

Blunt abdominal trauma ruptured ovarian dermoid cyst and chemical peritonitis. A case report and literature review

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Abstract

Introduction: Dermoid ovarian cyst also called mature ovarian teratoma is the most common benign ovarian germ cell tumor. The rupture of this cyst is an exceptional and potentially lethal complication. It causes acute and severe inflammation of the peritoneum, which can lead to multiple organ failure and death.

Case presentation: We report the case of a 55-year-old black woman, followed in a gynecology unit for an asymptomatic and noncomplex ovarian cyst. She was admitted at the emergency department for severe abdominal pain initially without fever, which occurred following a fall on the abdomen. Following the clinical examination, generalized acute peritonitis was diagnosed. After a short resuscitation, a midline laparotomy was performed. The latter revealed an abundant peritoneal effusion of greyish sebaceous material, resulting from the rupture of a voluminous right ovarian cyst; an acute inflammatory reaction of the adjacent peritoneum; sebaceous implants on the bowels and the mesentery and a non ruptured left ovarian cyst. We performed a bilateral salpingo-oophorectomy and abdominal toileting. The post-operative course was uneventful till six months of follow up. Histopathological analysis of the cysts revealed a mature ovarian teratoma.

Conclusion: Traumatic rupture of an ovarian dermoid cyst is exceptional and leads to a chemical peritonitis requiring an early diagnosis, adequate and immediate management in order to reduce the morbidity and mortality linked to the associated complications.

Abbreviation: °C: Celsius degree; AFP: Alpha-fetoprotein; CA 125: Cancer antigen 125; CT scan: Computerized tomography scan; dl: Deciliter; FAST: Fast focused assessment with sonography for trauma; g: Gram; HCG: Human chorionic gonadotropin; l: Liter; ml: Milliliter; mm: Millimeter

Background

Peritonitis is defined as an inflammation of the serous membrane that lines the abdominal cavity and the organs contained therein. The peritoneum, which is an otherwise sterile environment, reacts to various pathologic stimuli with a fairly uniform inflammatory response. Depending on the underlying pathology, the resultant peritonitis may be infectious or sterile. Chemical (sterile) peritonitis may be caused by irritants such as bile, blood, urine, barium, or other substances such as those from the rupture of a dermoid ovarian cyst [1]. A dermoid cyst or mature teratoma is the most common benign ovarian germ cell tumor. It represents around 70% of germinal ovarian tumors before menopause and almost 20% in postmenopausal women [2]. It can be observed at any age, but with a clear predominance in female of reproductive age [3]. Dermoid ovarian cysts are most often asymptomatic, but they can be revealed by complications [4]; mainly torsion and rupture of the cyst [3-5]. The rupture of an ovarian dermoid cyst in the peritoneal cavity can be spontaneous, but most often iatrogenic [6,7]. However, and very rarely, rupture of an ovarian dermoid cyst can be the result of a blunt abdominal trauma. It is in this line that we report the case of the traumatic rupture of a dermoid ovarian cyst complicated by chemical peritonitis in a post-menopausal patient. A literature review on the

subject was also carried out; it consisted of publications over the last ten years with focus on this pathology.

Case presentation

A 55-year-old postmenopausal woman followed-up by a gynecologist for an asymptomatic ovarian was admitted to the emergency room of our tertiary hospital for diffuse abdominal pain of 24 hours duration which was initially without fever. The pain began following an abdominal trauma 24 hours ago where she fell from the staircase at home with impact on the abdomen. She had mild pelvic pain with spontaneous regression a few minutes later. The outcome a few hours later was marked by recurrence of abdominal pain of increasing intensity, permanent and unremitting to usual analgesic such as Paracetamol 1 g taken orally. The site of the pain was initially hypogastric then became a secondary generalized abdominal pain. Her family and psychosocial histories were normal.

On admission, the primary assessment reported no airway obstruction nor signs of respiratory distress. Her pulse was 112 beats

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per minute, respiratory rate 32 cycles per minute, oxygen saturation 98% and fever (38.4 °C). The cardiovascular examination revealed a normal blood pressure at 112/61 mmHg, warmed extremities. All peripheral pulses were present and of good volume. Her conjunctivae were colored, and heart auscultation was normal. The abdomen was generally distended with no ecchymosis. There was generalized abdominal guarding, rebound tenderness and contracture.

On FAST investigation, a particular peritoneal effusion was seen with a hyperechoic right adnexal mass measuring 167 x 102 mm and a cystic formation of the left iliac fossa measuring 103 x 40 mm. Conventional chest X-ray did not show pneumoperitoneum. A laboratory panel revealed leucocytosis at $12 \times 10^6 / l$, with granulocytic predominance, haemoglobin at 11.3 g/dl. The rest of the biological examinations were within normal ranges. At the end of the clinical assessment, we concluded on a secondary generalized peritonitis. Considering the absence of fever at the beginning, the etiologies evoked were a gastric or bowel perforation or a rupture of right ovarian cyst.

After antibiotic therapy, analgesics and intravenous fluids, we performed a midline laparotomy under general anesthesia. Intraoperative findings were an abundant peritoneal effusion (1600 ml) of greyish sebaceous material resulting from the rupture of a voluminous right ovarian cyst; an acute inflammatory reaction of the adjacent peritoneum; sebaceous implants covering the intestinal loops (Figure 1a) and the mesentery; an unruptured and macroscopically normal left ovarian cyst (Figure 1b, Figure 2). With consent of her husband and with respect of her postmenopausal age, we performed a bilateral salpingo-oophorectomy, and abundant washing of the peritoneal cavity with normal saline.

The postoperative course was uneventful, and she was discharged home six days later. The histological analysis of the resected ovarian cysts showed dermoid cysts or mature single tissue teratoma due to the unique presence of a well differentiated skin ectodermal tissues (pilosebaceous hair follicle and keratin). Postoperative follow-up at two months and six months were normal. The patient had no complaint; the abdominal ultrasound found no peritoneal tumor and the dosage of tumor markers was within normal values (AFP, hCG, CA-125).

Discussion

Definition, classification and epidemiology of ovarian cystic mass

An ovarian cyst is a tumor with a liquid component, which arises from an ovary, surrounded by a capsule and larger than 30 millimeters



Figure 1. Intraoperative view

- A. Very adherent sebaceous implants placed on the intestinal loops and the mesentery
B. Acute inflammatory reaction of the peritoneum and left ovarian cyst (black arrow)

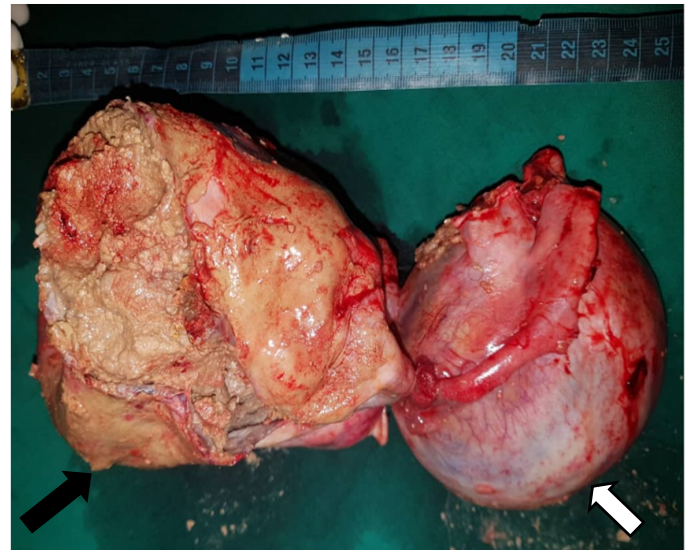


Figure 2. Image of bilateral ovarian cyst

- Black arrow.** Ruptured right ovarian cyst revealing significant pasty sebaceous material
White arrow. Unruptured left ovarian cyst (arrowhead)

[8]. It is a frequent gynecological pathology occurring in 5 to 17% of women [9]. It can be functional or organic. Organic cysts arise from: the surface epithelium (epithelial ovarian tumors); the specialized stroma (sex cord-stroma tumors) or can be derived from germ cells (Ovarian germ cell tumors) [4,6]. These tumors are most often benign, but can be malignant or borderline [4]. Among ovarian germ cell tumors, teratomas are the most common [10].

Histologically, teratomas are made up of elements from the three embryonic layers: the ectoderm (skin and nervous tissue), the mesoderm (muscle and adipose tissue) or the endoderm (digestive tract and bronchus) [4,8].

We distinguish the immature teratoma which is a malignant tumor and the mature teratoma also called benign cystic mature teratomas or dermoid cysts. Almost 95% of all teratomas in the ovaries are benign [10]. The term “dermoid cyst” is due to the predominance of ectodermal derivatives (sebaceous glands, skin appendages and keratin) within the sebum cystic content.

Mature teratomas are made up of well-differentiated tissue from at least two of the three layers of stem cells. Ectodermal and mesodermal tissues are found in 100% and 90% of cases respectively. Macroscopically, they are cystic tumors in 88% of cases, rarely solid. In cystic forms, their liquid content is most often sebaceous in nature and rarely serous [4,10]. In our patient, it was an unusual histological form, namely a mature single tissue teratoma made entirely of cutaneous ectodermal tissue with a pasty sebaceous content on the right side and serous content on the left side.

The pathology is usually unilateral, on the right side, and bilateral in 10 to 17% of cases [4]. In the patient described in the case report, the cyst was bilateral, hence, unusual.

Clinical manifestations

Dermoid cyst is usually asymptomatic and discovered during a routine gynecological examination or imaging. When symptomatic, it causes a lower quadrant abdominal pain, due to complications [4,6] such as torsion (16%), and rupture in 1.2 to 3.8% of cases [3]. Infection,

hemorrhage and hemolytic anemia are more rare complications [8]. Malignant transformation is exceptional and is only observed postmenopausal women [4].

The rupture of an ovarian dermoid cyst, though exceptional, is most often iatrogenic (intraoperative), sometimes spontaneous (during pregnancy or after a torsion) and rarely traumatic [3,4]. Very few cases of traumatic rupture of a dermoid cyst have been reported [11]. The dissemination of cystic contents into the abdominal cavity is called “spillage” [7]. In sudden ruptures with massive spillage, acute peritonitis develops. This chemical peritonitis is linked to the aseptic but chemically aggressive content of the ruptured mature cystic teratoma, which causes granulomatous inflammation of the peritoneal serosa with formation of dense adhesions. The chemical compounds in question are mainly fatty acid and cholesterol crystals and neutral fats diluted in a liquid dispersion phase supposed to be sweat [12-14]. It is a surgical emergency.

In case of cracking of the teratoma and slow flow of its content in the partitioned peritoneum, the diagnosis is guided by the discovery in imaging of fatty peritoneal implants sometimes very far from the cystic ovary. In the context of incidentalomas, the examination shows images similar to those of an ovarian cystic teratoma but of peritoneal localization, sub and/or supra-mesocolic, often reported in literature under the name of “parasitic ovarian dermoid cysts” [7].

Although the diagnosis of generalized acute post-traumatic peritonitis was easily evoked in our patient, the etiology was not obvious. The abdominal and pelvic CT scans could have confirmed the diagnosis by the presence of infiltration with edema of the parietal peritoneum, mesentery and large omentum, associated with fluid collections between the intestinal loops and the Douglas pouch, at contact of a large ruptured mature cystic teratoma of the ovary [7]. However, before the clinical diagnosis of peritonitis, the realization of preoperative imaging is not mandatory, this in order to reduce the morbidity and mortality related to delay in treatment [15].

Management

The treatment of the dermoid cyst depends on the clinical presentation.

When the pathology is discovered accidentally in an asymptomatic patient, the treatment is based on preventive excision of the cyst in order to obtain the histological diagnosis and to avoid the occurrence of subsequent complications (torsion, rupture or malignant transformation).

Recurrence is rare after cystectomy [4]. In a premenopausal woman, preservation of ovarian tissue via ovarian cystectomy is generally preferable to complete oophorectomy. In postmenopausal women, a salpingo-oophorectomy is preferred. Concerning surgical procedure, laparoscopy is the preferred surgical approach because it results in less morbidity than laparotomy [16].

In case of torsion of a dermoid cyst, surgical treatment becomes urgent, in order to avoid rupture of the cyst and to salvage the ovary from ischemic necrosis. The treatment methods are the same as those mentioned above.

In the event of rupture into the peritoneal cavity, the consequence is a severe generalized chemical peritonitis. The initial treatment consists of resuscitation measures combining hydration, analgesics, blood transfusion and correction of electrolyte imbalances.

The surgical intervention takes place in two steps. The first consists of an aspiration of spilled ovarian cyst contents, generous and profuse irrigation of the cavity with lukewarm normal saline and suction to eliminate any residual sebaceous material. The second stage is cystectomy or salpingo-oophorectomy [6]. The procedure can be performed laparoscopically. Therefore, large volume suction / irrigation system and other appropriate operative laparoscopy tools should be available. Using a 10 mm port, large volumes of intra-peritoneal blood and clot can be removed by alternating suction and irrigation. Several operations to wash the abdominal cavity are sometimes necessary [13,16].

Pronostic

Recurrence after excision of a dermoid cyst is rare. The risk of malignant transformation is described in literature with an incidence of 0.2 - 2% for which can degenerate into carcinomas and sarcomas [3,4]. The factors suggesting malignant degeneration are an age greater than 50 years and a tumor diameter greater than 10 cm [17].

Conclusion

Overall, this case highlights a rare case of a ruptured dermoid ovarian cyst following a blunt abdominal trauma. The ensuing chemical peritonitis from the massive spillage of its content requires immediate and adequate surgical management in order to reduce morbidity and mortality. There are no known methods to prevent rupture of an existing ovarian cyst, with the exception of removal of the cyst.

Declaration

Competing interest

The authors declare that they have no competing interests.

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Availability of data and material

Data sharing is not applicable to this article as no data sets were generated or analyzed during the current study

Ethical consideration

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Any identifying material has been removed, including the patient's name, date of entry, face or any distinctive features on the pictures taken

Author's contribution

IJK and LWT, contributed in design of the study and writing of the manuscript

DBB contributed in critical reading

IJK, collected the pictures, and obtained the patient's consent.

All authors have read and approved the final version of the manuscript.

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