

Gallbladder perforation following abdominal liposuction: case report of a radiological pitfall

Alessandro Bergna,¹ Gabriella Cappiello,² Rusconi Andrea,¹ Ettore Lillo,¹ Anna Falvo,² Massimo Amboldi,¹ Leonardo Lenisa,¹ Teresa de Giorgi,³ Jacques Megevand¹

¹Department of General Surgery, Humanitas San Pio X, Milan; ²Department of General Surgery, Humanitas Clinical and Research Hospital, Rozzano; ³Department of Radiology, Humanitas San Pio X, Milan, Italy

Abstract

Liposuction is a widely performed aesthetic procedure. However, its potential for serious complications remains underestimated. We report a rare case of delayed liver trauma and gallbladder

perforation in a 33-year-old woman following abdominal liposuction. After developing persistent abdominal pain, imaging revealed perihepatic fluid collections but failed to clearly identify a gallbladder injury. The clinical examinations suggested the presence of a localized peritonitis; therefore, an exploratory laparoscopy was performed, showing a minor hepatic injury and an active bile leakage from a gallbladder perforation, necessitating a laparotomic cholecystectomy. The patient recovered uneventfully. This case report underscores the importance of clinical judgment when imaging is inconclusive and highlights the role of diagnostic laparoscopy in the management of intra-abdominal injuries.

Correspondence: Alessandro Bergna, M.D., Humanitas San Pio X, Via F. Nava, 31, 20159 Milan, Italy.
Tel.: +39 0269516321.
E-mail: alessandro.bergna@sanpiox.humanitas.it

Key words: gallbladder trauma; liposuction; abdominal trauma; case report.

Contributions: AB, conception, design, and manuscript writing; GC, manuscript writing and critical review; AF and TDG, data collection and manuscript writing; EL, MA, LL, and AR, critical review; JM and AR, case management and critical review. All the authors have read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

Conflict of interest: the authors declare no potential conflict of interest.

Ethics approval and consent to participate: no ethical committee approval was required for this case report by the Department because this article does not contain any studies with human participants or animals. Informed consent was obtained from the patient included in this study.

Consent for publication: the patient gave her written consent to use her personal data for the publication of this case report and any accompanying images.

Availability of data and materials: data that support the findings of this study are available on request from the corresponding author.

Received: 23 April 2025.

Accepted: 18 May 2025.

Publisher's note: all claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article or claim that may be made by its manufacturer is not guaranteed or endorsed by the publisher.

©Copyright: the Author(s), 2025

Licensee PAGEPress, Italy

Case Reports in Emergency Surgery and Trauma 2025; 3:42
doi:10.4081/crest.2025.42

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0).

Introduction

Liposuction is one of the most commonly performed aesthetic procedures worldwide. Despite its widespread use, complications are often underestimated and underreported. Many patients remain unaware of the significant risks and potential complications associated with this procedure. To date, only a few cases of traumatic lesions following liposuction have been reported.¹ Traumatic gallbladder perforation is also a rare occurrence, with the literature reporting an incidence of approximately 2% for perforating or blunt trauma to the gallbladder.^{2,3} Recently, we managed a case of delayed manifestation of liver trauma and gallbladder perforation following abdominal liposuction in a 33-year-old woman. Diagnostic imaging was inconclusive in identifying a clear gallbladder leak; therefore, clinical evaluation proved decisive in guiding the surgical intervention. This combined clinical-radiological approach allowed us to both identify and treat the lesion effectively.

Case Report

We report the case of a 33-year-old woman who suffered a gallbladder perforation following abdominal liposuction performed in March 2024 at a foreign plastic surgery center. Her surgical history included breast augmentation and rhinoplasty. Her body mass index was 22.5, and her past medical history was unremarkable. After being discharged, the patient experienced progressively worsening abdominal pain, poorly responsive to home management with paracetamol and NSAIDs. Eleven days after the liposuction, due to persistent abdominal pain, the patient was referred to our center for an outpatient abdominal ultrasound, which revealed free perihepatic and subdiaphragmatic fluid. The fluid was partially anechoic and partially echogenic, consistent with prior bleeding (Figures 1 and 2).

The patient was then admitted to our surgical ward for further diagnostic assessment. On admission, her vital parameters were as follows: body temperature 37.6°C, blood pressure 115/80 mmHg, heart rate 68 bpm, blood oxygen saturation 98%, and respiratory rate 15/min. Clinical examination showed five scars of the abdominal liposuction regularly healing. Bilateral ecchymosis was noted at the flank-dorsal junction. The palpation of the right hypochondrium revealed local tenderness and a positive Blumberg's sign. Neurological examination revealed that the patient was alert, albeit with slowed speech, without signs of cranial nerve impairment and focal neurological signs.

Blood tests showed WBCs $10.97 \times 10^9/L$, Hb 9.8 g/dL, PLT $700 \times 10^9/L$, CRP 12.39 mg/dL, PCT 0.09 ng/mL, serum amylase 49 IU/L, lipase <3 IU/L, and AST/ALT 29/31 U/L. The patient was deemed hemodynamically stable. A thoraco-abdominal CT scan was performed, showing mild pleural effusion, a subglissonian collection near the gallbladder, and two perihepatic intraperitoneal collections, with no evidence of active bleeding (Figures 3 and 4).

Considering the persistence of abdominal pain poorly responsive to NSAIDs, an exploratory laparoscopy was performed 3 hours after admission. The procedure revealed localized peritonitis in the upper right quadrant, with the peritoneal cavity walled off by omental, visceral-visceral, and parietal adhesions. Careful laparoscopic dissection exposed multiple blood and biliary collections,

which were drained to allow further exploration of the supramesocolic compartment. Two lesions were identified: one on segment V of the liver and a penetrating injury to the gallbladder with active bile leakage. The presence of such adhesions and free fluid strongly limited the achievement of Strasberg's critical view of safety. Therefore, an antegrade cholecystectomy was performed *via* a laparotomic approach. The postoperative course was uneventful,

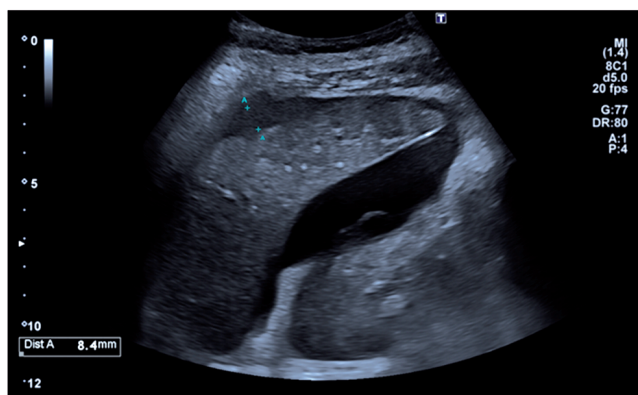


Figure 1. The abdominal ultrasound shows the presence of a voluminous perihepatic fluid collection.

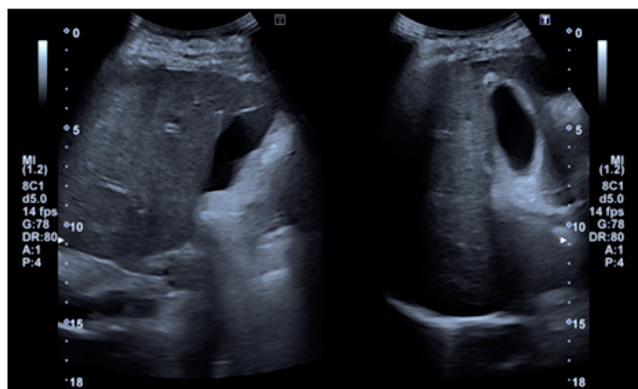


Figure 2. The abdominal ultrasound shows the integrity and continuity of the gallbladder walls; the gallbladder contains anechoic contents and appears slightly distended.

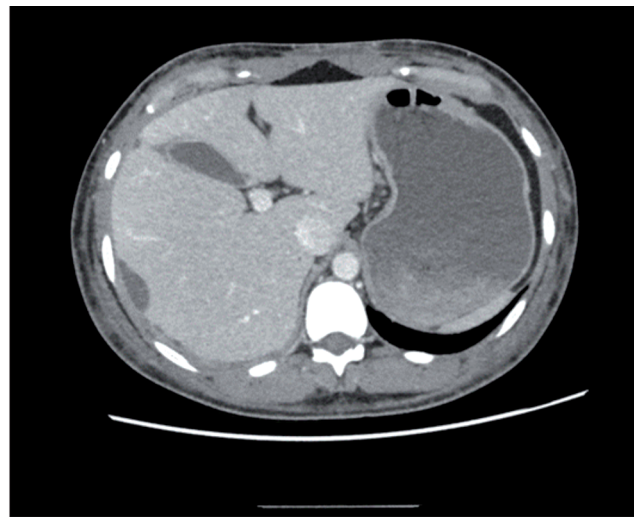


Figure 3. The thoraco-abdominal CT-scan shows the integrity of the gallbladder walls and the presence of peri-hepatic free fluid collections.



Figure 4. The thoraco-abdominal CT-scan shows a pericholecystic fluid collection and two collections below S6 and above S7-8, all likely containing blood.

and the patient was discharged on the fourth postoperative day in good general condition.

Discussion

Liposuction is a routinely performed surgical procedure that can lead to severe complications. The literature documents a few isolated cases of gallbladder perforation and one case of bilothorax resulting from liver injury after tumescent liposuction. Traumatic injury to the gallbladder is a rare occurrence, with an estimated incidence of perforating or blunt trauma of approximately 2%.^{1,2} The gallbladder is shielded by the costal arch and the liver, making injuries to this organ almost invariably associated with hepatic or other organ damage. The majority (89%) of traumatic gallbladder injuries result from penetrating trauma. The incidence of gallbladder injury accompanying other intra-abdominal trauma ranges from 0.5% to 8.6%.⁴ Isolated gallbladder injuries are uncommon, with most cases occurring alongside liver injuries, reported in 83% to 91% of cases. Concurrent injuries to the spleen and duodenum are also frequently observed, occurring in up to 54% of patients.⁵ Gallbladder perforation is classified into four types according to Niemeier and Anderson.^{6,7} This case represents a type 1 gallbladder perforation, characterized by chemical peritonitis caused by irritation from bile salts and the presence of localized hemoperitoneum. According to the World Society of Emergency Surgery (WSES) classification of extrahepatic biliary tree injuries and the American Association for the Surgery of Trauma - Organ Injury Scale (AAST-OIS) classification injury scoring scale, our case is included respectively in WSES class I and AAST-OIS grade II extrahepatic biliary lesions.⁸

Literature reports a 16% preoperative imaging detection rate for traumatic gallbladder injuries.⁹ Our experience aligns with this finding, as the preoperative imaging played an important role in guiding the diagnostic pathway, supporting our clinical suspicion of traumatic injury in the hepatic region. However, it was not conclusive, as it did not reveal a clear lesion in the gallbladder. The identification of free intraperitoneal fluid on ultrasound, though nonspecific, necessitated a CT scan, which revealed collections highly suggestive of hepatic region injury. However, consistent with the low preoperative detection rate of gallbladder perforation reported in the literature, preoperative imaging did not reveal direct signs of gallbladder perforation. Instead, only indirect findings were observed, such as pericholecystic fluid, intra-abdominal collections, and a collapsed gallbladder.

CT remains the diagnostic modality of choice for gallbladder injuries, particularly when hyperdense blood is identified within the gallbladder lumen.^{10,11} Additional signs include pericholecystic fluid and irregularities in the gallbladder wall. Ultrasound can also aid in the diagnosis, detecting heterogeneous hyperechoic blood within or adjacent to the gallbladder as pericholecystic fluid.¹² While ultrasound is more effective for evaluating atraumatic gallbladder pathology, CT provides superior accuracy in traumatic settings, particularly for identifying high-density fluid or fluid/fluid levels within the gallbladder lumen and assessing concurrent injuries to adjacent organs.^{8,10,12}

Since gallbladder injuries may be missed on CT, hepatobiliary scintigraphy serves as a reliable tool in equivocal cases, particularly for detecting bile leakage at the injury site.¹³ Delayed imaging may be required to identify isotope extravasation from the biliary system. Alternatively, MRI, with its superior soft-tissue contrast resolution, has proven effective in detecting subtle mural discontinuities in cases with indeterminate CT findings.^{8,14} In our case, the decision not to perform an MRI was driven by clinical, surgical, and practical

considerations. The patient was in pain, and the examination, besides being lengthy, required a static supine position that she could not tolerate. Moreover, the CT scan had already revealed findings that required urgent surgical exploration, making the MRI an unnecessary waste of time and resources. The diagnosis of gallbladder injuries can be challenging, and delays may lead to the development of symptoms such as weight loss, nausea, vomiting, abdominal distension, jaundice, ascites, and abdominal pain. In this case, the CT scan strongly suggested hepatic injury, prompting the decision to proceed with surgery without further radiological investigations. The definitive diagnosis was made intraoperatively: exploratory laparoscopy confirmed gallbladder perforation and minor hepatic injury. This facilitated a subsequent laparotomy through a small incision, contributing to a swift postoperative recovery.

Laparoscopy is suitable in hemodynamically stable patients when the precise localization and severity of injuries are challenging to determine through radiological techniques alone (WSES). By providing direct visualization of the abdominal cavity, laparoscopy reduces the risk of unnecessary surgical interventions and limits the use of exploratory laparotomy, which is associated with higher postoperative complication rates.^{15,16} Furthermore, the reduced surgical trauma supports faster recovery and shorter hospital stays, offering significant benefits for both patients and healthcare systems.^{15,16}

This case report leads to three key considerations. First, although liposuction is performed for aesthetic purposes, it remains a surgical procedure that can lead to serious complications and should therefore be performed by experienced surgeons. Radiological investigations are valuable tools in the management of penetrating trauma; however, the detection rate of gallbladder lesions is low, according to the literature. Our experience aligns with the existing literature and emphasizes the importance of a proper clinical evaluation. A proper assessment of signs and symptoms plays a pivotal role in the management of trauma patients, especially when facing delayed-onset conditions. In such cases, exploratory laparoscopy can further enhance the benefits of clinical evaluation by locating the exact site of injury and assessing the extent of damage. This approach minimizes the need for extensive surgical exploration, enabling targeted laparotomy only when necessary, thereby reducing surgical morbidity and improving patient outcomes.

Conclusions

The delayed manifestation of a gallbladder trauma makes the diagnostic process challenging. Clinical examination allows the integration of further advanced radiological diagnostics and exploratory surgical procedures. These strategies collectively aim to reduce the impact of surgical intervention, ensuring precise localization of the injured site and tailored treatment while prioritizing patient safety and recovery.

References

1. Ezzeddine H, Husari A, Nassar H, et al. Life threatening complications post-liposuction. *Aesthetic Plast Surg* 2018;42:384-7.
2. Soderstrom CA, Maekawa K, DuPriest RW Jr, Cowley RA. Gallbladder injuries resulting from blunt abdominal trauma: an experience and review. *Ann Surg* 1981;193:60-6.
3. Thomson BNJ, Nardino B, Gumm K, et al. Management of blunt and penetrating biliary tract trauma. *J Trauma Acute Care Surg* 2012;72:1620-5.

4. Ajlan AM, Alqahtani A, Kellow Z. Intracholecystic fat herniation in traumatic gallbladder perforation: a case report: A case report. *J Comput Assist Tomogr* 2009;33:408-9.
5. Sharma O. Blunt gallbladder injuries: presentation of twenty-two cases with review of the literature. *J Trauma* 1995;39:576-80.
6. Niemeier OW. Acute free perforation of the gall-bladder. *Ann Surg* 1934;99:922-4.
7. Anderson BB, Nazem A. Perforations of the gallbladder and cholecystobiliary fistulae: a review of management and a new classification. *J Natl Med Assoc* 1987;79:393-9.
8. Coccolini F, Kobayashi L, Kluger Y, et al. Duodeno-pancreatic and extrahepatic biliary tree trauma: WSES-AAST guidelines. *World J Emerg Surg* 2019;14:56.
9. Ball CG, Dixon E, Kirkpatrick AW, et al. A decade of experience with injuries to the gallbladder. *J Trauma Manag Outcomes* [Internet] 2010;4:3.
10. Cinquantini F, Tugnoli G, Piccinini A, et al. Educational review of predictive value and findings of computed tomography scan in diagnosing bowel and mesenteric injuries after blunt trauma: Correlation with trauma surgery findings in 163 patients. *Can Assoc Radiol J* 2017;68:276-85.
11. Joseph DK, Kunac A, Kinler RL, et al. Diagnosing blunt hollow viscus injury: is computed tomography the answer? *Am J Surg* 2013;205:414-8.
12. Akay HO, Senturk S, Cigdem MK, et al. Isolated traumatic gallbladder rupture: US findings and the role of repeat US in diagnosis. *Pediatr Radiol* 2008;38:691-3.
13. Gagne S, O Sullivan-Murphy B, Lo HS, McIntosh LJ. Pancreaticobiliary trauma: A multimodality imaging update. *Semin Ultrasound CT MR* 2018;39:355-62.
14. Tkacz JN, Anderson SA, Soto J. MR imaging in gastrointestinal emergencies. *Radiographics* 2009;29:1767-80.
15. Neugebauer EAM, Sauerland S. Guidelines for emergency laparoscopy. *World J Emerg Surg* [Internet] 2006;1:31.
16. Agresta F, Ansaloni L, Baiocchi GL, et al. Laparoscopic approach to acute abdomen from the Consensus Development Conference of the Società Italiana di Chirurgia Endoscopica e nuove tecnologie (SICE), Associazione Chirurghi Ospedalieri Italiani (ACOI), Società Italiana di Chirurgia (SIC), Società Italiana di Chirurgia d'Urgenza e del Trauma (SICUT), Società Italiana di Chirurgia nell'Ospedalità Privata (SICOP), and the European Association for Endoscopic Surgery (EAES). *Surg Endosc* 2012;26:2134-64.