

# Abdominal Compartment Syndrome due to OHSS

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Received October 2011; Revised and accepted March 2012

## Abstract

Abdominal compartment syndrome is a dangerous clinical situation, usually following abdominal injuries & operations. It is seldom observed in patients with gynecologic and obstetric problems. Abdominal compartment syndrome may be consequence ovarian hyperstimulation syndrome. A 28-year-old woman presented as a severe ovarian hyperstimulation. The increased IAP indicated that OHSS may be considered a compartment syndrome. Abdominal compartment syndrome needs laparotomy or paracentesis for reduction of pressure.

**Keywords:** Ovarian hyperstimulation syndrome (OHSS), Abdominal compartment syndrome (ACS), Intraabdominal pressure (IAP)

## Introduction

Infertility is a relatively common disorder. Estimated about 40.5 million seek therapy (1). Ovarian hyperstimulation Syndrome (OHSS) is an iatrogenic complication of ovulation stimulation in (ART) (2). The prevalence of mild OHSS is 20%-23% of IVF cycles while a 3%-6% moderate and 0.1%-2% severe form were reported as well (3,4,5). Despite of several factors contribute to increased vascular permeability, the pathophysiology of this syndrome remains unknown (6,7). Adnexal torsion, rupture of ovarian cysts, hemoperitoneum, thrombotic events and Anesthesia complications may be consequence of OHSS (8-12). Abdominal compartment syndrome (ACS) is quite rare considering the ART protocol, but can be fatal (13-15). Several therapies have been proposed for severe OHSS (16-20). However ACS needs laparotomy.

## Case Description

A 28-year-old woman referred to the emergency department complaining of abdominal pain. She had a history of primary infertility for 10 years. Hormonal tests were: prolactin = 18 ng/dL, FBS = 103 mg/dL and TSH = 3.5  $\mu$ U/L. Oocytes were retrieved and 10 embryos were prepared; due to ovarian hyperstimulation, the embryos were frozen and GnRH antagonist was administered. Four days later, she presented with abdominal discomfort, dyspnea and fever. Vital signs were: RR=28/min, PR=120/min, T=38.5°C, BP=100/70 mmHg. Physical examination revealed: abdominal distension, subicteric sclera and oliguria. Weight=90 kg and height=170 cm. Lab: Hb=12.2 mg/dl, WBC=21.6 with shift to left, sodium=135, potassium=4.2, AST=75, ALT=60, Alk p=380, BS=140. Albumin=2.8, direct bilirubin=8.2, indirect bilirubin=2.1.

Sonographic examination revealed multiple cysts in both ovary, free fluid in the abdomen, pleural effusion and the initial diagnosis was OHSS and infection. After taking blood sample, we started Ceftriaxone (1 g BD), venous crystalloids, albumin

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vial, prophylactic heparin. On the third day, the patient developed a fever again with her vital signs as follows: BP=90/60 mmHg, RR=38/min, PR=130/min, T=40°C. Metronidazole and gentamycin were added to her antibiotic regimen. Sonography confirmed copious amounts of fluid in the abdominal, pelvic cavities, and large multicystic ovaries (figure-1). Due to the increasing distension and dyspnea despite supportive measurement, The patient was immediately prepared for laparotomy with an impression of abdominal compartment syndrome and peritonitis. Once the abdomen was opened, copious amounts of pus and gas ejected as high as 1.5 meters, similar to a volcano. The abdominal fluid was purulent and foul-smelling. A cavity with definite boundaries was observed, its filled with gas and pus, started from the pelvic with a tendency to the right side and reached the abdominal wall on both sides, pushing the intestines against the diaphragm. The right ovary was discovered with a size of 150x180 mm, with copious pus surrounding it. Right oophorectomy was done and 4 liters pus was removed. Since the intestinal loops above the cavity, as well as the uterus and left ovary outside the cavity, were intact, we decided not to manipulate them. The abdominal cavity was irrigated with 10 L normal saline. Intravenous antibiotics continued. On the day following the surgery, the fever decreased and was resolved on the third day. Abdominal distension, abolished after surgery, and re-appeared after three days. Abdominal exam revealed fluid collection which increased in volume 5 days after surgery. The fever was resolved and appropriate urinary output was established. The lab tests on the fifth day after surgery are as follows: BS=225, TSH=11µU/L, Electrolytes, renal & hepatic tests were normal. The abdominal fluid was aspirated under sonographic

guide (serous liquid and non-purulent). The preserved left ovary sustained its large size with numerous follicles and cysts, giving it the view of hyperstimulation. It appeared that the refractory hyperstimulation syndrome caused the recurrent abdominal distension through serous oozing from the surface of the preserved ovary. Metformin (TDS) and levothyroxine 50 µg daily was initiated. Two days later, the free fluid in abdomen was decreased, and sonography reported the amount of abdominal fluid as moderate on day 10, and as small on day 15. She discharged with good general appearance. We visit her 6 months later. The preserved left ovary had normal size and active follicles. The left ovary and uterus were normal and pelvis was free from fluid. Levothyroxine and metformin were continued as before. Three frozen embryos were transferred to her uterus.

## Discussion

Abdominal compartment syndrome is a dangerous clinical situation, usually following abdominal injuries & operations. In most cases, it leads to abdominal inflammation or peritonitis, entailing a high risk of mortality (12). It is seldom observed in patients with gynecologic and obstetric problems. In our patient, severe, sustained ascites collection and entry of microorganism via the ovarian puncture resulted in peritonitis and the abdominal compartment syndrome. Oliguria, constipation indicated pressure on the urinary & GI system. Several cases of obstructive uropathy caused by ascites have been reported in OHSS which have been managed with DJ catheter to prevent from renal failure (22).

Predicting factors for OHSS include: low age, low weight, endocrine evaluations and previous episodes of hyperstimulation (6, 23, 24, 25, 26). In our patient,



**Figure1.** Enlargement of ovaries and abdominal fluid despite therapy on the third day

women were hot flushes (59.5%), mood swing (42.6%) and vaginal dryness (41.1%). Other symptoms associated with menopause were sleep increased LH/FSH ratio.

However, as the disease progressed, hypothyroidism and diabetes were indicated. The initial value of about 3.5 $\mu$ U/L for TSH reached 11 $\mu$ U/L during the course of the disease, which seems to indicate treatment with levothyroxine in cases of PCO with TSH levels in the upper normal limit. Fluid collection in the third space resulted in pressure on pelvic organs, indicating laparotomy for abdominal decompression. The persistence of the condition may be attributed to the endocrine disorder. Following the extraction of purulent discharges, the patient was expected to experience improvement.

However, copious serous fluid accumulated in the abdomen a few days later alongside swollen follicles in the preserved ovary. CilTulin and et al, reported one case that recovered after laparotomy and abdominal decompression (27). In our case, infection and elevated intra-abdominal pressure resolved following laparotomy, whereas serous oozing into third space persisted, to be resolved only after the endocrine disorders were addressed with levothyroxine and metformin. Most articles consider polycystic ovaries as the most important risk factor for OHSS (28). Insulin resistance, hypothyroidism, and hyperprolactinemia are the most common causes of PCO. In the case of our patients, however, the blood sugar and thyroid tests were normal prior to ovarian induction and the endocrine disorders manifested only after the aggravation of the disease and the laparotomy. PCO patients are recommended to consume metformin despite normal blood sugar, because of the insulin resistance. However, the studies do not recommend prophylactic administration of levothyroxine for ovarian induction. Transvaginal oocyte retrieval (TVOR) is the method of choice for retrieving oocytes in most fertility clinics, since it entail less danger to the large pelvic vessels which are visible in this method (29). It is not, however, free of risks and cases of hemorrhage, hemoperitoneum, injury to pelvic organs, infection and endometrial rupture have been reported (30, 31).

In one study conducted on 2670 patients who underwent TVOR without receiving prophylactic antibiotics, the incidence of pelvic infection was reportedly 0.6% (32). Ovarian abscesses have been reported following TVOR (33). Sepsis caused by pelvic infection is a life-threatening condition.

Unfortunately, our patient had developed ovarian abscess and peritonitis caused by pelvic infection. Lack of antibiotics prior to oocyte retrieval, undiagnosed diabetes and hypothyroidism can lead to persistent hyperstimulation and pelvic infection.

### **Conclusion**

We concluded that ovarian hyperstimulation can be persisted by endocrine underline disorders and break in sterile technique may cause an operative site contamination.

### **Acknowledgement**

I would like to thank Somayyeh Amiri- moghaddam, MD (Moallem Educational & Cultural Institute, Tehran, I.R.Iran for editing the English version.

### **Conflict of Interest**

This study discloses any potential conflicts of interest and commercial affiliation.

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