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Case Report

A Large Isolated Pleural Effusion in the Right Hemithorax as an Unusual Manifestation Following IVF

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Abstract

Background: Ovarian hyperstimulation syndrome (OHSS) is a serious iatrogenic complication of ovulation induction therapy. I hereby present a rare case of a large, isolated right-sided pleural effusion causing respiratory compromise following IVF. The clinical presentation of abdominal ascites is known to be common in OHSS, with isolated pleural effusions being a rare finding. ***Case presentation:*** The reported case is a rare example of an isolated pleural effusion in a 36-year-old lady with polycystic ovarian syndrome (PCOS) and ongoing sessions of IVF due to infertility. The patient was hospitalized due to shortness of breath. A chest x-ray was performed and revealed a large pleural effusion in the right hemithorax. Ultrasound-guided thoracentesis was safely performed without complications. ***Conclusions:*** I hereby present a rare clinical manifestation of OHSS presenting with a large isolated pleural effusion. Patients being treated for infertility with ovulation induction should be assessed and monitored frequently for the prevention of developing OHSS.

Keywords: ***Pleural effusion, Hydrothorax, Ovarian hyperstimulation, OHSS, in vitro fertilization, IVF***

Background

Ovarian Hyperstimulation Syndrome (OHSS) is an iatrogenic disorder mainly caused by procedures stimulating the ovaries during treatment of infertility [1]. The pathophysiology related to the syndrome includes a sequence of events which involve the release of cell-signaling cytokines from luteinized follicles, mainly vascular endothelial growth factor (VEGF), and possible activation of the renin-angiotensin system in woman with OHSS, potentially inducing vascular permeability, leakage of fluids into third spaces, and consequently a tendency of thrombi development [1,2]. The primary risk factors contributing to the development of OHSS include young age, low body mass index (BMI), polycystic ovarian syndrome (PCOS), and a positive history of those receiving high doses of ovulation induction medications such as human chorionic gonadotropin (hCG) [2,3]. Being familiar with the underlying risk factors could act as a predictor for OHSS and preventive measures could be taken before its occurrence. Studies have demonstrated that the incidence of moderate-to-severe OHSS occurs in approximately 1%-5% of all women undergoing treatment of infertility [4,5]. A wide spectrum of presentations related to OHSS have been reported in the past, ranging from mild isolated pleural effusions, effusions with accompanying abdominal ascites, to acute respiratory failure and shock [5,6,7]. I hereby present a rare case of OHSS with an isolated large pleural effusion in the right hemithorax following ongoing cycles of IVF, ultimately resulting in respiratory compromise.

Case presentation

A 36-year-old married lady, known case of Polycystic Ovarian Syndrome (PCOS) and infertility, was admitted through the emergency department due to constant shortness of breath associated with runny nose which started 3 days prior to hospital arrival. Her medical history included ongoing sessions of in-vitro fertilization (IVF) at a private hospital, along with medications she is taking for ovulation induction which she couldn't exactly specify. Upon presentation and assessment, the patient was stable, afebrile, had a respiratory rate of 20 breaths/min, blood pressure was 122/78 mmHg, and a weight of 87 kg. Examination of the chest revealed diminished air entry on the right side. Nasopharyngeal swab for COVID-19 was obtained upon arrival and appeared negative along with exclusion of other infectious and non-infectious causes. Chest radiography (X-ray) was performed and demonstrated a near-complete white-out of the right chest, manifesting a large Pleural Effusion of the right hemithorax with adjacent atelectasis [**Figure 1**]. Laboratory tests showed an Albumin level of 29.93 g/L, Alkaline Phosphatase 187 IU/L, a Calcium level of 2.04 mmol/L, Glucose 3.96 mmol/L, and a significantly high Gamma-Glutamyl Transferase (GGT) level of 149 IU/L. Upon admission, the patient received supportive therapy including a prophylactic dose of Enoxaparin and was later planned for ultrasound-guided pleural drainage by an Interventional Radiologist (IR). Thoracentesis was performed safely under ultrasound guidance through placement of an 8-French Pigtail catheter targeting the right pleural effusion, with a 70ml specimen of

the pleural fluid being obtained and sent for cytology followed by chest tube insertion and patient encouragement of using an incentive spirometer for assisted recovery post-drainage [**Figure 2**]. The procedure was well-tolerated by the patient without encountering any immediate complications. The day following the procedure, a repeated chest x-ray was done and showed subsequent improvement of the right Pleural Effusion and adjacent atelectasis [**Figure 3**]. Final aspiration cytology report revealed mild chronic inflammatory cells including macrophages, lymphocytes, and mesothelial cells associated with chronic mild inflammatory process, and negative for malignancy. Following investigations and proper assessment of the case, a final diagnosis of large right sided Pleural Effusion secondary to Ovarian Hyper Stimulation Syndrome (OHSS) following cycles of ongoing IVF was made. Later, the patient showed significant improvement in her symptoms, with no morbidities, and was discharged in a stable condition without any complications.

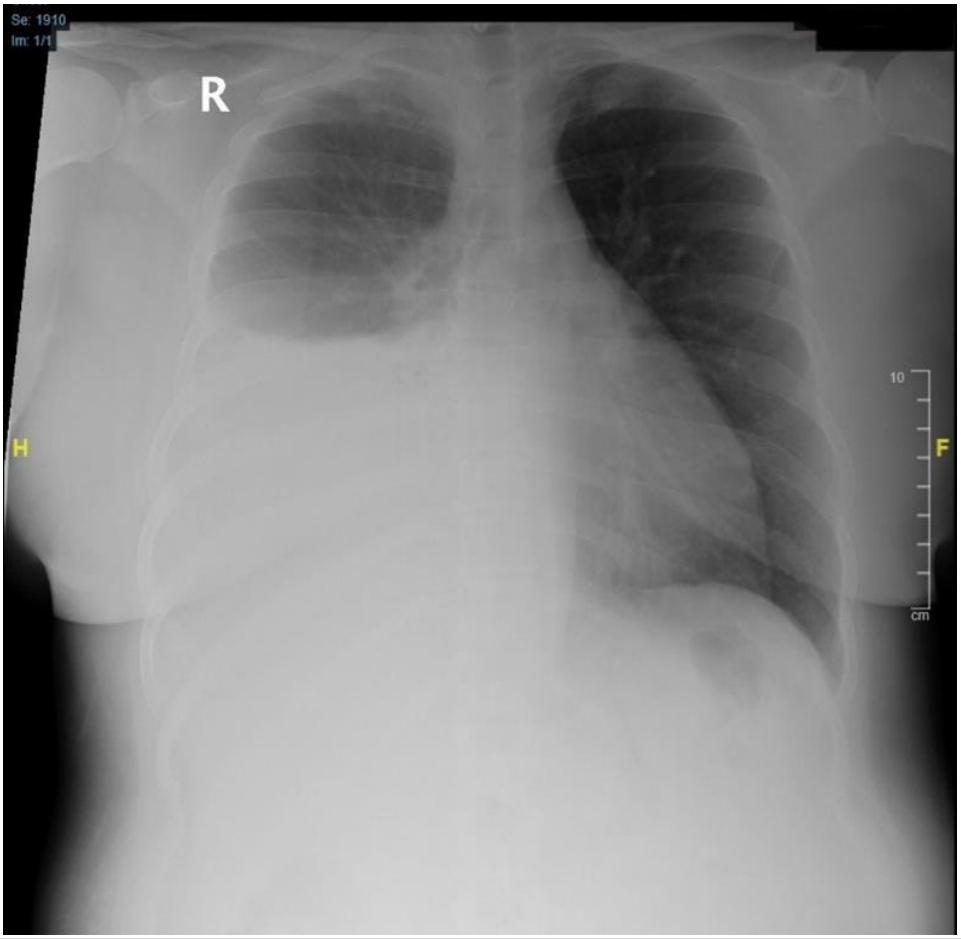

Figure.1: Chest radiography (x-ray) showing a large pleural effusion in the right hemithorax.

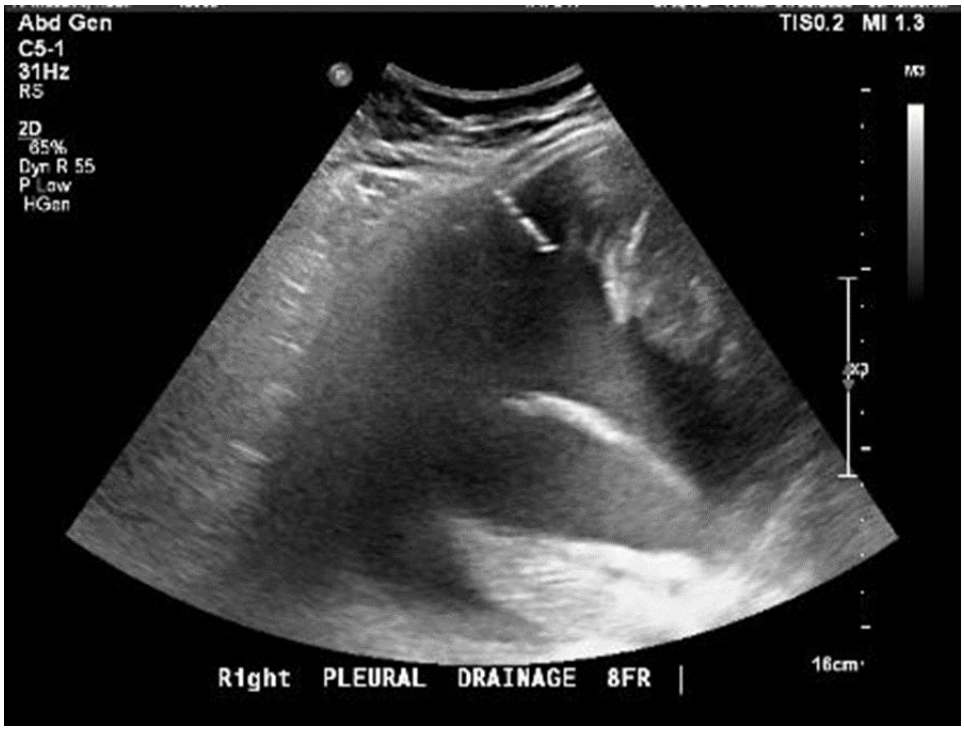

Figure.2: Ultrasonography study showing the insertion of an 8-French catheter in the right-sided effusion for drainage.

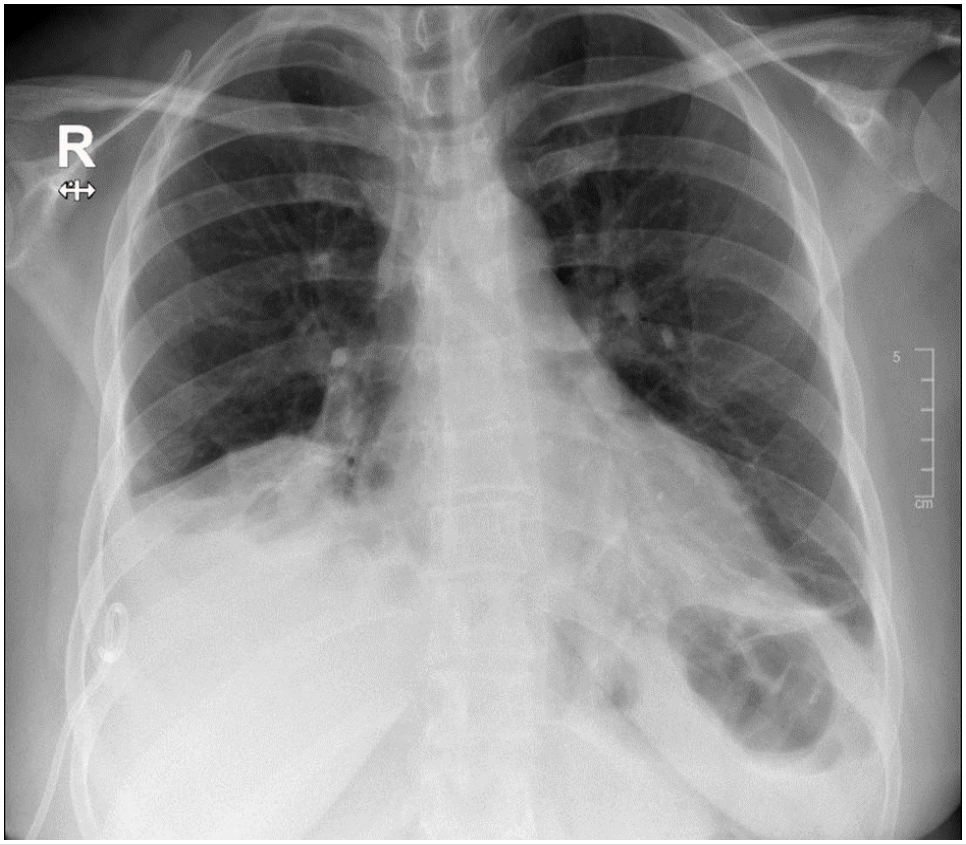

Figure.3: Chest radiography (x-ray) showing clear improvement of the pleural effusion post-drainage.

Discussion

The reported case is a rare example of an isolated right-sided large Pleural Effusion secondary to OHSS. Women undergoing sessions of IVF with the complication of OHSS can present at different onsets with varying severity in illness ranging from mild-moderate hyperstimulation syndrome, or severe OHSS requiring critical care [1,4]. Symptoms frequently recorded in the past mostly relate to the presentation of abdominal ascites, such as nausea, vomiting, and abdominal discomfort [5,6]. The symptomatology related to OHSS is mainly influenced by the alteration of the vascular beds permeability, due to activation of the renin-angiotensin system (RAS), the release of vasoactive substances such as VEGF, which is crucial in the pathogenesis of OHSS, and interleukins 1B, 6 [1,8]. Previous evidence has shown that patients presenting with atypical pleural effusions share a common complaint of shortness of breath with a decrease in oxygen saturation being up to approximately 87%, with one case reporting a patient presenting with acute respiratory failure and shock [4,5,7]. The pathogenesis of OHSS and its subsequent development of pleural effusion has not been fully understood, with an assumed hypothesis that the fluid build up is most likely related to the release of the vasoactive substances causing a fluid shift from the intravascular space to the extravascular compartment, resulting in the effusion [8,9]. This effusion commonly affects the right side as described in previous literature, consistent with the presented case [4-7]. The prevention of OHSS is crucial in achieving overall well-being, with required measures taken to prevent any life-threatening events as a consequence of negligence. Several strategies have been proposed to prevent the occurrence of OHSS and its early detection which involve using Serum anti-Mullerian hormone (AMH) of more than 3.36 ng/mL as a biomarker, and an antral follicle count (AFC) of more than or equal to 24 as a predictor of moderate to severe OHSS. Frequent Ultrasound and E2 monitoring have also been found to be vital in the surveillance of OHSS [1,3,10]. The treatment of OHSS depends on the condition of the case, whether its severe causing hemodynamic instability, clinical ascites with or without hydrothorax, or mild with presenting abdominal pain or bloating accompanying ovarian enlargement, requiring patient stabilization and correction of electrolyte imbalances [11]. The use of aspirin, IV calcium and metformin have been found to be efficient for preventing ovarian hyperstimulation [1,8,10]. OHSS is an iatrogenic disorder that requires close monitoring and management, and if left untreated, can cause significant morbidity and mortality. In our presented case, an ultrasound guided thoracentesis was done for resolving the large right hemithorax pleural effusion, with an end-result of significant improvement in the patients dyspnoea and improved pulmonary function. Patients undergoing cycles of IVF with the use of ovulation induction therapies are at risk of developing OHSS, thus, they should be carefully monitored and assessed to prevent the occurrence of such a consequence.

Conclusion

I hereby present a rare clinical manifestation of OHSS presenting with a large isolated pleural effusion. Moreover, the effusion developed in a patient with PCOS and infertility undergoing sessions of IVF, with both considered risk factors for OHSS. Patients being treated for infertility with ovulation induction medications should be assessed and monitored frequently for the prevention of developing OHSS.

Abbreviations

OHSS: Ovarian hyperstimulation syndrome
PCOS: Polycystic ovarian syndrome
IVF: In vitro fertilization
VEGF: Vascular endothelial growth factor
IR: Interventional radiologist
BMI: Body mass index
hCG: Human chorionic gonadotropin
GGT: Gamma-Glutamyl Transferase
AMH: Anti-Mullerian hormone
AFC: Antral follicle count
RAS: Renin-angiotensin system

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Availability of data and materials

The case history and reports used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The author declares that he has no competing interests

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None

Authors contributions

Abdulaziz Alnassar contributed to the conception and design of the study. He performed the collection and interpretation of data and wrote the manuscript.

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Not applicable

Research registration

N/A

Guarantor

I, as the author of the study, accept full responsibility for the work and/or the conduct of the study, had access to the data, and controlled the decision to publish.

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