilicus, laparotomy and thorough peritoneal lavage was considered. As anticipated, entry into the abdomen was extremely challenging and dense inflammatory adhesions were encountered. No intra- abdominal collection was found and on separating bowel adhesions with difficulty, some hair and sebum were found between bowel loops.

Post operatively patient was started on diclofenac. She remained afebrile for 48 hours, subsequently it was interesting to know that the spikes of fever would occur just prior to the scheduled time of next dose of diclofenac. This prompted us to continue the drug for 8 days, after which anti-inflammatory drug was downgraded to paracetamol, and she gradually improved. Systemic steroids were not given since the role is controversial and the patient had pneumonia.

The case was reviewed by the morbidity committee in the department and agreed that laparoscopy will continue to be the standard of care even for a large dermoid. This case was operated by a skilled consultant with adequate experience. Thorough peritoneal lavage was done and the specimen was retrieved by an endo-bag, as is the recommendation. Prophylactic single dose of antibiotics and was not continued as the was no evidence of infectious process. The committee suggested an earlier re-laparoscopy and lavage within 48 hours of her presentation could have reduced the duration of her morbidity. Why a decision for immediate laparoscopy and lavage was not taken as, it was thought that a thorough lavage was done at primary surgery and going back in might increase morbidity due to adhesions. Howevere, in hindsight immediate relaparoscopy and relavage might be a good option before dense adhesions set in. As there is insufficient literature to support or refute early relaparoscopy.

Laparoscopic approach is preferred to laparotomy, considering the overall reduction in operative morbidity, post op pain, analgesic requirement and hospital stay, with satisfactory scar.[7,8] To minimize the occurrence of intra operative spillage and ensuing peritonitis, measures recommended

include puncture of a large dermoid with trocar, retrieval of the specimen via endobag, [9] and thorough peritoneal lavage. Abundant saline lavage has been proven to reduce inflammation and adhesions significantly in an experimental study.[10] Retrieval of specimen via colpotomy also lessens spillage as compared to laparoscopic port site retrieval.[11] Systemic steroids have also been tried with one group reporting success.[12]

Conclusion

Chemical peritonitis following spillage of dermoid contents poses a management dilemma. Though fortunately rare, when it does occur it is extremely distressing for the patient and the treating surgeon alike. S epsis was ruled out in our patient, thus conservative management with antibiotics therapy formed was tried and as the patient was not responding, laparomty and thorough peritoneal lavage was resorted too but the procedure was technically challenging. Strong multi- disciplinary input along with timely surgical intervention as when required, is the key to successful management of this agonizing complication.

Acute inflammation was the consistent finding both at imaging and at laparotomy. Role of powerful anti-inflammatory agents like steroids need to be studied further.

Authors' Contribution

MGF wrote the whole manuscript. SVK, LM and SS reviewed the manuscript. NAR assisted in the writing and revision of the manuscript. All authors approved the final version of the manuscript.

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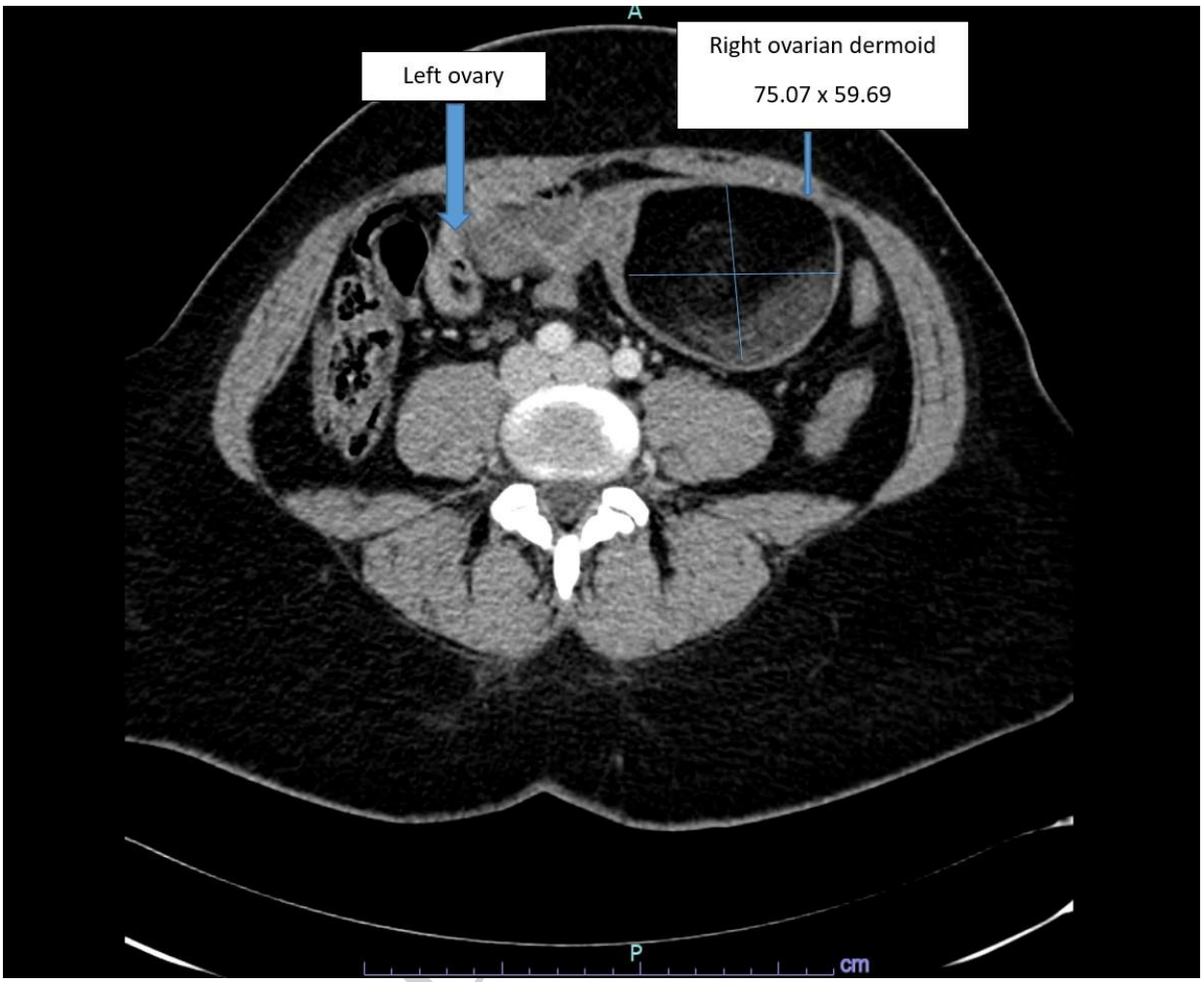

Figure 1: Preoperative CT-abdomen, showing Bilateral dermoids

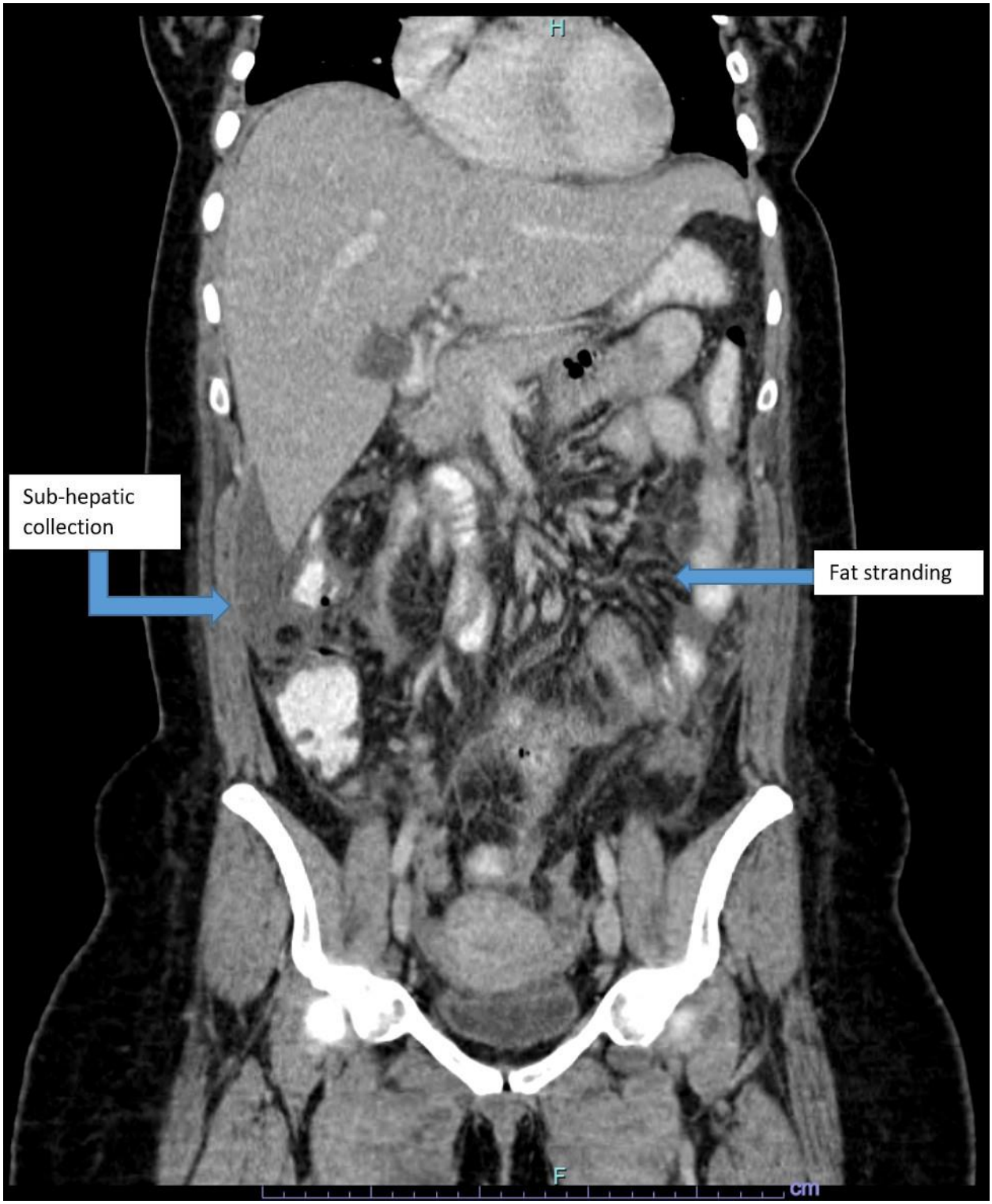

Figure 2: Postoperative CT –abdomen with signs of acute inflammation