

Unexpected Abdominal Compartment Syndrome Following a Diagnostic Hysteroscopy

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Abstract: A diagnostic hysteroscopy is unreported in the literature as a cause of Abdominal Compartment Syndrome (ACS). We have reported a case of a 28-year old woman who developed abdominal compartment syndrome during diagnostic hysteroscopy. An excess of irrigation fluid moving through the fallopian tubes to the peritoneal cavity due to improper input/output balance has led to a fluid overload and a metabolic acidosis. This highlights the importance of incessant clinical awareness and permanent monitoring in operations affecting the Intra Abdominal Pressure (IAP).

Key words: Female Infertility • Intra Abdominal Pressure • Metabolic Acidosis

INTRODUCTION

Abdominal compartment syndrome (ACS) is marked by a significant raise of intra-abdominal pressure (IAP) over 20mmHg and increase risk of organ dysfunction or failure [1, 2]. No accurate statistics are available regarding the occurrence of ACS since it depends on the target patient population. However, the ACS incidence's range was from 0.5% to 8% in the general medical and/or surgical population; and from 6% to 14% in trauma patients as reported previously [2-4]. Trauma, major burns, bowel obstruction or swelling, intra-abdominal masses or lesions, large intra-abdominal tumors are among the main ACS risk factors (reviewed by [2, 4]). Given the multifactorial criteria of the risks leading to ACS, a cautious and continuous surveillance of patients and the monitoring of vital signs remain the key to prevent and efficiently treat this syndrome and potential associated organ-dysfunction.

Case Report: A 28-year old woman with a diagnosis of two-year secondary infertility is presented. The patient is nulliparous with a history of 11 abortions. Although the patient past medical history showed a case of hypothyroidism, her last TFT (thyroid Function test) was normal. Regarding her infertility profile, it was normal except the obstruction of the right fallopian tube confirmed by HSG (hysterosalpingogram).

To investigate this infertility case, a diagnostic hysteroscopy of potential uterine pathology under general anesthesia was planned. Following the pre-operative investigation that was normal, anesthesia was induced by the administration of fentanyl and propofol [5]. A size-3 laryngeal mask was thereafter inserted and general anesthesia was performed with nitrous oxide and sevoflurane 1.2%. While the patient is maintained in a lithotomy position, cervical dilation was achieved to allow the hysteroscope insertion and examination under an input flow of normal saline irrigation fluid.

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Around 70 minutes after the procedure was started, the patient started defecation, bladder was bulging and vulva area, including the outer and inner labia as well as the vestibule, were all edematous. Clinical examination showed a distended, tense and rigid abdomen with an impression of abdominal compartment syndrome (ACS).

To check potential respiratory stress, immediate chest auscultation was clear and the patient general status was stable. Meanwhile, the peak inspiratory airway pressure (PIAP) was increased from 12 to 22 cmH₂O, End-tidal CO₂ was almost the same and Oxygen saturation (SpO₂) maintained at 100%. Despite these encouraging signs and to prevent further complications, the patient was electively intubated and an arterial line was inserted.

By that time, a total of 6000 mL of normal saline solution was given but unfortunately no proper input/output balance measurement was done since the monitoring system of the volume difference (into versus out of the uterus) was defecting. Although we estimated the input/output deficit to around 3900 mL, a strict real time control of the volume differential was missing. Bedside ultrasounds showed clearly a moderate amount of fluid in the abdomen; and both blood urea and electrolytes (U&E) and complete blood cell (CBC) were normal.

The diagnostic hysteroscopy operation lasted around 75 minutes with a minimal blood loss; and a mild adhesion in uterine cavity was identified as the main factor causal factor of this infertility case.

After consultation of the general surgeon who reexamined the patient, the patient was kept under observation in the clinic; and both a chest x-ray and comparative-statistics radiography for the abdomen were ordered; and both were normal.

Only 20 minutes later, the nurse watching the patient noted the patient became hypothermic 34°C and slightly hypotensive (100/50 mmHg). The ACS suspicion is confirmed and the patient was kept for conservative management. Immediately, the patient warming was initiated and a urine catheter was inserted. Despite the 40mg of furosemide given, the patient was totally anuric.

A metabolic acidosis (pH=7.19) was reported after performing the arterial blood gases quantification with a hyperlactatemia (lactic acid= 5 mmol/L). Therefore, 100mg of NaHCO₃ was immediately given to the patient leading to blood gases correction.

The onset of hypotension and metabolic acidosis showed that the patient is at risk and requires intensive care. The patient was thereafter transferred and kept

under observation at the ICU. Upon admission on ICU, the total urine output was only 30ml (oliguria) and vital signs of the patient were respectively blood pressure (BP)=136/70 mmHg, Temperature=35°C, respiratory rate (RR)=18 breaths per minute and heart rate (HR)=90 beats per minute. Moreover, the blood gases showed a pH=7.31, CO₂=36 mEq/L and a lactic acid=3.2 mmol/L. Abdominal pressure displayed by the bladder catheter is 26mmHg.

In ICU patient was given 10mg/hr of furosemide and human albumin 20% (50mg each 12 hours). Eleven hours later, the patient was extubated and her abdomen pressure fall to 14mmHg. Since the patient status has become normal, stable and with good oxygenation, she was transferred to the ward of hemodynamically stable patients with positive balance 2,900 CC.

Two days after the surgery, the patient was discharged from the hospital without any post operative complication.

DISCUSSIONS

The examination of the pelvic organs and structures using laparoscopy or hysteroscopy is recommended in the diagnosis of female infertility especially when the external physical examination returns normal results. Moreover an in addition to diagnostic purposes, the hysteroscopy is also useful for some operative purposes [6-8].

In our case, the patient uterus received around 3900 mL over the first 24h which was high enough to induce the ACS. This volume fits with the findings of Malbrain *et al.* [9] who reported that the high-volume fluid resuscitation should be over >3500 ml/24 h to induce an ACS. It is therefore crucial to maintain permanent monitoring of the irrigation fluid volume difference inside the uterus.

It is interesting to mention that according to our knowledge, it is the first time that a case of hysteroscopy-based infertility diagnosis of the uterine cavity leads to an ACS. The swelling of the abdominal wall, the decrease of urine output, the blood hypotension and the hypothermia were very indicative parameters supporting the impression of ACS as reported in previous studies according to the recommendations of the World Society of the Abdominal Compartment Syndrome [4, 10, 11]. The normal average of Intra-Abdominal Pressure (IAP) is less than 5 mmHg. In our case, the IAP bladder measurement showed 26 mmHg, which was higher than the cut-off of ACS induction suggested elsewhere [1].

The vital signs of the patient and the blood gases were very useful before and after the patient transfer to ICU in order to immediately correct the acidosis (pH=7.19) to the normal range (7.35-7.45)[2] and to check any respiratory stress signs that might worsen the situation. In fact, the increase of IAP was shown to exert an upward pressure on the abdominal diaphragm leading to reduced total lung capacity and therefore breathing difficulties and a risk of intra-abdominal hypertension (IAH) [4]. Additionally, we were aware about the patient who was hypothyroidic which was reported to be associated with higher risk of blood pressure [12].

CONCLUSION

ACS is a serious complication that might affect simultaneously many organs due to a poor compensation of the IAP. Although rare, serious pre- and post-operative complications could happen during the hysteroscopy procedure and the patient management. The intrauterine fluid flow monitoring is an obligation. Consequently, additional attention, experience and live monitoring are crucial to ensure a successful operation.

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