Removal of a 40-kg ovarian tumor and the ensuing complex postoperative complications

Alya Binmahfouz, Paul Leschke, Karin Steinke

ABSTRACT

Introduction: Giant ovarian cystic tumors are uncommon, they are mostly encountered in postmenopausal females who do not seek medical attention early in the course of the disease, out of fear of being diagnosed with malignancy. However, late presentation subjects patients to a wide spectrum of complications and at times an unfavorable prognosis.

Case Report: We present the case of a 57-year-old female who was admitted to our hospital in an unstable condition, complaining of dyspnea and massive abdominal distention. Imaging showed a giant ovarian cystic tumor, causing mass effect on the lungs and abdominal viscera and compressing the inferior vena cava (IVC). After drainage of 38 L of dark brown fluid and surgical removal of the tumor, the patient suffered respiratory failure due to re-expansion pulmonary edema, and was admitted to the intensive care unit (ICU) and mechanically ventilated. Additionally, therapeutic heparinization of IVC thrombosis was accomplished. The histology of the ovarian mass revealed borderline mucinous tumor. The patient made a full recovery after 15 days.

Conclusion: This case illustrates the spectrum of potential postoperative complications ensuing from the removal of a giant abdominal mass causing respiratory and hemodynamic imbalance.

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CASE REPORT

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Keywords: Giant ovarian tumor, Postoperative complications, Re-expansion pulmonary edema

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INTRODUCTION

Giant ovarian cystic tumors are not common, they are mostly encountered in postmenopausal females who do not seek medical attention early in the course of the disease, out of fear of being diagnosed with malignancy. However, late presentation subjects patients to a wide spectrum of complications and at times an unfavorable prognosis.

CASE REPORT

A 57-year-old nulliparous woman was brought in by ambulance with respiratory distress and increasing abdominal pain. She reported progressive abdominal distention over the past two years on a background history of longstanding depression and schizophrenia.

She was single, living with her mother, had social phobia and white-coat phobia preventing her from seeking medical attention for her condition. She had fallen out of bed, suffered right rib fractures and was not able to get up, which prompted call of the ambulance. On physical examination she was pale, afebrile, with a heart rate of 110 beats/min, respiratory rate of 25 breaths/min, and blood pressure of 150/95 mmHg. She weighed 112 kg, and a height of 155 cm. Her abdomen was markedly distended with dilated superficial veins, and an abdominal girth of 117 cm (Figure 1). She had marked bilateral lower limb and sacral edema, and her feet were dusky and cool.

The laboratory results showed low hemoglobin at 99 g/L (115–160 g/L), high urea at 8.8 mmol/L (2.1–7.1 mmol/L), normal creatinine 77 μ mol/L (46–90 μ mol/L), and normal coagulation profile. Her blood gases were disturbed: low PO₂ 61 mmHg (75–100 mmHg), high PCO₂ 54 mmHg (35–45 mmHg), and low pH 7.28 (7.35–7.45). Tumor markers showed markedly elevated CA-125 at 463 kU/L (<35 kU/L), slightly elevated CA-19.9 at 39 kU/L (<35 kU/L) and CEA at 6.6 μ g/L (<5 μ g/L), and normal β -hCG <5 IU/L.

A frontal chest radiograph demonstrated bilaterally elevated hemi-diaphragms with markedly reduced lung volume; however, no large pleural effusion was evident. A large radiopaque abdominal mass was visible (Figure 2A). Abdominopelvic ultrasonography (US) scan showed a massive complex cystic mass with septations, the origin of which could not be reliably identified. A contrast enhanced CT scan of the abdomen and pelvis showed a 38x38x50 cm septated cystic mass arising from the pelvis, extending to the upper abdomen, with significant mass effect (Figure 2B), displacing and compressing intra/extraperitoneal structures, and causing intrahepatic bile duct dilatation and bilateral renal pelvicalyceal dilatation. The small and large bowel loops were severely effaced and the right lower lobe of the lung was collapsed. No free intra-abdominal fluid was seen.

Shortly after admission, the patient underwent laparotomy with right salpingo-oophorectomy. 38 L of dark brown fluid were drained from the right ovarian cystic mass that measured 50x40x45 cm (Figure 3). Gross histopathologic examination showed a multiloculated cystic ovarian mass, with 6 mm thick outer wall, the largest cyst measured 30 cm in diameter, and contained serous to viscous fluid; no solid circumscribed tumor areas were present, the external surface was smooth. Microscopic examination revealed mucinous borderline ovarian tumor with intestinal-type epithelium, areas of papillary and pseudopapillary architecture, mild to moderate cytological atypia, and occasional mitotic

figures. No definite stromal invasion was detected. In the immediate postoperative period, the patient went into respiratory failure presumed secondary to re-expansion pulmonary edema and was admitted to ICU and mechanically ventilated. A CT pulmonary angiogram excluded pulmonary embolism, however, a suspicion of IVC thrombosis was raised; the lower cuts of the scan showed a scaphoid abdomen with decompression of the liver and kidneys (Figure 4). A dedicated abdominal sonographic examination confirmed non-occlusive thrombosis of the IVC (Figure 5), for which the patient received IV heparin for seven days that was bridged with warfarin subsequently. On the seventh postoperative day, she was transferred to the ward in a stable condition, received nutritional and psychological care, and was discharged from hospital after further eight days.

DISCUSSION

Ovarian cancer is the second most common gynecologic malignancy following endometrial cancer;

Figure 1: Photograph of a 57-year-old female presented with respiratory distress and marked abdominal distention, abdominal girth was 117 cm.

Figure 2: (A) Preoperative semi erect chest X-ray demonstrating decreased lung volume with bilaterally elevated hemidiaphragms and bibasal atelectasis, no significant pleural effusion seen. Diffuse increased opacity of the visualized part of the abdomen denoting a large abdominal mass. (B) Sagittal reformat of a contrast enhanced CT scan of the abdomen and pelvis demonstrates a large abdominopelvic hypodense mass with significant mass effect on the lungs and abdominal viscera.

however, it claims the lives of more women worldwide. Prevalence increases with age and peaks in the 6th decade of life. Ovarian tumors can be classified as epithelial, germ cell, sex cord–stromal, or metastatic. The most common of these are epithelial tumors, with an incidence of 85%. Borderline cystic ovarian tumors, as the presented case, represent an intermediate category in the spectrum from benign to malignant, and occur commonly as serous and mucinous subtypes. They have a 10% risk of extra-ovarian spread, and a five-year survival

rate of 90%. Our case demonstrates classic mucinous features including large size, septations and densities of the cyst contents higher than simple cystic or serous fluid, often above 10 Hounsfield Units. The slow growth over several years favors a non-malignant subtype. Although elevated serum CA-125 levels are seen in 80% of ovarian cancer patients, only 50% of patients with early disease have elevated CA-125, which has a sensitivity of 69–97% and specificity of 81–93%. However, elevated CA-125 is not confined to malignancy; it is also elevated in patients with liver cirrhosis, endometriosis, adenomyosis, fibroids, pelvic inflammatory disease, pancreatitis, 40% of patients with non-ovarian malignancy and even in 1% of healthy subjects. Other biological markers including alpha-fetoprotein, human chorionic gonadotropin, CA-19.9, and carcinoembryonic antigen are of limited usefulness, and can be elevated in many benign conditions and non-ovarian malignancy [1, 2].

Role of Imaging

Transvaginal ultrasonography (US) is the initial step in the diagnosis of ovarian tumors because it is readily available, non-invasive, has a high negative predictive value and helps in distinguishing cystic from complex cystic-solid and solid lesions. Computed tomography scan is essential in the preoperative assessment of the extent of disease and in postoperative follow-up, as it allows for comprehensive evaluation of lymphadenopathy and evidence of recurrence, and with the use of oral contrast agent, it can differentiate bowel from peritoneal implants—a major advantage over US and MRI scan [1]. MRI scan should be reserved for problem solving when US findings are non-diagnostic or equivocal. FDG PET has a low sensitivity of 58% and specificity of 76% in the early diagnosis of ovarian cancer. Nonetheless, the role of fused PET/CT in the preoperative evaluation and postoperative follow-up of ovarian cancer patients is promising, with a sensitivity of 80% and specificity of 97% [3].

While it is important to accurately characterize lesions preoperatively as benign or malignant, this distinction is often difficult, even with MRI scan. Treatment may be ovary sacrificing (salpingo-oophorectomy) or ovary-sparing, based on the risk of malignancy [2].

Complications

Preoperative complications include torsion, infarction, hemorrhage, and cyst rupture with resultant pseudomyxoma peritonei [4]. Intraoperative/postoperative complications comprise aspiration, re-expansion pulmonary edema caused by rapid expansion of a chronically collapsed lung with increased pulmonary vascular permeability, and circulatory collapse resulting from a combination of significant intraoperative blood loss and splanchnic venous pooling after sudden removal of the mass leading to decreased venous return [4, 5]. An extensive study on the pathogenesis of re-expansion

Figure 3: Surgical specimen post right salpingo-oophorectomy demonstrating a large tumor with collapsed cystic component (arrow).

Figure 4: Postoperative spiral CT pulmonary angiogram (inferior cut below diaphragms) showing scaphoid abdomen with decompression of the liver and kidneys.

Figure 5: Gray scale ultrasound image of the abdomen showing an echogenic non-occlusive thrombus of the IVC with narrowed lumen.

pulmonary edema showed that plasma albumin leaks from the pulmonary microvessels immediately after re-expansion when the lung had been in a state of collapse for at least three days [6]. Our patient did not develop hypotension and shock after removal of the cyst, as her hemodynamic parameters were closely monitored, and prudent fluid transfusion was successfully achieved.

The role of anesthesia is critical in prevention of the expected complications. Some studies advocate objective use of muscle relaxants during anesthesia induction, due to the negative effect on thoracic compliance [5]. Furthermore, the surgical technique of drainage of the cyst and excision of the tumor cannot be overemphasized. It has been recommended that tumor be gradually reduced preoperatively to minimize risk of respiratory and circulatory complications, which can be achieved by drainage of the cyst over several hours or sometimes even a few days [7]. A study conducted in Japan concluded that use of a suprapubic catheter for preoperative drainage of the ovarian cyst decreases the risk of intraperitoneal fluid leakage which may facilitate the spread of potentially malignant cells [8].

CONCLUSION

The removal of giant abdominal masses is associated with potential extra-abdominal and systemic perioperative complications, such as but not limited to re-expansion pulmonary edema, hypotension, and thromboembolism that dictate prudent medical and surgical management, and emphasize the need for accurate preoperative planning.

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Author Contributions

Alya Binmahfouz – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Paul Leschke – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Karin Steinke – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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