Gallbladder torsion
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Section: Abdominal imaging
Area of Interest: Liver
Procedure: Localisation
Procedure: Contrast agent-intravenous
Procedure: Removal
Imaging Technique: CT
Special Focus: Calcifications / Calculi Ischaemia /
Infarction Case Type: Clinical Cases
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Patient: 89 years, female

Clinical History:
A thin, 89-year-old female patient presented with a 2-day history of nausea, vomiting, tender right iliac fossa, abdominal distension and constipation.
Blood tests were performed, which demonstrated a raised CRP at 112mg/l and normal white cell count at 8.8 10^9/l.
Liver function tests were within normal limits.

Imaging Findings:
The patient underwent a CT examination of the abdomen and pelvis following the administration of intravenous and oral contrast medium.
This demonstrated a distended gallbladder, which contained multiple calcified gallstones (Fig. 1). On the coronal reformatted images there was an unusual appearance of the gallbladder neck with wall enhancement, which suggested a double wall appearance (Fig. 2, white arrow). On axial images perpendicular to the axis of the twisted gallbladder mesentery, this corresponded to a ‘whirl’ sign [1] (Fig. 3a, b) raising the radiological suspicion of a twist at the gallbladder neck and torsion.
The patient underwent emergency laparoscopic evaluation.

Discussion:
A. Background:
Gallbladder torsion is very rare, causing 1 in 365, 520 hospital admissions [2].
It occurs when the organ twists on its mesentery along the axis of the cystic duct and artery sufficiently to compromise its vascular supply. Impaired venous drainage causes ischaemia and eventual gallbladder perforation.
Atrophy and loss of fat tissue with time results in non-fixation of the gallbladder to the inferior liver margin, explaining the greater affliction of the elderly. 85% of cases occur between 60-80 years of age [2], with a female-to-male ratio of 3:1.

B. Clinical perspective:
Potential precipitating events for torsion are violent movements, kyphoscoliosis of the spine, visceroptosis, hyperperistalsis of stomach and colon, and a tortuous atherosclerotic cystic artery.
Cholelithiasis (identified in 25-30% of cases) is not a significant risk factor [2].

Gallbladder torsion may be either incomplete (<180°) or complete (>180°) [2, 3], the latter resulting in gangrene and
further complications if unresolved.

Lau et al [4] proposed triple triads of clinical presentation, categorised by:
1. Patient characteristics (elderly, thin, deformed spine),
2. Specific symptoms (short history, right upper quadrant pain, early-onset vomiting)
3. Physical signs (abdominal mass, deranged heart rate or temperature, but lack of toxaemia/jaundice). A palpable mass may be present [3].

Meanwhile, incomplete torsion typically causes recurrent episodes of progressive pain.

Both complete and incomplete torsion characteristically demonstrate non-specifically raised inflammatory markers (white cell count, C-reactive protein) and normal liver function tests [5].

C. Imaging perspective:

Of the 500 cases reported in the literature [6] since Wendel’s original description [7], <10% were identified pre-operatively [2] – likely due to non-specific signs and symptoms and the condition being relatively unknown.

Radiological imaging may therefore assist in diagnosis.

On ultrasound, specific features include an enlarged, spherical/conical-shaped, ‘floating gallbladder’ inferior to its normal position, cystic duct located to the right of the organ, and tapering/torsion of the cystic duct itself [3].

Diagnostic CT imaging criteria [8] consist of a fluid collection between the gallbladder and gallbladder fossa of the liver, a horizontal rather than vertical long axis of the gallbladder, and an enhancing cystic duct on the right side of the gallbladder.

Interestingly, in our case, these signs were not evident.

However, non-specific signs of inflammation, such as oedema associated with a thickened gallbladder wall indicating ischaemia or necrosis, should also raise suspicion.

D. Outcome:

Treatment of gallbladder torsion, whether incomplete or complete, is by prompt laparoscopic decompression, detorsion, and cholecystectomy.

Early recognition and treatment limits mortality to 3-5% [6].

E. Take-home message:

Gallbladder torsion is a rare cause of right-sided abdominal pain.

Differential Diagnosis List: Complete gallbladder torsion with venous infarction and necrosis (Fig. 4a, b), Acute cholecystitis, Appendicitis

Final Diagnosis: Complete gallbladder torsion with venous infarction and necrosis (Fig. 4a, b).

References:


Figure 1

Description: Multiple hyperdense gallstones (white arrow) within an enlarged, spherical gallbladder.

Origin: Department of Radiology, West Suffolk Hospital, Suffolk, England.
Description: Suspicious contrast-enhancement at the gallbladder neck (white arrow). Origin: Department of Radiology, West Suffolk Hospital, Suffolk, England.
Figure 3

Description: Axial CT images showing the rare but specific 'whirl' sign at the gallbladder neck (white arrows), suggestive of gallbladder torsion. Origin: Department of Radiology, West Suffolk Hospital, Suffolk, England.
**Description:** Axial CT images showing the rare but specific 'whirl' sign at the gallbladder neck (white arrows), suggestive of gallbladder torsion. **Origin:** Department of Radiology, West Suffolk Hospital, Suffolk, England.
Figure 4

a

Description: Abnormal discoloured gallbladder (white arrow) in keeping with necrosis with a small amount of adjacent free blood (black arrow). Origin: Department of Surgery, West Suffolk Hospital, Suffolk, England.

b

Description: Untwisting of the gallbladder torted neck (black arrow) demonstrating immediate change in colour and appearance of the gallbladder (white arrow) with reperfusion. Origin: Department of Surgery, West Suffolk Hospital, Suffolk, England.