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## Clinical Reports

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### Same day drainage and removal of a giant ovarian cyst

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**Purpose:** An unusual case of a giant ovarian cyst was successfully anaesthetized with a combination of epidural followed by general anaesthesia. The method was chosen to avoid circulatory depression and re-expansion pulmonary oedema in removal of a giant tumour in a woman who did not understand the nature of her disease.

**Clinical features:** A 58-yr-old woman (107.6 kg, 150 cm and abdominal girth: 163.5 cm) was admitted for removal of a giant ovarian cyst. There was gross pitting oedema of both legs and an elevated diaphragm but no pleural effusion. She did not understand the severity of her disease. It was decided to drain the cyst gradually, followed by total surgical removal on the same day. An epidural catheter was inserted at the L<sub>3-4</sub> interspace with the patient in the left lateral position and, under epidural anaesthesia, 44.3 L fluid were drained over two hours without producing circulatory depression or pulmonary oedema. General anaesthesia was induced, with the patient in the supine position, by slow injection of 10 mg midazolam, 100 µg fentanyl and inhalation of nitrous oxide 50% in oxygen, and maintained with adding epidural block using lidocaine 1.5% and bupivacaine 0.5%, and sevoflurane 0.4 to 0.8%. During surgery, the volume of infused fluid was carefully controlled with central venous pressure monitoring. Ulinastatin, a protease inhibitor, was infused to prevent pulmonary oedema. No circulatory depression nor pulmonary oedema occurred perioperatively.

**Conclusion:** For the removal of a giant ovarian cyst, slow drainage over two hours under epidural anaesthesia may safely precede later removal of the cyst on the same day under general anaesthesia.

**Objectif :** Décrire la technique anesthésique, une épidurale suivie d'une générale, adoptée pour l'exérèse d'un kyste ovarien géant. La technique choisie devait prévenir la dépression circulatoire et l'oedème pulmonaire par réexpansion lors de l'exérèse de la tumeur. La patiente était incapable de comprendre la nature de sa maladie.

**Éléments cliniques :** Une femme de 58 ans (poids : 107,6 kg, tour de taille : 163,5 cm) a été hospitalisée pour l'exérèse d'un kyste ovarien géant. Elle présentait un oedème énorme avec godet aux deux jambes et un diaphragme surélevé mais sans épanchement pleural. Elle ne comprenait pas la gravité de sa maladie. Il a été décidé de drainer le kyste graduellement et d'en faire l'exérèse chirurgicale le même jour. Avec la patiente en décubitus latéral gauche, un cathéter épidural a été inséré à L<sub>3-4</sub>. Sous anesthésie épidurale, le drainage a retiré 44.3 L de liquide sur une période de deux heures sans dépression circulatoire ni oedème pulmonaire. Une fois la patiente en décubitus dorsal, l'anesthésie générale a été induite par l'injection lente de midazolam 100 mg, de fentanyl 100 µg et l'inhalation de protoxyde d'azote 50% en oxygène. L'anesthésie a été maintenue par l'ajout de lidocaïne 1,5% et de bupivacaine 0,5% à l'épidurale et l'inhalation de sévoflurane 0,4 à 0,8%. Pendant la chirurgie, la tension veineuse centrale a servi à monitorer le volume de liquide perfusé. Un inhibiteur de la protéase, l'ulinastatin, a été perfusé pour prévenir l'oedème pulmonaire. La période périopératoire s'est déroulée sans dépression circulatoire ni oedème pulmonaire.

**Conclusion :** On peut sans trop de risques enlever un kyste ovarien géant sous anesthésie générale en faisant précéder l'intervention d'un drainage réparti sur une période de deux heures.

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**R**EMOVAL of a giant abdominal tumour may cause circulatory collapse<sup>1</sup> or re-expansion pulmonary oedema.<sup>2</sup> Also, administration of general or spinal anaesthesia in a patient with a huge abdominal mass may induce circulatory shock due to aortocaval compression. In previous reports,<sup>3,4</sup> tumours have been removed, without circulatory or respiratory complications, by the gradual drainage of 44–48.4 L of cyst fluid over four or five days before definitive surgery. However, this slow drainage restricts patient activity and necessitates hospital admission for several days before removal of the tumour.

We describe a patient with a giant abdominal tumour of 47.0 kg, in whom it was decided to drain the cyst gradually under epidural anaesthesia before removal of the tumour, on the same day, under general anaesthesia.

### Case report

A 58-yr-old woman complained of an abdominal swelling which had been enlarging for 44 yr. At 14 yr, her weight increased from 28 kg to 58 kg. Since then, her weight had increased steadily. On admission, she weighed 107.6 kg with a height of 150 cm and an abdominal girth of 163.5 cm. There was gross pitting oedema of both legs and engorged veins in the anterior chest and abdominal wall. Arterial blood pressure was 140/94 mmHg and the heart rate was 60 beats·min<sup>-1</sup>. She could not sleep in the supine position. Chest X-ray showed an elevated diaphragm and enlargement of the lower thoracic portion due to a large abdomen but there was no pleural effusion.

There were no abnormalities in haematological and biochemical data, blood gas analysis (pH 7.431, PaCO<sub>2</sub> 38.5 mmHg, PaO<sub>2</sub> 87.8 mmHg breathing room air) and respiratory function tests (% of FVC was 80.2% and % FEV<sub>1.0</sub> was 75.9%). The abdominal swelling was diagnosed as a giant ovarian cyst by computed tomography. She did not understand the severity of her disease. It was decided to drain the cyst gradually which was to be followed by surgical removal on the same day.

The patient starved for at least 12 hr before entering the operating room. No premedication was given and she was transported to the operating room in the left lateral position to avoid aortocaval compression. In the same position, an epidural catheter was inserted 5 cm cephalad at the L<sub>3-4</sub> space by a median approach using an 18 G Tuohy needle. Insertion of the epidural catheter was not difficult despite the large abdomen. We attempted to insert a catheter in the inferior vena cava (compressed by the tumour) to monitor central venous pressure (CVP), but identification of the femoral artery

and vein in the inguinal region was impossible due to the large size of her abdomen. Therefore, only the upper CVP was monitored via the internal jugular vein. Arterial blood pressure, heart rate, percutaneous arterial oxygen saturation (SpO<sub>2</sub>) and upper CVP were monitored. Six millilitres lidocaine 1.5% were injected epidurally to produce an analgesic level from T<sub>7</sub> to L<sub>4</sub>, 10 min after injection. Then, spontaneous drainage of the cyst with echo guided puncture was commenced. A total of 44.3 L cyst fluid drained over two hours with only slight decreases in arterial blood pressure and CVP (Figure). The patient was then turned to the supine position.

General anaesthesia was induced slowly with 10 mg midazolam, 100 µg fentanyl and inhalation of nitrous oxide 50% in oxygen. Tracheal intubation was facilitated with 8 mg vecuronium. Anaesthesia was maintained with epidural block using lidocaine 1.5% or bupivacaine 0.5%, nitrous oxide 50% in oxygen and sevoflurane 0.4 to 0.8% (Figure). Muscle relaxation was obtained with vecuronium. When the SpO<sub>2</sub> decreased to 98% during surgery, ulinastatin (a protease inhibitor; Miraclid™, Mochida Pharmaceutical Co. Ltd.) 300,000 units in 100 ml saline were infused over one hour in an attempt to prevent pulmonary oedema. After surgery, tracheal extubation was performed without difficulty, but the patient was observed in the intensive care unit after operation. The duration of surgery (including drainage) was five hours 45 min and the duration of anaesthesia was seven hours and 45 min. Blood loss was 1800 ml, cyst fluid drainage was 44,300 ml and urine volume was 2900 ml. Blood transfusion of 700 ml (concentrated red blood cell), infusion of 2,850 ml of crystalloid (lactated Ringer's solution) and 2,250 ml of plasma protein fraction (Plasmanate Cutter™ including 44 mg albumin

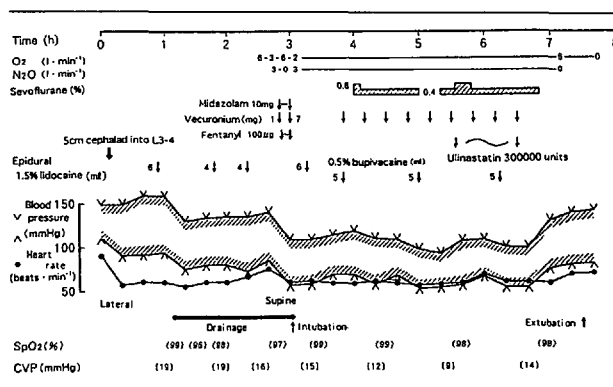


FIGURE Anaesthesia record

O<sub>2</sub>: oxygen, N<sub>2</sub>O: nitrous oxide, SpO<sub>2</sub>: percutaneous arterial oxygen saturation, CVP: central venous pressure measured through a catheter via superior vena cava. Epidural anaesthesia with lidocaine 1.5% was used for cyst drainage and general anaesthesia for tumour removal.

per 1 ml) were given. There were no changes in blood gas analysis, chest X-ray findings or haematological and biochemical examinations after surgery. The weight of the cyst was 47.0 kg including the suctioned fluid and the pathological findings were of mucinous cystadenoma. The patient was discharged from the intensive care unit next day without complication.

### Discussion

In the present case, a giant ovarian cyst was successfully drained and removed on the same day using epidural followed by general anaesthesia. Initially, it was planned to drain the cyst fluid under local anaesthesia for a few days before removal of the tumour, as has been reported previously,<sup>3,4</sup> to prevent circulatory depression and re-expansion pulmonary oedema during tumour removal. However, the patient could not fully comprehend her medical situation and it would have been difficult for her to be restricted for several days. Therefore, it was decided to drain the cyst and remove the tumour on the same day.

Cyst drainage required only regional anaesthesia. Spinal anaesthesia was avoided to prevent circulatory depression, vasodilatation and aortocaval compression due to loss of muscle support. Local anaesthesia may produce insufficient analgesia for peritoneal manipulation and it cannot be maintained for up to four hours. Therefore, epidural anaesthesia was chosen. General anaesthesia was selected for tumour removal for several reasons. First, the tumour was very large and a large incision and long duration of the operation was expected. Second, we judged that she would not tolerate lying still for a long time whilst awaked. Third, general anaesthesia was considered to have no further risk for circulatory depression or re-expansion pulmonary oedema after cyst drainage had been performed before anaesthesia induction.

For removal of a giant abdominal tumour, general anaesthesia<sup>5</sup> or epidural anaesthesia<sup>6</sup> has been reported. The induction of general anaesthesia is sometimes difficult because of decreased lung and thoracic compliance due to the enlarged abdomen. Kobayashi *et al.*<sup>5</sup> reported a case of difficult ventilation with premature ventricular contractions (PVC). In that case the trachea was intubated under insufficient depth of anaesthesia due to difficult ventilation, which induced bronchospasm followed by PVCs.<sup>5</sup> The patient with a large abdominal tumour could be treated as a full stomach. Rapid sequence induction with cricoid pressure might be the first choice. However, induction with barbiturate and succinylcholine may induce haemodynamic instability because the depth of anaesthesia is insufficient and barbiturates produce marked

cardiovascular depression. Therefore, anaesthesia was induced with slow injection of midazolam and fentanyl to avoid cardiovascular depression and to give a sufficient anaesthesia.

Epidural anaesthesia has been reported for the removal of ascites and a large abdominal tumour in a 74-yr-old woman.<sup>6</sup> The authors monitored upper and inferior vena caval pressure, but experienced a sudden decrease in blood pressure during change from the left lateral to the supine position. Our attempt to insert a catheter in the inferior vena cava failed because of the large abdomen. Therefore, we abandoned lower CVP measurement and monitored only upper CVP. No alteration in blood pressure occurred during change of position from left lateral to supine because of the appropriate administration of crystalloid and colloid (plasma protein fraction) solutions to keep the CVP in stable.

Pulmonary oedema has been reported following surgery for a giant intra-abdominal cyst.<sup>7</sup> Pulmonary oedema may occur after removal of the tumour due to the sudden re-expansion of a chronically collapsed lung as a result of compression by the elevated abdomen. This is similar to the unilateral pulmonary oedema after treatment of spontaneous pneumothorax.<sup>8</sup> In the present case, the cyst was drained gradually during spontaneous ventilation with epidural anaesthesia to re-expand the collapsed lung slowly. In addition, ulinastatin, a protease inhibitor, was administered during operation. Ulinastatin inhibits both the activity and the release of various enzymes: trypsin, chymotrypsin, elastase, hyaluronidase, etc. and it has stabilizing effects on cell membranes.<sup>9</sup> Ulinastatin is reported to reduce increased pulmonary permeability,<sup>10</sup> and it might prevent pulmonary edema.<sup>11</sup> There are no reports on the side effects of ulinastatin. In this case, ulinastatin was administered during general anaesthesia. However, it might be better to administer ulinastatin before the start of positive pressure ventilation, that is before intubation, to prevent an increase of pulmonary permeability by re-expansion.

In conclusion, 47 kg of ovarian tumour was removed safely under general anaesthesia after draining the cyst for two hours under epidural anaesthesia.

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