

Continuous Abdominal Paracentesis for Successful Management of Severe Ovarian Hyperstimulation Syndrome

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Abstract: ***Objective:** To present a case of severe OHSS treated with continuous abdominal paracentesis. **Case:** A 30 yo with history of primary infertility related to female factor underwent a procedure of IVF. Basal hormone FSH 5.75, LH 3.20, E2 33.42, PRL 40.64 and AMH was 3.38 ng/mL. Ovulation induction was initiated on day 3 of the cycle with 225 IU/day rFSH. On day 8 of the stimulation, administration of the antagonist was started and ovulation triggering by 10,000 IU of hCG. Estradiol level on the day of hCG was 2,400 pg/mL and a total of 20 mature follicles were aspirated. Three days later, three eight-cell embryos were transferred and luteal phase was supported by vaginal administered progesterone. Nine days after retrieval, patient suffered from nausea, vomiting, abdominal distention, shortness of breath and weight gain. Blood pressure was 110/70 mmHg with a pulse of 92 beats/minute and respiratory rate of 24 breaths/minute. Physical examination found ascites and abdominal circumference was 90 cm. Ultrasound examination revealed bilateral enlarged ovaries and ascites. Laboratory values were WBC 17,64, HCT 35,9%, sodium 135 mmol/L, kalium 3,7 chloride 105 mmol/L, SGOT 22 IU/L, SGPT 21 IU/L, creatinine 0.6 mg/dL, albumin 2.8 g/dL, D-Dimer 6,049 ng/mLFEU and urine output of 500 mL/day. Patient were hospitalized and continuous abdominal paracentesis of 1000 mL/day was performed under ultrasonographic guidance. With this procedure, ascitic fluid was drained efficiently and the patient's clinical and laboratory findings improved gradually in six days. Chemical pregnancy was confirmed by 761,42 mIU/mL of serum β -HCG 14 days after ovum retrieval. **Conclusion:** Continuous paracentesis may represent an alternative to multiple paracentesis in management of early severe ovarian hyperstimulation syndrome.*

Keywords: Ovarian hyperstimulation syndrome, continuous paracentesis

1. Introduction

The ovarian hyperstimulation syndrome (OHSS) is often observed in patients undergoing controlled ovarian hyperstimulation (COH) cycles. The hallmark of OHSS is the fluid shift from intravascular to third space due to increased capillary permeability. In its severe form, OHSS is a serious and potentially life-threatening complication resulting in respiratory failure, severe hemoconcentration, hypovolemia, and electrolyte imbalances. Ascites and hydrothorax causing respiratory difficulty are typical in severe OHSS. Treatment in severe OHSS is supportive and is aimed at correcting electrolyte imbalances and hemoconcentration. The maintenance of intravascular volume and adequate renal perfusion is crucial. In patients with tense ascites, paracentesis is performed to improve the symptoms. A recent study showed that for women with severe OHSS, abdominal paracentesis significantly improves urinary output, regardless of medical treatment. However, incomplete tapping might result in rapid re-collection of ascites, requiring re-tapping. The more times paracentesis is carried out, the greater the risk of complications occurring. We report a case of early onset severe OHSS occurring on the 9 day after ovum retrieval. Continuous abdominal paracentesis utilized CVC (Central Venous Catheter Sets (Certofix® Duo V720- B. Braun, Germany)) provided successful relief of OHSS symptoms.^{1,2}

2. Case

We report a case of early onset severe OHSS occurring on the 9th day after ovum retrieval. A case of 30 years old woman with history of primary infertility related to female factor (non patent tube bilateral) underwent a procedure of IVF in our center and presented at our hospital with symptoms of early onset severe OHSS. The patient BMI was 24,5 kg/m², the menstrual period was regular, at 28 days, her basal FSH 5.75, LH 3.20, E2 33.42, PRL 40.64 and AMH was 3.38 ng/mL. GnRH antagonist protocol were conducted and ovulation induction was initiated on day 3 of the cycle with 225 IU/day rFSH. On day 8 of the stimulation, administration of the antagonist was started and ovulation triggering by 10,000 IU of hCG. The estradiol level on the day of hCG was 2,400 pg/mL and a total of 20 mature follicles were aspirated transvaginally under ultrasonographic guidance. Eight oocytes were harvested, of which 6 were mature; these 6 were used in ICSI, and 4 fertilized. Three days later, two good quality eight-cell embryos were transferred and luteal phase was supported by vaginally administered progesterone.

Nine days after retrieval, patient suffered from nausea, vomiting, abdominal distention as well as discomfort, shortness of breath, and weight gain. Blood pressure was 110/70 mmHg with a pulse of 92 beats/minute and respiratory rate of 24 breaths/minute. Physical examination showed tense ascites and abdominal circumference was 90 cm. Ultrasound examination revealed bilateral enlarged ovaries and significant ascites. Laboratory values were notable for WBC 17,64, HCT 35,9%, sodium 135 mmol/L, chloride 105 mmol/L, SGOT 22 IU/L, SGPT 21 IU/L, creatinine 0.6 mg/dL, albumin 2.8 g/dL, ESR 31 mm/h, D-Dimer 6,049 ng/mLFEU and urine output of 500 mL/day.

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Diagnosis of severe OHSS was graded according to Golan and Weissman. The patient was hospitalized and treated conservatively until the improvement of clinical and laboratory findings.

Drainage of excessive ascites (paracentesis) with central venous catheter (CVC) under ultrasonographic guidance is our procedure of choice for draining ascitic fluid. Abdominal paracentesis of 1000 mL/day was performed to allow continuous drainage of the ascitic fluid. Abocath/Catheter IV 16G was introduced into the largest accessible ascitic fluid pocket in the upper outer quadrant of the abdominal wall under local anaesthesia and trans abdominal ultrasound guidance. The needle was then removed and a guide wire of central venous catheter (Certofix® Duo V720- B. Braun, Germany) was inserted through the IV canula. The canula was removed with care so as to keep the guide wire in the peritoneal cavity. The CVC catheter was guided into the peritoneal cavity by the wire and the guide wire was removed. The catheter was anchored to the skin using 2-0 silk suture and a gauze dressing was then applied. The catheter was then connected to a draining bag and was kept in place until drainage ceased and ascites had resolved completely. The total volume of fluid drained and duration of drainage were recorded. A total of 3 l of ascitic fluid was drained over the next three days and there was a marked improvement in her general condition, a dramatic decrease in abdominal distention, abdominal girth and weight with an improvement in urine output. In three days the patient's body weight was 55 kg and the abdominal circumference was 80 cm. WBC of 12.02, HCT 33.3%, sodium 138 mmol/L, SGOT 28 IU/L, SGPT 25 IU/L, creatinine 0.9 mg/dL, albumin 3.2 g/dL, ESR 31 mm/h, D-Dimer 2,710 ng/mLFEU and urine output of 2500 mL/day. In particular, fluid intake was restricted to 1500 ml per 24 h, to avoid fluid overload. Prophylactic anticoagulation was started with low molecular weight heparin (LMWH) until discharge and human albumin 200 ml (albumin 20%), was supplemented per litre of ascites drained. With this procedure, ascitic fluid was drained efficiently and the patient's clinical and laboratory findings improved gradually. Chemical pregnancy was confirmed by 761,42 mIU/mL of serum β -HCG 15 days after ovum retrieval. One week later, a multiple intrauterine gestation sac was noted by sonogram at our outpatient department.



Figure 1: (a), (b), and (c) Drainage of excessive ascites (paracentesis) with central venous catheter (CVC)

3. Discussion

Ovarian hyperstimulation syndrome (OHSS) is a rare, but serious iatrogenic complication of In Vitro Fertilization treatments. There are a number of well-established primary risk factors for the development of OHSS, including young age, polycystic ovary syndrome (PCOS) – characterized by ultrasound and the ratio of luteinizing hormone (LH) to follicle stimulating hormone (FSH) – and a history of an elevated response to gonadotropins, i.e. prior hyper-response/OHSS. A number of ovarian response parameters have been evaluated for their ability to predict the development of OHSS, including absolute levels or rate of increase of serum E₂, follicular size and number, and number of oocytes collected. None of these measures have been shown to be independently predictive of OHSS.^{2,3}

Ovarian Hyperstimulation syndrome (OHSS) in IVF/ICSI cycles may occur either as an early (early onset) or a late pattern (late onset). OHSS with onset 10 days after oocyte retrieval (instead of the ovulatory injection of HCG) was classified as 'late' OHSS and the earlier onset as 'early' OHSS as seen in our case.³

The severe forms of OHSS are usually complicated by tense ascites and pleural effusion causing nausea, vomiting,

abdominal, discomfort, abdominal pains, respiratory distress, renal compression and oliguria. In addition, the marked ovarian enlargement stretch peritoneum and stimulate the vagus nerve leading to palpitation (bradycardia), sweating, diarrhea, and vomiting. The treatment for OHSS is predominantly supportive, with the correction of electrolyte imbalances and expansion of intravascular volume thereby reducing hemoconcentration and promoting diuresis. The primary indications for abdominal paracentesis are symptomatic (severe discomfort or pain and pulmonary compromise).⁴

In severe OHSS severe ascites may occur and can lead to dyspnoea, abdominal discomfort and oliguria. To relieve ascites paracentesis is performed by repeated and/or continuous removal. Paracentesis reduces intra-abdominal pressure in OHSS and causes immediate relief of dyspnoea and renal perfusion. Another mechanism hypothesised is via the elimination of toxic derivatives such as inflammatory substances produced by hyperstimulated ovaries. Paracentesis has not been found to have any adverse pregnancy outcome; instead, it increases uterine artery perfusion.^{5,6,7}

Recurrent invasive procedures in a short period might increase the risk of infection and bleeding. Therefore we used an CVC catheter for continuous drainage in order to prevent multiple drainage procedures. Certofix® Duo V720-B. Braun CVC is highly flexible, safe and certain positioning with kink-proof guide wire. Continuous drainage was continued until the ascitic fluid flow had stopped. However, because permanent catheters themselves can be sources of infection, the use of prophylactic antibiotics should be considered. In cases with severe OHSS, continuous drainage can be used instead of intermittent transvaginal/abdominal paracentesis. Since the OHSS is a time-limited phenomenon, this method can be considered reliable for the elimination of symptoms without impairing patient comfort.

Chan et al. described a case report of severe OHSS treated by continuous abdominal paracentesis. They concluded that earlier continuous aspiration of the ascitic fluid improved the patient's condition as soon as euvoemia was reached. They advocated abdominal paracentesis with continuous drainage to be performed earlier in such patients.⁸

Dawood et al. in his study, the continuous versus intermittent paracentesis methods were assessed by clinical and laboratory parameters of the designed outcomes. The continuous drainage via abdominal route was found to be superior to the intermittent method in both clinical symptoms relief and laboratory adjustment of hematocrit, electrolytes and serum albumin.⁹

Nastri et al. used trocar and cannula of laparoscope to insert a cheaper Nelaton's catheter instead of the expensive Pigtail catheter. The advantages of continuous drainage in this study were the following items: (a) Rapid improvement of symptoms and signs of the condition, (b) Rapid return of oral feeding with rapid correction of electrolytes and albumin, (c) Rapid return to oral fluids alleviating hemoconcentration (d) Immediate mobilization of patients avoiding DVT (e)

Improvement of renal functions after relief of compression (f) Easy drainage as Nelaton's catheter is of wide pore than the pigtail catheter (g) Avoiding repeated aspirations which are annoying to the patients and physician as well and (h) Greater safety of the technique (no complication reported). Currently, the use of this technique is still limited being new and not popular from one side, on the other side the incidence of severe OHSS was decreased owing to the effective methods for prevention, such as the use of lower doses of gonadotropin, frequent monitoring, coasting and avoidance of luteal phase supplementation with HCG, the use of vascular endothelial growth factor (VEGF) inhibitors such as cabergoline and the use of the more safe triggering recombinant luteinizing hormone (rLH). Abuzeid et al. concluded that percutaneous placement of a pigtail catheter is a safe and effective treatment modality for severe OHSS. It may represent an attractive alternative to multiple vaginal or abdominal paracentesis. The second conclusion was that their technique was not suitable for obese patients as the metal introducer provided in the pigtail catheter kit was difficult to use and they instead used the non-disposable gamete intra-fallopian treatment trocar and cannula to facilitate the introduction of the catheter.^{10,11,12}

Al-Ramahi *et al.* (1997) reported three cases when an indwelling peritoneal catheter was used to decrease the need for repeated paracentesis. The authors concluded that continuous drainage of the ascitic fluid is a better alternative to multiple abdominal paracentesis in the management of severe OHSS.^{11,13}

In this case, earlier continuous 1000 mL/day ascitic fluid aspiration was performed and with this procedure, ascitic fluid was drained efficiently and the patient's condition improved and also significantly improved urinary output, regardless of medical treatment. In addition, improvement in hemoconcentration was supported by the reduction of creatinine, hematocrit, and leukocyte concentration. The impact of continuous paracentesis on the ongoing pregnancy was unknown, but in this case, a chemical pregnancy was confirmed by 118 mIU/mL of serum β -HCG 15 days after ovum retrieval. However, the optimal amount of ascites removed from pregnant women with severe OHSS is open to debate. A marked relief of compression symptoms occurred after removing the first 1000 ml of ascitic fluid.¹³

There is no leakage of ascitic fluid from the puncture sites. Injury to the enlarged ovaries or visceral organs did not occur and peritoneal infection did not develop in this patient during or after paracentesis.

4. Conclusion

Continuous paracentesis of ascites improved the patient's comfort without need for repeated aspirations and may represent an alternative to multiple paracentesis in management of early severe OHSS.

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