

Spoke wheel ovaries in ovarian hyperstimulation syndrome

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Section: Genital (female) imaging

Area of Interest: Abdomen Pelvis

Procedure: Imaging sequences

Procedure: Diagnostic procedure

Imaging Technique: Ultrasound

Imaging Technique: CT

Special Focus: Inflammation Pathology Oedema Blood

Case Type: Clinical Cases

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Patient: 24 years, female

Clinical History:

A 24-year-old woman presented to the emergency department with abdominal pain and nausea for one week, progressive abdominal distension for 3 days. She reported a history of intravenous treatment with human chorionic gonadotropin (hCG) for infertility for the past 3 months. The abdomen was distended and tense. Urine output was reduced.

Imaging Findings:

Ultrasonography (US) revealed a large multiseptated cystic abdominopelvic lesion giving 'spoke wheel' appearance with hyperechoic dependent content within the cysts (Fig. 1) and severe ascites with bilateral pleural effusion (Fig. 2). Contrast-enhanced computed tomography showed bilateral multicystic ovarian enlargement giving the classic 'spoke wheel' appearance (Fig. 3) with fluid-blood levels in few cysts (Fig. 4) with large ascites and also bilateral mild to moderate pleural effusion (Fig. 5).

Discussion:

Ovarian hyperstimulation syndrome (OHSS) is a known complication of assisted reproductive treatment. The syndrome consists of cystic enlargement of the ovaries and third space fluid accumulation due to fluid shift secondary to increased capillary permeability and perifollicular neoangiogenesis. This is hormone-dependent as a result of administration of hCG or its analogues. Now it is better understood that vasoactive substances such as interleukins, tumour necrosis factor-alpha, endothelin-1, and vascular endothelial growth factor secreted by the ovaries are responsible for the increase in vascular permeability. Subsequently haemorrhagic areas are formed within the enlarged cysts. Enlarged ovaries cause abdominal pain, nausea and vomiting. [1]

Ascites is the result of fluid leakage from follicles, increased capillary permeability leading to third spacing, or due to rupture of follicles. The fluid shift is represented by ascites, pleural effusion and/or hydropericardium along with generalised oedema etc. and this leads to hypovolaemia. [1]

A severity grading classification for OHSS was proposed, which assists in its management [2]:

Mild OHSS

Grade 1 - Abdominal distention and generalised discomfort

Grade 2 - Grade 1 disease with nausea, vomiting and/or diarrhoea + ovarian enlargement (5 to 12 cm)

Moderate OHSS

Grade 3 - Features of mild OHSS + sonographic evidence of ascites

Severe OHSS

Grade 4 - Features of moderate OHSS + clinical evidence of ascites and/or pleural effusion and dyspnoea

Grade 5 - All of the above with haemodynamic instability and/or death

coagulation abnormalities and diminished renal perfusion and function.

Hyperreactio luteinalis (HL) also gives similar radiological appearance, however, they can be differentiated by history because OHSS is secondary to infertility treatment whereas HL is a spontaneous occurrence. HL is mostly seen in the third trimester and OHSS in the first trimester of pregnancy. [3]

US is the initial and final imaging modality which shows bilaterally enlarged ovaries (up to 25 cm) and multiple cysts showing the classic 'spoke wheel' appearance. Contrast-enhanced computed tomography also shows similar findings but is rarely performed, except when it is done to rule out other causes of complex cystic ovarian lesions. [4]

Differential Diagnosis List: Ovarian hyperstimulation syndrome (OHSS), Polycystic ovaries, Theca lutein cysts, Hyperreactio luteinalis, Ovarian cystic neoplasms

Final Diagnosis: Ovarian hyperstimulation syndrome (OHSS)

References:

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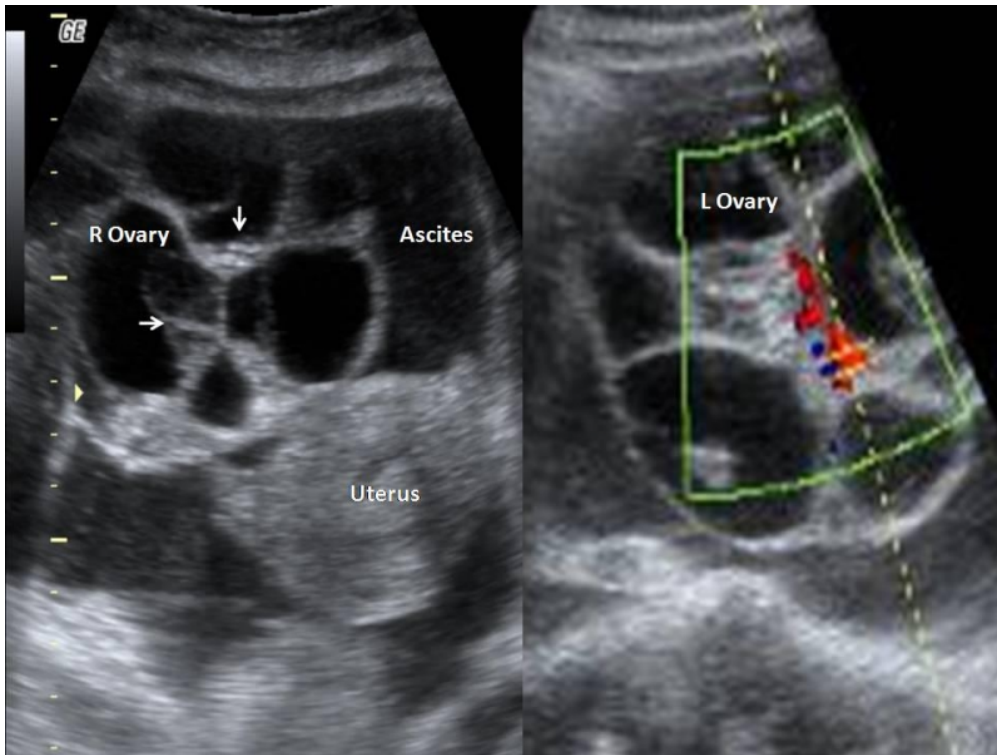
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Figure 1

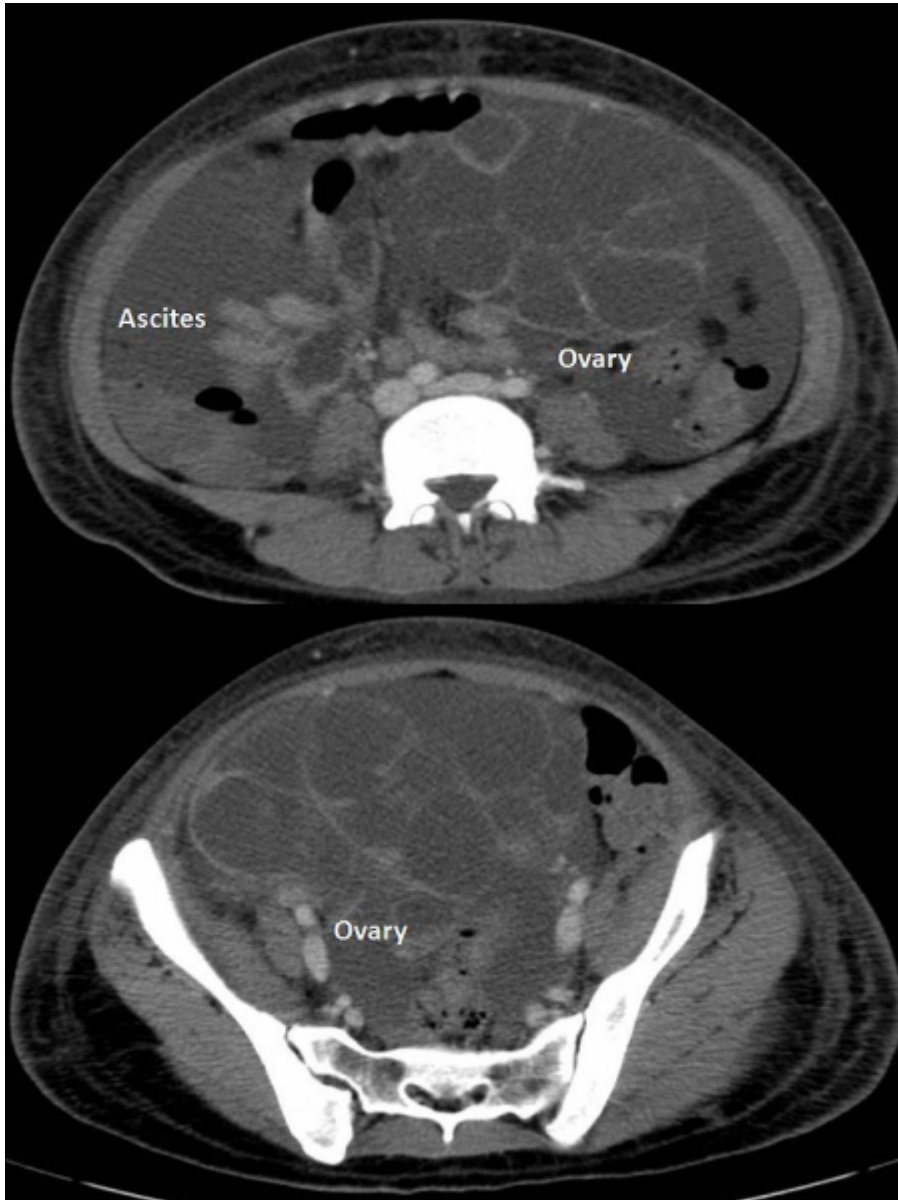
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Description: Transabdominal pelvic ultrasound reveals bilateral 'spoke wheel' appearance of the ovaries. There is echogenic content in the cysts that layers in the dependent position (arrows) and the ascites is echogenic. **Origin:** Sebastian B, Department of Radiology, St. John's Medical College, Bangalore, India

Figure 2

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Description: Contrast-enhanced computed tomography in the axial plane reveals bilaterally enlarged multicystic ovaries showing a 'spoke wheel' appearance. Ascites is also seen. **Origin:** Sebastian B, Department of Radiology, St. John's Medical College, Bangalore, India

Figure 3

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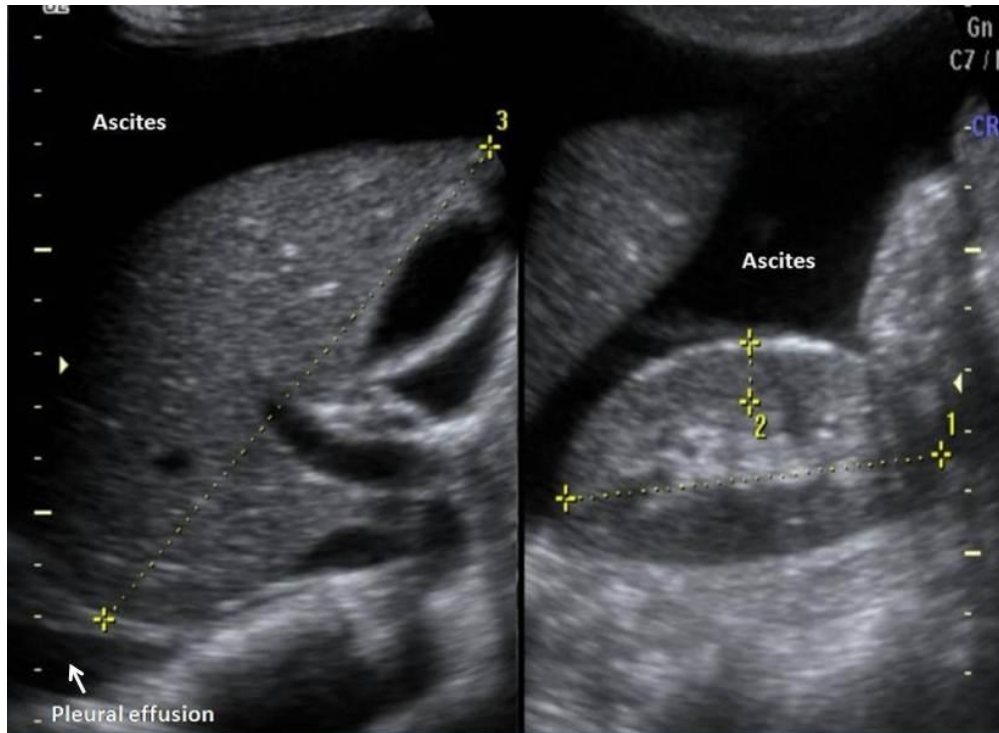


Description: Multiple cyst haemorrhages: Fluid-blood levels.

Unenhanced computed tomography in the axial plane reveals 'spoke wheel' ovaries with multiple cysts showing hyperdense dependent levels indicating intracystic haemorrhage. **Origin:** Sebastian B, Department of Radiology, St. John's Medical College, Bangalore, India

Figure 4

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Description: Severe ascites with pleural effusion (arrow) are noted in the abdominal ultrasound examination. **Origin:** Sebastian B, Department of Radiology, St. John's Medical College, Bangalore, India