



# Operative Hysteroscopy Intravascular Absorption Syndrome: The Gynaecology's TURP Syndrome-A Case Report

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## Abstract

**Introduction:** Operative hysteroscopy intravascular absorption (OHIA) syndrome is caused by intravascular absorption of fluid distension/irrigation medium during hysteroscopy. There are very few reported cases of this syndrome using saline as irrigation fluid. The current report was on a case of severe OHIA syndrome that necessitated resuscitation in an intensive care unit (ICU).

**Case Presentation:** A 41-year-old, 65-kg, smoker female patient was admitted for an endoscopic resection of submucous uterine myoma under general anesthesia using a laryngeal mask airway. In the 50th minute of the procedure, end-tidal CO<sub>2</sub> dropped from 35 to 25 mmHg and pulse oximetry (SpO<sub>2</sub>) from 100% to 90%. Crackling sounds were heard from the base of the lungs. As a pulmonary oedema was suspected, the volume of irrigated saline was checked. A total of 4000 of the total 9000 mL of the saline had been absorbed into intravascular compartment. She developed a severe metabolic acidosis (pH 7.09) with severe hypokalemia (K<sup>+</sup> 2.3 mEq/L), hypocalcaemia (Ca<sup>2+</sup> 0.76 mEq/L), anemia (hemoglobin 5.3 g/dL), and hypothermia (tympanic temperature 33°C), as well as a generalized oedema with pulmonary and airway oedema. Due to airway oedema, she could only be intubated with a 6.5-mm tracheal tube. Resuscitation in the ICU was required. Electrolyte disturbances were corrected and furosemide was administered. She had a full recovery after 24 hours and 48 hours later, she was discharged.

**Conclusions:** Absorption of the irrigation fluid can result in life-threatening fluid overload. Accurate fluid balancing and limiting the operation time may prevent such complications. Therefore, early diagnosis and treatment of this syndrome is emphasized.

**Keywords:** Hysteroscopy, Intravascular Absorption

## 1. Introduction

Technology advances in medicine lead to an increased number of endoscopic and less invasive procedures performed by a range of surgical specialties. Resectoscopic surgeries are increasingly used for gynecological procedures. Although such surgeries decrease the requirement for laparotomies, they can cause complications including uterine perforation, hemorrhage, gas embolism, sepsis, and fluid overload. Operative hysteroscopy intravascular absorption (OHIA) syndrome is caused by intravascular absorption of fluid distension/irrigation medium during hysteroscopy (1).

There are very few reported cases of OHIA syndrome using saline as irrigation fluid. The current report described a case of severe OHIA syndrome that necessitated management in an intensive care unit (ICU). The present case report aimed at emphasizing the importance of an early diagnosis and treatment of OHIA syndrome.

## 2. Case Presentation

A 41-year-old, 65-kg, female smoker (15 pack-year history) patient was admitted for an endoscopic resection of a submucous uterine myoma under general anesthesia. This was the second surgery for the same myoma. Preoperative examination and laboratory test results were normal. Baseline blood pressure and heart rate were 120/70 mmHg and 80 beats per minute, respectively. An intravenous catheter was placed and normal saline was administered. General anesthesia was induced with fentanyl and propofol. The I-gel® laryngeal mask No. 4 was inserted. Anesthesia was maintained with desflurane in 40% of oxygen. The patient was placed in lithotomy position and a hysteroscopy with a bipolar 9-mm resectoscope, utilizing 0.9% saline as the distention/irrigation medium was conducted.

In the 50th minute of the procedure, end-tidal CO<sub>2</sub> dropped from 35 to 25 mmHg and pulse oximetry (SpO<sub>2</sub>)

from 100% to 90%. Other vital signals including blood pressure and heart rate were stable. Crackling sounds were heard from the base of the lungs. As a pulmonary oedema was suspected, the volume of irrigated saline was checked. A total of 9000 mL of saline was used and only 4000 mL was collected. The surgery was stopped. At that point the patient was uncovered and a generalized oedema was noticed, with a marked distended abdomen and cervical oedema with tissue tension. The inspired fraction of oxygen was increased to 100% and an arterial blood analysis was performed, which showed pH 7.09, PaCO<sub>2</sub> 41 mmHg, PO<sub>2</sub> 70 mmHg, HCO<sub>3</sub><sup>-</sup> 12.4 mEq/L, Na<sup>+</sup> 145 mEq/L, K<sup>+</sup> 2.3 mEq/L, Ca<sup>2+</sup> 0.76 mEq/L, hemoglobin 5.9 g/dL, O<sub>2</sub> sat 89%, and blood glucose level of 50 mg/dL.

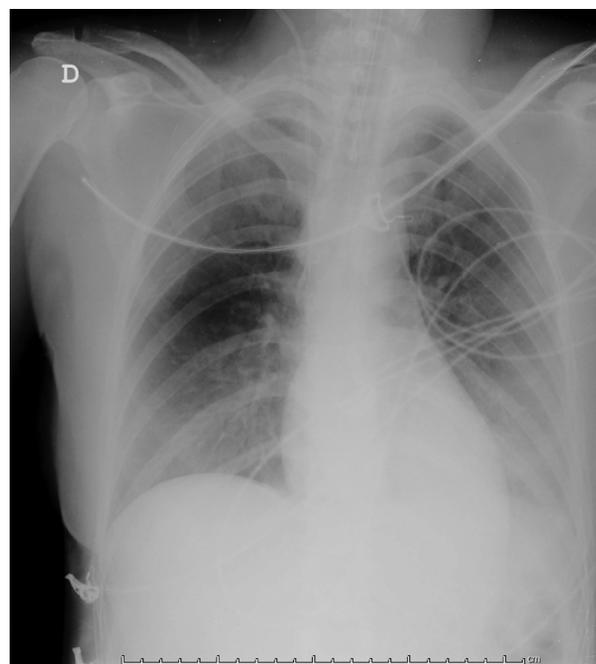
Therefore, 100 mL of sodium bicarbonate 8.4% and 20 mg of furosemide were administered. Laryngeal mask was replaced by a tracheal tube to improve oxygenation and ventilation. Using a video laryngoscope C-MAC®, the airway oedema could be observed, especially in the arytenoid region, which restricted the observation of the vocal cords and only let the intubation of a 6.5-mm tracheal tube. The arterial and central lines were put and 10 mEq of potassium chloride, 2 g of calcium chloride, 2 g of magnesium sulfate, and 20 mL of dextrose 30% were administered through the central line. The patient was placed in supine position and surgeons performed a laparoscopy to exclude uterus perforation. There was no uterine rupture, but a prominent oedema of the intestinal loops and a small amount of peritoneal free fluid were observed. A bladder catheter was inserted. The patient's auricular temperature was 33°C.

The patient was admitted to ICU. Her postoperative chest X-ray showed bilateral pulmonary oedema (Figure 1).

During her ICU stay, the serious electrolyte disturbances (hypokalemia, hypocalcaemia, and hypomagnesaemia) and acidosis were corrected. Hemoglobin increased to 9.3 g/dL (Her pre-procedure hemoglobin level was 11.9 g/dL). There were no coagulation abnormalities. Temperature returned to the normal state. Generalized oedema was resolved with a urine output of 3000 mL in total, which made extubation possible six hours after ICU admission. She received oxygen supplementation for 12 hours with a nasal cannula and was transferred to the general ward approximately 24 hours after ICU admission, where she stayed for another day, after which she was discharged.

### 3. Discussion

OHIA syndrome is very similar to transurethral resection of the prostate (TURP) syndrome in which a constellation of symptoms and signs develop as a result of excessive



**Figure 1.** Chest X-ray showing diffuse increased opacity in both lung fields, suggesting pulmonary edema

absorption of irrigating fluid into circulation (2). In hysteroscopy, this is the consequence of intravasation of the media via the uterine vasculature. If intrauterine pressure exceeds mean arterial pressures, media flows into the arterial tree, sometimes quite rapidly (3). The amount of fluid absorbed is further enhanced by the number of vascular channels opened during myomectomy and prolonged duration of surgery (4).

The consequences of this syndrome are hemodilution with acidosis, electrolyte disturbances, anemia, hypervolemia, and losses to the 3rd space with systemic and pulmonary oedema. Moreover, monopolar resectoscope utilizing 1.5% glycine distending media is associated with hyponatremia and hyposmolarity; therefore, bipolar resectoscopy using 0.9% saline is commonly performed (4).

There are only a few reported cases of OHIA syndrome using saline as irrigation fluid and not as serious as the current one (5, 6).

The incidence of fluid overload during hysteroscopic surgery is reported to be less than 5%, but a standard definition of fluid overload is missing. British Society for Gynecological Endoscopy/European Society for Gynecological Endoscopy Guideline Development Group for Management of Fluid Distension Media in Operative Hysteroscopy recommends that a fluid deficit of more than 1000 mL and 2500 mL should be used as a threshold to define fluid over-

load when using hypotonic and isotonic solutions, respectively, in healthy female patients (7).

The studied patient received a fluid overload of 4000 mL, the surgery was prolonged, and she was submitted to a myomectomy. All of these factors contributed to a severe OHIA syndrome. There was no monitoring of fluid output and deficit in this case, which should be done every 10 minutes of the surgery (7).

There are other mechanisms to minimize fluid absorption: maintaining intrauterine pressure as low as possible, allowing adequate visualization below the mean arterial pressure; intracervical injection of diluted vasopressin before dilatation of the cervix; and using regional or local anesthesia with sedation instead of general anesthesia (7).

The first sign of respiratory distress in the current case was a drop of both end-tidal CO<sub>2</sub> and SpO<sub>2</sub>, but an increase of peak inspiratory pressure or a decrease of tidal volume might be other presentations of this syndrome, since the ability to ventilate congested lungs worsens.

Fluid overload should be managed with loop diuretics and electrolyte disturbances should be corrected. Hyponatremia should be managed carefully, since a rapid correction could lead to central pontine myelinolysis. Pulmonary oedema should be managed with oxygen supplementation, diuretics, morphine, and head-up position to facilitate ventilation and in severe cases, mechanical ventilation.

In the current case, potassium and calcium were administered to the patient since plasma values were too low and could be life-threatening. Hypomagnesaemia usually accompanies hypokalemia; therefore, magnesium sulfate was administered as well. Hypertonic glucose was also administered to achieve plasma glucose levels of more than 80 mg/dL.

The resulting hemodilution, in addition to causing severe anemia, can lead to diffuse intravascular coagulopathy and increasing the number of deaths secondary to this syndrome.

It was tried not to transfuse allogeneic blood, since it was a temporary condition that was resolved with the elimination of excessively absorbed fluid.

The patient had a severe airway oedema, but it was still possible to intubate her. However, if the oedema progresses, it may prevent the anesthesiologist to secure the airway with a tracheal tube, demanding an emergent cricothyrotomy.

In the current case, the patient was under general anesthesia, which delayed the diagnosis. Regional anesthesia may be safer and beneficial to detect the early warning symptoms of this syndrome, since patients are awake (8). General anesthesia with endotracheal intubation could be safer in longer surgeries in which the risks of developing

OHIA are high. Further research is required to recommend a strategy over another.

### 3.1. Conclusions

Absorption of the irrigation fluid used in hysteroscopy surgeries can result in life-threatening fluid overload. Accurate fluid balancing and limiting the operation time may prevent such complications.

Anesthesiologists need to have a high index of suspicion of this condition as rapid identification and treatment may prevent more serious complications and the death of healthy, young female patients.

### Footnotes

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**Patient Consent:** Written informed consent was obtained from the patient.

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