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Absorption of Irrigating Solution during Hysteroscopic Metroplasty

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Absorption of irrigating fluid during transurethral resection of the prostate is a well-known phenomenon.[1] Depending on the height of the container holding the irrigating solution and hence the hydrostatic pressure and length of time required for the resection, several liters of fluid can be absorbed over the course of an hour. The absorbed fluid can cause acute hyponatremia, red blood cell hemolysis, disseminated intravascular coagulation, and even pulmonary edema from volume overload.[1] We report a patient who underwent hysteroscopic metroplasty using sterile water as irrigant and subsequently developed hyponatremia, hemolysis, and mild disseminated intravascular coagulation.

CASE REPORT

A 33-yr-old, 53-kg woman, who had four pregnancies with first trimester miscarriages and who also had a septate uterus, was scheduled for hysteroscopic metroplasty. Her past medical history was otherwise unremarkable. Vital signs and results of routine laboratory tests including hemoglobin concentration of 14.0 g were normal.

The patient underwent laparoscopy with laser ablation of endometriosis and adhesions concurrently with hysteroscopic metroplasty under anesthesia (and tracheal intubation) maintained with nitrous oxide/oxygen, enflurane, fentanyl, and vecuronium; 8 l of sterile water under hydrostatic pressure of 60–80 mmHg were used to distend and irrigate the uterus over the course of 2 h. The uterine septum was relatively avascular, and it appeared that most of the irrigant returned back through the cervix or was suctioned out of the abdomen after transtubal passage. The anesthetic course was uneventful except for an increase in blood pressure from 120/70 to 150/90 mmHg without a change in heart rate 40 min after hysteroscopy was started. Hematuria was noted toward the end of the case. The patient emerged from anesthesia and quickly became alert and oriented. Because there had been no obvious trauma and the urine was pink in color rather than dark red, hemoglobinuria was suspected. Blood was drawn from the patient to determine hemoglobin, free hemoglobin, and electrolyte concentrations. Tests to diagnose disseminated intravascular coagulation (DIC) including prothrombin time (PT), partial thromboplastin time (PTT), and fibrin split products (FSP) were also performed.

The results revealed a decrease in hemoglobin to 12.4 g/dl, a free hemoglobin of 145 mg/dl (normal = 0–24), and a sodium of 129 mEq/l. The tests for DIC showed a prolonged PTT of 41.1 s (normal, 24–36 s) and elevated FSP of >10 but <40 s (normal, <10 s). The PT was 11.4 s (normal, 9–12 s). She had mild oozing from the periumbilical incision. Pulse oximetry showed a saturation of 98–99% and she was breathing room air and the lungs were clear on examination.

The patient was treated with mannitol 50 g iv, sodium bicarbonate 50 mEq iv, and administration of fluids (Ringer's lactate) to maintain urine output above 60 ml/h. The hematuria cleared and the incision stopped oozing. She recovered overnight with laboratory results returning to normal 18 h later, and she was discharged the following morning.

DISCUSSION

Hysteroscopic metroplasty is a relatively new technique that is replacing abdominal metroplasty for the correction of Mullerian abnormalities including the septate uterus.[2,3] The technique involves instilling a solution to distend the uterus for endoscopic visualization. Thirty-two per cent dextran 70 (Hyskon®) is commonly used for this purpose.[4,5] The substance conducts light well, is viscous, flows slowly through the fallopian tubes into the peritoneal cavity, and is not easily miscible with blood. Sterile water has been used for short procedures without complications. Because it was thought that Hyskon® may caramelize when electrosurgery is performed, sterile water was used in the case presented.

The nature of the surgery, the prolonged exposure of 2 h, and the hydrostatic pressure of 60–80 mmHg required to distend the uterus resulted in significant water absorption with associated hyponatremia, hemolysis, and, in this case, mild DIC. Dextran 70 is not without its own risks. It too can be absorbed systemically through freshly traumatized endometrium and cause problems including plasma expansion with resultant hyponatremia and pulmonary edema.[6] Dextran 70 has been associated with prolongation of bleeding time and anaphylactic reactions.[6] The manufacturer recommends limiting procedures to less than 45 min, using less than 500 ml, and not to exceed an infusion pressure of 150 mmHg.

In conclusion, this case demonstrates that principles underlying development of transurethral resection syndrome in patients undergoing prostate surgery apply equally well to patients undergoing endoscopic uterine surgery in which a large volume of irrigating fluid under pressure is used for a prolonged period of time (>1 h). Because of prolonged surgical procedures in a teaching setting, the practice of using sterile water for hysteroscopic surgery was discontinued in our institution. Dextran 70 is used instead. If electrosurgery is planned, caramelization may occur; this will only affect the patency of the infusion channels of the hysteroresectoscope, which will

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require thorough inspection after its use. To avoid the problems associated with the absorption of dextran 70, we recommend careful monitoring of the infusion pressure that should not exceed 150 mmHg and limiting the procedure time to less than 45 min and the infusion volume to less than 500 ml.

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Subdural Hematoma following Spinal Anesthesia

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Subdural hematoma is a very rare yet life-threatening complication of spinal anesthesia. The purpose of this report is to describe a case of subdural hematoma following spinal anesthesia and to emphasize the importance of early diagnosis and appropriate treatment of this very serious condition.

Case Report

A 68-yr-old male presented as an outpatient for elective inguinal hernia repair. His past medical history included a history of hypertension and hyperlipidemia but was otherwise unremarkable. The patient had previous surgery for herniorrhaphy 3 times and arthrotomy 2 times performed under general anesthesia with severe postoperative nausea and vomiting on each occasion.

The patient underwent left inguinal herniorrhaphy under spinal anesthesia. Following uncomplicated lumbar puncture at the L3-4 interspace using a 25-G spinal needle, 12 mg of 0.75% marcaine was administered. After 20 min, there was no evidence of anesthesia, so the lumbar puncture was repeated at the L2-3 interspace using the same volume of 0.75% marcaine. Satisfactory anesthesia to a level of T-5 ensued.

The intraoperative course was uncomplicated except for a decrease in systolic blood pressure from 149 to 110 mmHg that was treated by the iv administration of ephedrine 10 mg. The patient's systolic blood pressure remained greater than 110 mmHg throughout the remainder of the operative period.

The patient had no immediate postoperative complications other than difficulty in urination that resolved spontaneously. He was discharged the following day.

On the seventh postoperative day, the patient complained of persistent left retro-orbital and left hemicranial headaches not related to position and generalized weakness and loss of appetite. The patient denied history of trauma. The headaches persisted for approximately 2 weeks, improved for 1 week, but then returned. The patient was seen by the anesthesiologist who recommended consultation with a neurologist because of the nature of the headache.

A thorough physical/neurological examination revealed no focal neurologic signs other than a slight left lateral gaze nystagmus. Computer axial tomography (CAT) scan with and without contrast revealed a left subdural hematoma with marked mass effect and midline shift and marked subfalcene herniation. The patient subsequently underwent trephination with drainage under general anesthesia without complication.

A follow-up CAT scan on postoperative day 3 showed resolution of the subdural hematoma and decreased mass effect and correction of midline shift. The patient's postoperative course was uneventful and he was discharged on the fourth postoperative day. There was no residual neurologic deficit.

Discussion

The most frequent complication following spinal anesthesia is headache. In the majority of patients, this symptom subsides within a few days following conservative treatment including bed rest, analgesics, and fluids. Some patients require an epidural blood patch to control more severe or persistent headaches. When a headache persists despite the treatment, however, it is incumbent upon anesthesiologists to consider an intracranial complication such as subdural hematoma.

The mechanism involved is believed to be formation of a dural fistula caused by dural puncture with a spinal

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