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OPERATIVE HYSTEROSCOPY INTRAVASCULAR ABSORPTION SYNDROME – A LIFE-THREATENING COMPLICATION

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ABSTRACT

Operative hysteroscopy intravascular absorption (OHIA) syndrome is a rare and potentially life-threatening complication related to irrigation fluid systemic absorption during hysteroscopy. It can lead to severe electrolyte disturbances, cerebral and pulmonary oedema, dysrhythmias and coagulopathy. We present the case of a 30-year-old woman who underwent a hysteroscopic myomectomy. After absorbing 2.5 l of normal saline, she experienced haemodynamic instability, respiratory distress and severe metabolic acidosis, initially mistaken for an anaphylactic or haemorrhagic shock. Insufficient monitoring of fluid deficit and irrigation fluid pressures contributed to the condition. This case underscores the importance of recognising OHIA and its risk factors to enable timely intervention and prevent adverse outcomes. Close fluid balance monitoring is vital in hysteroscopic surgeries to mitigate OHIA development.

KEYWORDS

Hysteroscopy, pulmonary oedema, fluid overload, iatrogenesis

LEARNING POINTS

- OHIA syndrome occurs due to the systemic absorption of the irrigation fluid used during hysteroscopic procedures.
- The presentation is diverse with encephalopathy, pulmonary oedema, dysrhythmias, electrolyte disturbances and coagulopathy.
- Fluid balance and irrigation fluid pressures should be monitored during hysteroscopic procedures to mitigate OHIA development.

INTRODUCTION

Hysteroscopy is commonly employed for intrauterine surgeries such as myomectomy and polypectomy. Studies report a low incidence of adverse events (0.2–0.4%)[1], with reported cases related to uterine perforation, massive bleeding and fluid overload. Operative hysteroscopy intravascular absorption (OHIA) syndrome refers to fluid overload complications related to the irrigation solution and

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pressure used during the procedure. Severe complications can occur, such as severe electrolyte disturbances, cerebral and pulmonary oedema, dysrhythmias and coagulopathy[1,2].

CASE DESCRIPTION

We report the case of a 30-year-old woman with a history of well-controlled asthma and no known drug allergies. She underwent an elective transvaginal uterine myomectomy with a hysteroscopic resectoscope due to submucosal uterine fibroids. The procedure was performed under spinal anaesthesia with bupivacaine, along with sedoanalgesia using midazolam and fentanyl. Cefazolin was administered as antibiotic prophylaxis. Normal saline (NS) was used as a uterine distension medium.

Seventy minutes into the surgery, the patient's condition suddenly deteriorated. She developed haemodynamic instability (blood pressure of 76/42 mmHg), sinus bradycardia (35 bpm), decreased consciousness and desaturation (peripheral oxygen saturation of 85% without supplemental oxygen). Facial and cervical oedema were observed, along with scattered bilateral wheezing on pulmonary auscultation. Anaphylactic shock was considered, and the patient received intramuscular adrenaline and intravenous (IV) clemastine and hydrocortisone. Due to persistent bradycardia and altered consciousness, adverse effects related to the anaesthetic induction drugs were suspected. Atropine and flumazenil were administered without clinical improvement. Therefore, combined general anaesthesia with sevoflurane, propofol and rocuronium was established and orotracheal intubation was ensured. Glottic oedema was evident.

Arterial blood gas analysis showed mixed severe hyperchloremic metabolic and respiratory acidemia (FiO_2 100% – pH 7.03, PCO_2 52 mmHg, PO_2 140 mmHg, HCO_3 13.7 mEq/l, lactate 0.6 mmol/l) and hypokalaemia. Electrolyte replacement and vigorous IV balanced crystalloid therapy were initiated. Due to ongoing hypotension, aminergic support with norepinephrine was started through a central venous catheter. Uterine perforation was suspected but laparoscopy revealed diffuse intestinal loops oedema and approximately 400–500 ml of non-haemorrhagic free fluid was aspirated from the abdominal cavity. No traumatic lesions were found.

The patient was admitted to the intensive care unit (ICU) for immediate post-operative care.

Blood tests revealed anaemia, leukocytosis with neutrophilia but no eosinophilia. The electrolyte panel showed hypernatraemia (146 mmol/l) and hyperchloremia (113 mmol/l). The serum tryptase level was within the normal range. A chest X-ray indicated pulmonary congestion *(Fig. 1A)*, while a computed tomography (CT) scan showed extensive bilateral parenchymal consolidations of the lungs, particularly in dependent areas, along with bilateral pleural effusion and free intraperitoneal fluid *(Fig. 2)*.

A head CT excluded intracranial oedema or haemorrhage, and a transthoracic echocardiogram revealed normal systolic and diastolic function without regional wall motion abnormalities.

An operative protocol review revealed a positive fluid balance of 1.5 to 2l during the procedure, prompting consideration of OHIA syndrome. A low-dose loop diuretic was used and a 2.5l negative balance was achieved in 48 hours with clinical improvement *(Fig. 1B)*. Vasopressor support was discontinued six hours after admission, and extubation was successfully performed within the first 24 hours. Eight hours after admission to the ICU, the acid-base disturbance was resolved. The patient was discharged from the hospital on the 6th day of hospitalisation.

DISCUSSION

OHIA syndrome was initially described in 1993[3] and to date, fewer than 30 cases have been reported worldwide[4], with no reports in Portugal. It occurs due to the systemic absorption of the irrigation fluid used during hysteroscopy by retrograde passage through the fallopian tubes, endometrium and by exposed vascular beds favoured by hydrostatic pressure and oncotic pressure gradient[5,6].

Premenopausal women are more prone to increased fluid passage into the peritoneal cavity, raising the probability of developing hyponatraemic encephalopathy and permanent

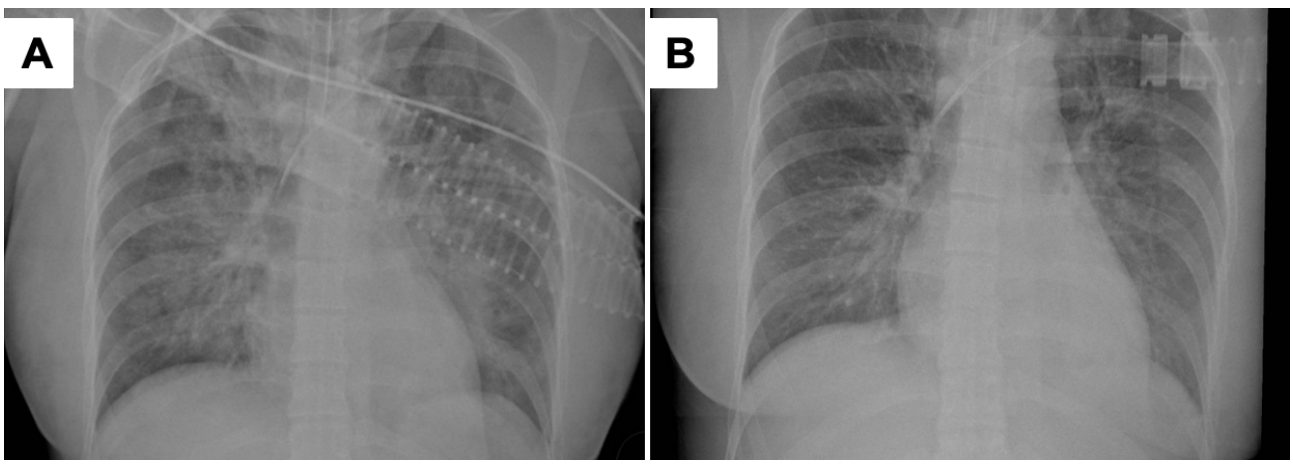

Figure 1. Chest X-ray at ICU admission (A) showing pulmonary alveolar oedema and prominence of upper lobe pulmonary veins. Revaluation after 8 hours (B) with significant improvement.

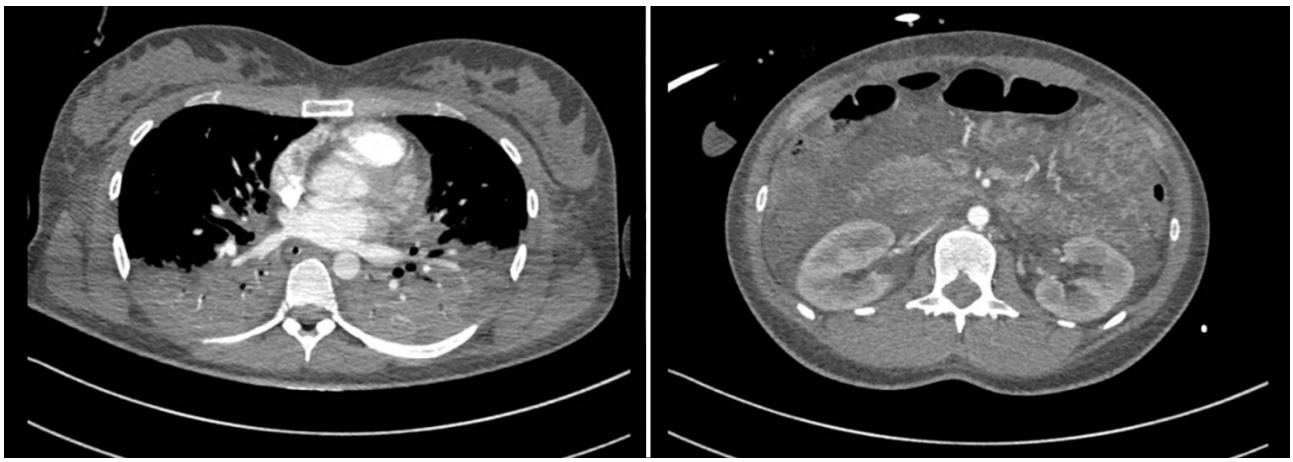

Figure 2. Chest, abdomen and pelvis CT scan at ICU admission showing bilateral parenchymal consolidations in the lungs, along with bilateral pleural effusion and free intraperitoneal fluid.

neurologic sequelae[7]. This is attributed to the effect of oestrogen inhibiting adenosine triphosphate pumps and increasing transcellular osmotic gradient, leading to higher fluid retention and oedema[5,7]. Nowadays, resectoscopes using bipolar current allow the use of isotonic electrolyte solutions with a better safety profile, minimising the risk of hyponatraemia due to hypotonic non-electrolyte-containing solutions[5]. Increased fluid absorption depends on factors such as the depth of myometrial penetration (myomectomies and resections of uterine septa pose a higher risk), the extent of vascular bed transaction, operative time length and surgical expertise[5,8,9]. Higher irrigation fluid pressures (40–60 mmHg)[8,9] and temperature[10] result in rapid absorption of the irrigation fluid.

Regional anaesthesia is preferred as it allows early detection of signs and symptoms of the syndrome[9] and is associated with less hypotonic fluid absorption[11]. If general anaesthesia is necessary, propofol is preferred over inhaled sevoflurane, as it is linked to lower fluid absorption[12]. The amount of IV fluids infused also correlates to OHIA development[8].

The presentation of OHIA syndrome is diverse, with encephalopathy, hypotension, pulmonary oedema, arrhythmia and coagulopathy. In our case, a premenopausal woman underwent a hysteroscopic myomectomy with NS used as the irrigation medium, and developed airway and pulmonary oedema. She also presented with hypokalaemia and severe metabolic and respiratory acidemia, which may have contributed to bradyarrhythmia[13].

The initial diagnostic hypotheses included anaphylaxis, anaesthesia drug side effects or uterine perforation, which led to unnecessary procedures. Fluid balance and irrigation fluid pressures were not effectively monitored. BSGE/ESGE guidelines suggest that fluid balance should be measured at least every ten minutes, and a maximum fluid balance of 2,500 ml should be set when using NS in a healthy woman; surgery must immediately stop when reaching this limit[6].

The treatment approach depends on the symptoms and severity of the condition. If the patient presents volume overload, the focus of treatment will be on optimising respiratory status through measures such as supplemental oxygen, non-invasive positive pressure ventilation or intubation, as necessary. Additionally, correction of hypervolemia will be achieved by using a loop diuretic. On the other hand, if hypotonic fluids were used, patients with symptomatic or severe hyponatraemia may be treated with hypertonic saline infusions[5,6]. In this case, despite adequate airway and respiratory support being achieved, IV fluids prompted congestion, which improved after negative fluid balance.

CONCLUSION

This case highlights an underrecognised and potentially life-threatening condition, emphasising the significance of vigilant fluid balance monitoring and consideration of risk factors to prevent OHIA development in hysteroscopic surgeries.

REFERENCES

1. Munro MG, Christianson LA. Complications of hysteroscopic and uterine resectoscopic surgery. *Clin Obstet Gynecol* 2015;**58**:765–797.
2. Lee EB, Park J, Lim HK, Kim Y Il, Jin Y, Lee KH. Complications of fluid overload during hysteroscopic surgery: cardiomyopathy and epistaxis – a case report. *Anesth Pain Med (Seoul)* 2020;**15**:61–65.
3. Jackson S, Lampe G. Operative hysteroscopy intravascular absorption syndrome. *West J Med* 1995;**162**:53–54.
4. Wang MT, Chang CC, Hsieh MH, Chang CW, Fan Chiang YH, Tsai HC. Operative hysteroscopy intravascular absorption syndrome is more than just the gynecological transurethral resection of the prostate syndrome: a case series and literature review. *Taiwan J Obstet Gynecol* 2020;**59**:748–753.
5. Elegante M, Hamera J, Xiao J, Berger D. Operative hysteroscopy intravascular absorption syndrome causing hyponatremia with associated cerebral and pulmonary edema. *Clin Pract Cases Emerg Med* 2019;**3**:252–255.
6. Umranikar S, Clark TJ, Saridogan E, Miligkos D, Arambage K, Torbe E, et al. BSGE/ESGE guideline on management of fluid distension media in operative hysteroscopy. *Gynecol Surg* 2016;**13**:289–303.
7. Palancsai Siftar J, Sobocan M, Takac I. The passage of fluid into the peritoneal cavity during hysteroscopy in pre-menopausal and post-menopausal patients. *J Obstet Gynaecol (Lahore)* 2018;**38**:956–960.
8. Yoo SW, Ki MJ, Oh YJ, Kim T, Nam S, Lee J. Rapid correction of severe hyponatremia and control of subsequent overcorrection in operative hysteroscopy intravascular absorption syndrome: a case report. *Medicine (Baltimore)* 2022;**101**:e31351.
9. Singh S, Kumar N, Paul D, Sasidharan S. A case of operative hysteroscopy intravascular absorption syndrome: gynaecological TURP syndrome. *Indian J Anaesth* 2021;**65**:167–169.
10. de Freitas Fonseca M, Andrade CM, de Mello MJE, Crispi CP. Effect of temperature on fluidity of irrigation fluids. *Br J Anaesth* 2011;**106**:51–56.
11. Bergeron ME, Ouellet P, Bujold E, Cote M, Rhéaume C, Lapointe D, et al. The impact of anesthesia on glycine absorption in operative hysteroscopy: a randomized controlled trial. *Anesth Analg* 2011;**113**:723–728.
12. Munmany M, Gracia M, Nonell R, Cardona M, Pons M, Martin M, et al. The use of inhaled sevoflurane during operative hysteroscopy is associated with increased glycine absorption compared to intravenous propofol for maintenance of anesthesia. *J Clin Anesth* 2016;**31**:202–207.
13. Smith CC, Brown JPR. A case of cardiac arrhythmia from absorption of normal saline during hysteroscopic myomectomy. *J Minim Invasive Gynecol* 2019;**26**:770–773.