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Anesthetic Management of a Giant Ovarian Cyst: A Case Report

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CASE REPORT
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ABSTRACT

Ovarian cysts are highly prevalent among women, particularly those of reproductive age. However, giant ovarian cysts are rare, as most cases are detected early during routine gynecological or ultrasound examinations. A giant ovarian cyst is defined as an ovarian cyst that is more than 10 cm in diameter. Cases with giant size pose significant clinical challenges. We report a case of an 18-year-old female patient with symptoms of an enlarged abdomen for six months causing shortness of breath, difficulty in activities and supine position. Initial examination revealed an abdominal circumference of 120 cm and a large cystic mass that required laparotomy. Challenges in anesthetic management are related to increased abdominal pressure by the mass, including aspiration risk, hemodynamic disorders, supine hypotensive syndrome, and re-expansion pulmonary edema. Consideration of anesthetic agent selection and perioperative monitoring strategies is key to minimizing complications and ensuring patient safety. In this case, anesthetic agents were carefully selected due to the presence of a giant ovarian cyst that significantly increased intra-abdominal pressure. A balanced general anesthesia approach was employed, prioritizing agents with minimal cardiovascular effects to maintain hemodynamic stability. Propofol was chosen for induction because of its rapid onset and ease of titration, while sevoflurane was used for maintenance due to its favorable cardiovascular profile and rapid recovery characteristics. Rocuronium was administered to facilitate muscle relaxation, and fentanyl was selected for analgesia owing to its potency and minimal impact on hemodynamics. To mitigate the risk of aspiration, rapid sequence induction was performed with endotracheal intubation in a semi-recumbent position. This anesthetic strategy was specifically tailored to address the risks associated with large intra-abdominal masses, such as aspiration, cardiovascular instability, and respiratory compromise.

Key Messages:

- Careful and tailored anesthetic management is critical for safely overcoming the significant respiratory and hemodynamic challenges posed by giant ovarian cysts, thereby minimizing complications and ensuring positive patient outcomes

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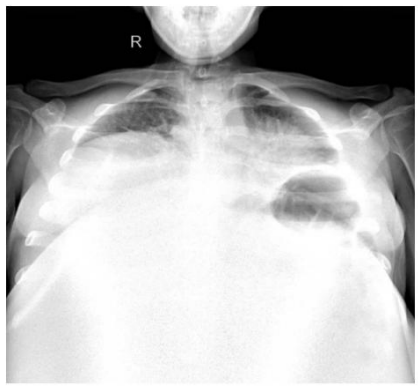
GRAPHICAL ABSTRACT

Anesthetic Management of Giant Ovarian Cyst: A Case Report

A case of an 18-year-old female patient with symptoms of an enlarged abdomen for six months causing shortness of breath, difficulty in activities and supine position.

This report aims to highlight the importance of proper management of permagna ovarian cysts from the aspect of anesthesia to reduce morbidity, mortality and improve the quality of life of patients.



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INTRODUCTION

The epidemiology of *giant ovarian tumors* (GOTs) is markedly understudied, although available data indicates that they are increasingly recognized as clinically significant. The definition of a giant ovarian tumor varies across studies; some define GOTs as those with diameters of at least 10 cm, while others advocate for a threshold of 15 cm or greater (1). Furthermore, cases of giant tumors reaching substantial weights have been documented, emphasizing their potential for significant morbidity. Historical accounts detail tumors weighing up to 137.4 kg (2) (3).

Epidemiological data suggests a decline in the incidence of large ovarian cysts, largely attributable to advanced imaging techniques and routine gynecological screenings, which have enhanced early detection of smaller masses (4). Nevertheless, cases of GOTs continue to pose diagnostic challenges due to their complex presentations, often mimicking other abdominal pathologies such as ascites or gastrointestinal carcinomas (5). Some studies emphasize that approximately 5.1% of cases initially suspected as ovarian cancer were later determined to be due to extra-ovarian diseases (6).

The demographic distribution of giant ovarian tumors most commonly affects women in their reproductive years, though significant instances are also reported in postmenopausal women (7). The histological types of GOTs include several subtypes, such as serous and mucinous cystadenomas, teratomas, and borderline tumors. Mucinous tumors, for instance, account for a significant percentage of cases, and some studies estimate that approximately 52% of giant ovarian tumors are cystadenomas (8) Other sources highlight the risk of borderline malignancy in these cases (9).

The prognosis associated with giant ovarian tumors largely depends on the tumor's histological type, size, and the presence of malignancy at diagnosis. Research has indicated that approximately 24% of giant mucinous tumors exhibit borderline malignancy; thus, their management requires careful consideration of surgical timing and technique (10), (11). Prognostication is also influenced by the presence of ascites, tumor markers, and patient demographic factors, which collectively inform treatment pathways (12).

CASE DESCRIPTION

An 18-year-old female presented with complaints of a progressively enlarged abdomen over the past six months, accompanied by abdominal pain and shortness of breath, likely due to increased intra-abdominal pressure. A history of surgery and comorbidities was denied. The patient had difficulty doing

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activities and sleeping on her back. Physical examination revealed an alert patient, measuring 156 cm in height and weighing 75 kg; no problems were found in the airway. Vital signs show an increased respiratory rate of 30 times per minute, a normal blood pressure of 131/93 mmHg, and a pulse of 93 times per minute. The abdomen appeared enlarged at the level of the xyphoid process, striae were visible, abdominal circumference was 120 cm, bowel noise was difficult to identify, and percussion was found to be dull. Ultrasound revealed a large cystic mass with massive ascites; a thorax roentgen examination showed a narrowed thorax cavity suspected due to pressure from the abdomen; laboratory examination with hemoglobin 11.6 and albumin 3.5, other laboratory values were not significant. The patient was diagnosed with a suspected malignant cystic ovarian neoplasm with massive ascites, classified as American Society of Anesthesiologists (ASA) Physical Status II, and scheduled for laparotomy debulking.

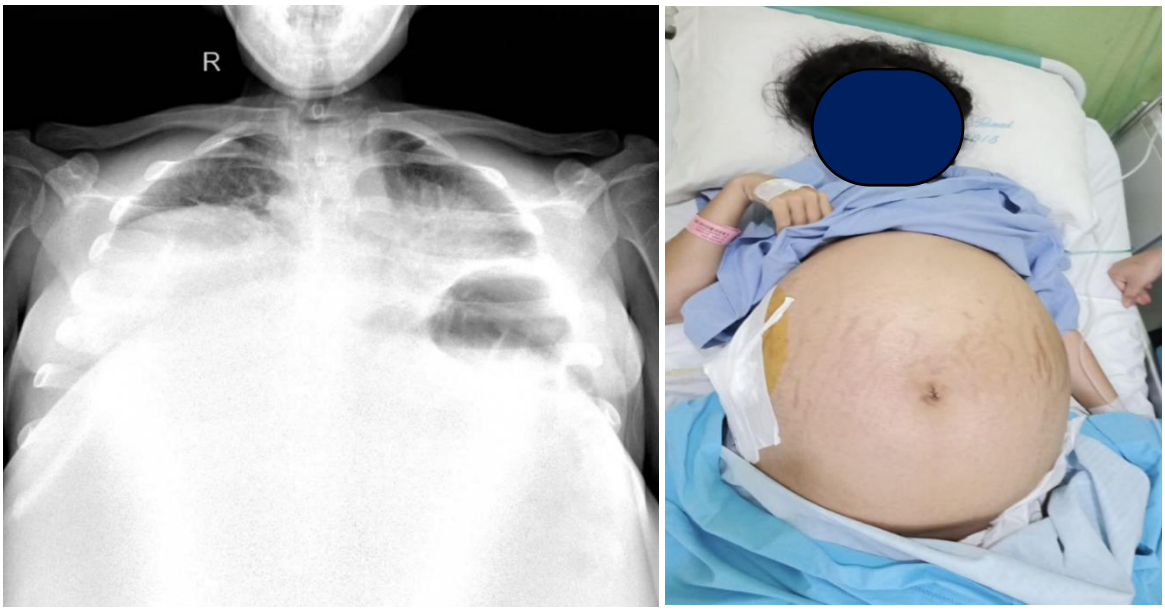

Figure 1. Chest x-ray and clinical photo of the patient

Anesthesia Management

The patient was given ondansetron 8 mg orally (PO) and ranitidine 150 mg PO the night before surgery. Prior to surgery, an abdominal drain removed 2 liters of ascitic fluid over two days. In the operating room, she was positioned supine with her head elevated and her abdomen tilted to the left to alleviate pressure. Preoxygenation was administered via an 8 L/min face mask. A large-bore IV line was placed for fluid administration. Induction was achieved using the Rapid Sequence Induction (RSI) technique with intravenous propofol at a dose of 2 mg/kg and rocuronium at a dose of 1.2 mg/kg to facilitate rapid endotracheal intubation, along with a Sellick maneuver until endotracheal intubation was confirmed. The ventilator was set to assist-control mode with pressure control, a respiratory rate of 14 breaths per minute, inspiratory pressure at 15, PEEP at 5, and FiO_2 at 50%. Sevoflurane at 2-4% and a 50:50 mixture of oxygen and air were used for maintenance.

Intraoperatively, 6 liters of ascitic fluid and a large cystic mass were removed over 2.5 hours, with stable hemodynamic parameters throughout. The patient was extubated in the operating room and transferred to the ICU, where she received fentanyl and paracetamol for pain management over two days. No intraoperative or postoperative complications occurred.

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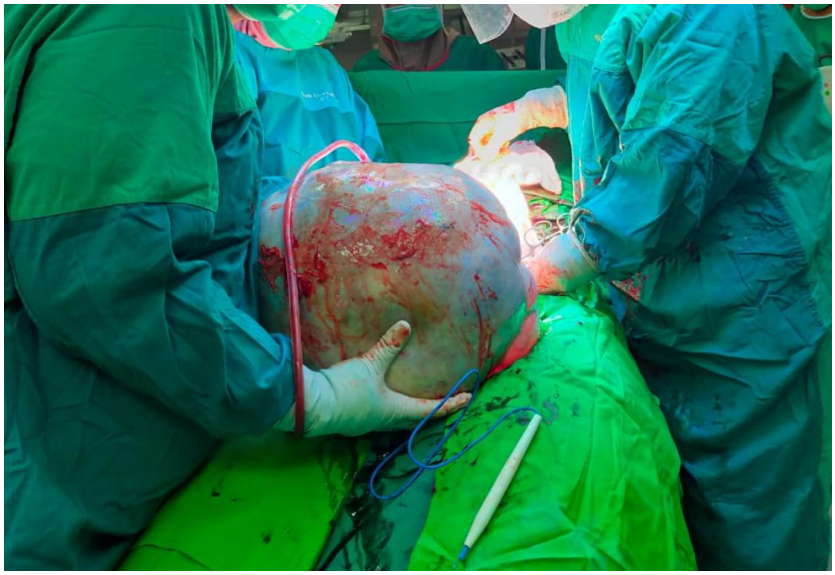

Figure 2. Intraoperative Giant Ovarian Cyst Removal

DISCUSSION

Managing patients with giant ovarian cysts requires a multidisciplinary approach due to the high risk of surgical complications (13). Respiratory and cardiovascular management is particularly critical. Before the tumor is removed, supine hypotensive syndrome may occur from tumor compression(14). During induction of anesthesia, the *head-up* or *beach-chair* position can safely prolong the duration of apnea before significant hypoxemia occurs(15). To mitigate this risk, patients are positioned with the head elevated and tilted to the left. During anesthesia induction, a head-up or beach-chair position can extend apnea time before hypoxemia sets in (16).

In various literatures, general anesthesia is always the first choice for patients with giant ovarian cysts using the Rapid Sequence Induction technique. For these cases, general anesthesia with Rapid Sequence Induction (RSI) is preferred to minimize the risk of aspiration due to increased intra-abdominal pressure caused by the giant mass. Several studies recommend RSI as the induction method of choice in patients at high risk of regurgitation and aspiration, such as those with delayed gastric emptying, elevated intra-abdominal pressure, or large abdominal tumors (17).

Meta-analysis of randomized placebo-controlled trials supports the usefulness of the H-2 receptor antagonists cimetidine, ranitidine, and famotidine in reducing gastric volume and acidity. These drugs block the ability of histamine to induce secretion of gastric juices with high concentrations of hydrogen ions(18). The patient was given ondansetron and ranitidine to prevent regurgitation due to intra-abdominal pressure that could lead to aspiration pneumonia. In addition to the administration of H2-receptor antagonists such as ranitidine to reduce the risk of aspiration, several anesthetic agents have been discussed in the literature regarding their use in surgeries involving giant ovarian tumors. Propofol is commonly used for induction due to its rapid onset and short duration, allowing better control during airway management (19). Rocuronium is preferred for neuromuscular blockade, particularly in rapid sequence induction protocols due to its fast onset at higher doses. Inhalational agents such as sevoflurane are frequently chosen for maintenance of anesthesia because of their favorable hemodynamic profile. Opioids like fentanyl are also commonly used for intraoperative analgesia, with careful dosing to avoid respiratory depression, especially in cases where diaphragmatic splinting is present due to large abdominal masses.

The rapid decrease in thoracic pressure and abdominal pressure after removal of giant ovarian tumors may lead to hemodynamic collapse. Researchers suggest avoiding drainage from a pathological perspective. Regarding intraoperative drainage, more and more researchers prefer slow drainage at a rate of 0.5-1 L/min(14). We have coordinated with the operator for slow drainage to avoid hemodynamic collapse. Intrathoracic pressure changes due to intraoperative positive pressure ventilation may also affect

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hemodynamic factors, risk of re-expansion pulmonary edema (RPE), Pulmonary oedema may occur after tumor removal due to sudden re-expansion of the lung from chronic collapse(15). We gradually reduce inspiratory pressure while coordinating with the operator for gentle tumor removal to prevent RPE. Intense pain after surgery can be a hindrance in the postoperative recovery process(14). Therefore, in this context, it is important to provide effective postoperative analgesia. With this in mind, we chose to implement a multimodal analgesia approach after surgery.

CONCLUSION

A multidisciplinary approach is needed in the management of giant ovarian cysts. Preoperative assessment for patient optimization, intraoperative management of the risk of respiratory and hemodynamic disorders, and postoperative-related postoperative pain management, are essential to avoid complications, reduce morbidity, mortality, and increase patient recovery rates.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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