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Management of a Giant Ovarian Cyst during COVID-19 Epidemic: A Case Report

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Abstract

Giant cysts of the ovary are defined as tumors with a diameter greater than ten centimeters. They've become rarer lately because of an earlier diagnosis and management due to availability of imaging modalities and routine checkups. Surgery remains the main form of treatment and the only curative one. We report the case of a 72-year-old woman who was brought to the emergency department for a weight gain of 47 kg, a recently worsening dyspnea and an abdominal distension making her unable to remain supine. Once the assessment was completed, a laparotomy was scheduled. A cystectomy with bilateral oophorectomy was performed and cytology was carried out. At first, histopathology revealed a borderline mucinous tumour, but additional analysis concluded to a mucinous cystadenoma with borderline areas and a transition zone progressing on to an atypical proliferative mucinous tumour and with an expansile mucinous cystadenocarcinoma focally which size was less than 1 cm. Post-operatively, the patient remained dyspneic with desaturation and also had fever. At this point, we suspected her to be positive to the COVID-19 virus. The chest CT scan showed an image of frosted glass, but the polymerase chain reaction (PCR) test was negative. In this report, we will conduct a literature review of the pathology and also discuss its outcome, prognosis and treatment. We shall also cover the anesthetic risk in these women. Such cases are very rare and their management is a real challenge for the anesthesiologist, the surgeon and the pathologist.

Keywords: Giant ovarian cyst; Borderline tumor; Cystadenocarcinoma; Surgery; COVID-19; Anesthesia

Abbreviations: CEA: Carcinoembryonic Antigen; CA 19.9: Carbohydrate Antigen 19.9; CA 125: Cancer Antigen 125; Ck: Cytokeratine; ED: Emergency Department; kU/L: Kilo Units per Liter; PCR: Polymerase Chain Reaction

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Key Message

Management of giant ovarian cyst is a challenge for both, surgeon and anesthesiologist. Good knowledge of ovarian mass and the anatomopathological analysis are essential for the treatment. The prognosis depends on the nature and staging of the cyst.

Introduction

Ovarian cysts are very common pathology, but giant ovarian cysts are rarer today. Giant cyst is defined as a mass measuring more than 10 cm. It has become rarer, because of the early diagnosis of adnexal mass due to routine check-ups and better imaging modalities. In the literature, only few cases have been reported, mainly in elderly patients [1]. Occasionally, ovarian cysts grow up gradually and can reach very large dimensions without raising any symptom. Mucinous cysts represent about 15 percent of all ovarian tumours. About 85 percent of mucinous tumours are benign, while 10 percent are borderline and 5 percent are malignant [2]. They most commonly occur in middle-aged women. In this article we report a 72-year-old woman with a giant right ovarian cyst (40 × 32 × 30 cm) mostly benign but with a borderline and a malignant component measuring less than one centimeter. Outcome and a literature review of the pathology, prognosis and management will be discussed [3].

Case Report

A 72-year-old woman was brought to the emergency department (ED) by her general practitioner for a huge abdominal mass. In her medical history, we retain a high blood pressure, severe obesity (BMI: 39.8), the consumption of 15 cigarettes per day and an ENT surgery. She had no family history of malignancies. The patient revealed gaining forty-seven kilograms in the last three months despite loss of appetite. She also recently presented few episodes of vomiting after meals. She finally explained that she suffered from shortness of breath, becoming increasingly important and that she lately had more mobility problems. On physical examination, the abdomen was uniformly distended with dullness on percussion. The patient was unable to lie supine due to the distension. Her laboratory finding revealed a hypochromic microcytic anemia and an increase of the tumor markers. The serum CEA level was normal, but the serum CA 125 and CA 19.9 were elevated, respectively at 117.7 kU/L (kilo units per liter) and 1425.2 kU/L. A contrast-enhanced abdominal CT-scan showed a large, well-defined abdominal mass that measured 40 × 32 × 30 cm, shifting the intraabdominal organs aside **(Figure 1).** A small intraperitoneal effusion was found in the Douglas pouch. The main hypothesis was of a giant right adnexal mass. Based on the first investigations, we decided to hospitalize the patient to complete the assessment and to prepare her for surgery. A parenteral nutrition was started since the patient had been starving for several days. Preventive doses of Enoxaparin have been started twice daily to prevent deep vein thrombosis and pulmonary embolism. An oral antiacid medication was prescribed as a prophylaxis against acid aspiration syndrome. The operation was scheduled four days later, after the patient had given consent regarding high-risk of the procedure.

Procedure was performed under general anesthesia in left lateral decubitus position. A midline sub and supra umbilical laparotomy was decided for the removal of the giant cyst **(Figure 2).** Additionally we performed a preventive bilateral oophorectomy. A drain was left at the end of the surgery. Once extubated, the patient was transferred to the intensive care unit for a 24 hours-monitoring.

At first, the histopathological diagnosis revealed a large atypical proliferative mucinous tumour, forming an encapsulated lesion with no clear sign of malignancy, classified borderline. Thereafter, additional analysis concludes to a mucinous cystadenoma with borderline and transition zones progressing to an atypical proliferative mucinous tumor with an expansile mucinous cystadenocarcinoma focally. Cytology was performed, but, unfortunately, the sample was lost.

Before surgery, we thought that the dyspnea presented by the patient was only explained by the cyst volume. But she remained breathless postoperatively with an episode of desaturation. She also had fever (39 degree). In the context of the COVID-19 epidemic, a thoracic CT scan was performed highlighting an unspecific image of frosted glass. PCR test was negative though, but we know that this screening test doesn't have a high level of sensitivity [4]. Anyway, we decided to isolate the patient. A secondary bacterial infection was suspected at this stage, so it was decided to start antibiotic on advice from our microbiologists.

Discussion

Giant cysts are defined as cysts of more than 10 cm. In our case, the cyst measured 40 × 32 × 30 cm and weighed 47 kg. Cystic ovarian masses that develop after menopause could be cancerous. That is why it is important to have regular pelvic exams. It is crucial for

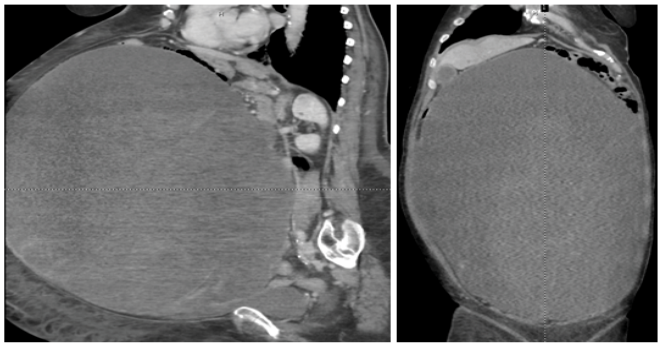

Figure 1 Enhanced CT-scan of a giant cyst from the right ovary measuring 42 × 32 × 30 cm.

Figure 2 Macroscopic view of giant ovarian cyst.

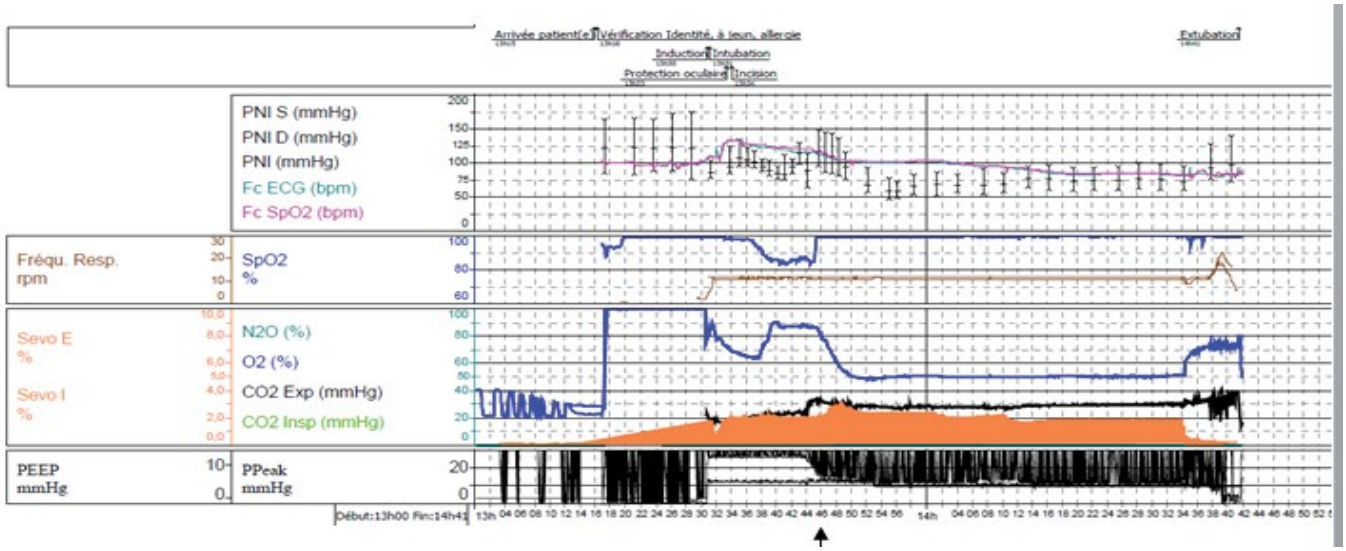

Figure 3 Effect when lifting the mass:

- Exhaled CO_2
- Cardiac output increased
- Blood pressure normalized
- Oxygen concentration decreased from 100% to 50%.

abdominal cystic tumors of unknown type to avoid aspiration of fluid, [5] because it might lead to the dissemination of malignant cell if the mass is cancerous, as described by Fischer [6]. In our case, the tumor markers were increased, which kept doubts about the nature of the mass.

As outlined above, epithelial tumors represent 60% of the ovarian tumors. Most of them are benign. Mucinous mass constitute 15% of the ovarian epithelial tumour. Among them, 85% are benign, while 10% are borderline and 5% are malignant. The particularity of our lesion is that on histopathological analysis, the major part of the mass was a mucinous cystadenoma with borderline area and a zone of mucinous cystadenocarcinoma of less than 1 cm. Ovarian mucinous masses are usually unilateral and multilocular. These tumours are frequently voluminous. Mucinous cystadenoma have a thin wall and occur between the third and the fifth decade, while mucinous borderline and mucinous cystadenocarcinoma affect women between fourth and seventh decade. Borderline tumors are divided into two histological subtypes, intestinal group which forms the vast majority and Müllerian group that is scarcer. Those tumors have an excellent prognosis if detected at stage I, as in our case [7]. The criteria which argue in favor of a cystadenocarcinoma are the presence of solid areas and irregular partitions. In our case, giving that borderline areas were found, an immunohistological exam was performed and the cytokeratin (CK) CK 7 and CK 20 were both positive, while the CDX2 was negative.

After a multidisciplinary discussion, it was classified as IA on FIGO's (International Federation of Gynecology and Obstetrics) staging. It corresponds to a tumor that involves one ovary with an intact capsule and without malignant cells in the peritoneal washing or ascites. Unfortunately the cytology was lost. At this stage, we questioned ourselves about the interest of returning to theatre to perform a new cytology as well as peritoneal biopsies. However the expected benefits of another surgery had to be weigthed against the significant morbidity factors. After multidisciplinary discussion, a new surgery was decided. After multidisciplinary rediscussion, a second surgery was planned three month later during which a new cytology, peritoneal biopsies and an appendicectomy were performed. The cytology and histopathology all returned negative.

Invasive mucinous carcinoma is subdivided into expansile type and infiltrative type. Expansile tumours have a better prognosis especially if the capsule is intact. According to expert centers for rare gynecological malignancies, the gold standard treatment for expansile mucinous tumour of the stage IA is a unilateral oophorectomy as well as omentectomy, cytology and appendicectomy for staging. Pelvic and lombo-aortic lymphadenectomy is not recommended for stage I [8].

In the current context of COVID-19 epidemic, the main question was the level of emergency of the surgery. At that moment, we didn't yet have clear recommendations on gynecological surgery. Later, guidelines from the European society for gynecological surgery recommended not carrying elective operations for benign conditions during the pandemic. Surgery for gynecological emergencies or cancer should be performed, unless alternative options are available until the end of pandemic. If surgery is required, it is preferable to screen patients for COVID-19 infection before the operation. The objective of these measures is to avoid the saturation of the health care systems and to limit the spread of infection in high-risk patient. Our patient did not have any symptom apart from dyspnea, which could be explained by the mass size. Despite this, a chest CT scan was performed pre-

operatively and it was normal. According to the guidelines, a positive test should postpone the surgery for 15 days [9]. Given the respiratory problems and the mass volume, surgery was strongly recommended as soon as possible. Furthermore, for the presumed early ovarian cancer on anatomopathological analysis, staging surgery, if it considered necessary, should be postponed until the end of the health crisis according to the recommendation of the "College National des Gynécologues Obstétricien Français" [10].

The anesthetic management of such cases is associated with significant morbidity. The following challenges need to be addressed: [11]

- Risk of hemodynamic instability as the abdominal mass causes compression of the inferior cava vein. This results into a decreased cardiac preload and a decreased cardiac output. Hypotension, tachycardia and reduced end-tidal CO_2 values reflect this decrease in cardiac output. Tilting the table to the left allows a reduction of inferior cava vein compression. Adequate vascular preload is crucial and use of sympathomimetics drugs may be required.
- Risk of hypoxemia because the volume of mass leads to a loss of lung volume, reducing lung compliance and functional residual capacity. As a result, compression atelectasis can occur, leading to ventilation perfusion mismatch (shunt effect). Preoxygenation and use of protective ventilation including PEEP and recruitment manoeuvres can help to avoid desaturation.
- Risk of aspiration during intubation due to impaired gastric emptying. Rapid sequence intubation is therefore recommended in these cases.
- Risk of re-expansion pulmonary edema following the excision of the mass, causing an abrupt decrease in pleural pressure. This phenomenon is usually described after evacuation of pneumothorax or pleural effusion but need to be considered in extreme cases such as this one.
- Risk of major bleeding and risk of hypothermia.

We didn't perform an epidural because the patient had an injection of enoxiparin less than 12 hours before the surgery. Some studies prefer to avoid epidural since it can disturb the mechanism that ensures balance, via sympathetic system, between blood pressure, cardiac output and peripheral vasoconstriction [12]. A complete monitoring was secured in the theatre with a heated water mattress to avoid hypothermia, a pulse oxymeter, ECG, non-invasive blood pressure. After 5 minutes of preoxygenation with 100% oxygen, in right lateral decubitus position, rapid sequence intubation was carried out in supine position, using sufentanyl, Propofol and high-dose rocuronium. Once intubation was done, hypotension and tachycardia and low end-tidal CO_2 values were observed, caused by the high drop in venous return, despite a left-tilt of the table. A bolus of ephedrine was given. When we lifted the mass, the exhaled CO_2 and the cardiac output increased, the blood pressure normalized, and we were able to decrease the oxygen concentration from 100% to 50% **(Figure 3).** From that moment on, we no longer had any particular anesthetic concerns. Surgery is surely the best and only curative solution. It helps to prevent the patient from any complications as perforation and spillage of the mass fluid into the cavity. The giant cyst was progressively removed to minimize the systemic effect on the cardiovascular system. Thereafter, we explored the entire abdominal cavity without finding any other suspicious lesion. The gold standard in early stage in young patients is a unilateral oophorectomy to allow future pregnancies. In our case, we decided to do a bilateral oophorectomy since the patient was 72-year-old. Appendectomy was not performed, the appendix being normal.

Conclusion

The giant ovarian cyst has become rare these days. A good knowledge of the different types of ovarian cysts is necessary for an optimal treatment. Surgery is the treatment of choice and the only way to relieve the symptoms caused by the mass effect of the tumor. The clinical symptoms can be explained by the gradual increase of the mass which compresses the splanchnic organs.

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