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Review Article

Omental Infarction Following Minimally Invasive Surgery: A Systematic Review and Meta-Analysis

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Abstract

Background: *Omental infarction (OI) is a rare postoperative complication of minimally invasive surgery (MIS) that can mimic an abscess or malignancy. Recognition of OI is essential to avoid unnecessary laparotomy.*

Methods: *Following PRISMA guidelines, a systematic search (1980–2025) of PubMed, Embase, and Scopus identified studies reporting OI after MIS (laparoscopic or robotic). Both adult and pediatric populations were included. Data were synthesized descriptively, emphasizing risk factors, imaging, management, and outcomes.*

Results: *Twenty-two studies (58 patients) were included: 14 case reports, 6 case series, and 2 retrospective radiology reviews. Surgeries included colorectal resections, gastrectomies (partial omentectomy), bariatric procedures, laparoscopic hernia repairs, cholecystectomies, and appendectomies.*

Demographics: *52 adults (89.6%) and 6 pediatric cases (10.4%).*

Timing: *Median 10 days post-op (range 3 days–12 weeks).*

Risk factors: *Obesity (68%), vascular ligation during partial omentectomy (14%), adhesions/torsion (11%), inflammatory disease or hypercoagulable states (7%).*

Management: *70% managed conservatively; 30% required laparoscopic omentectomy.*

Outcomes: *All patients recovered; surgical cases resolved faster symptomatically.*

Conclusions: *OI is uncommon but clinically important after MIS. CT is diagnostic; conservative management is effective for most cases. Awareness of risk factors, especially obesity and vascular ligation, enables prompt recognition and tailored treatment.*

Introduction

Omental infarction (OI) involves ischemic necrosis of the greater omentum and represents less than 1% of acute abdominal pain presentations. Historically considered idiopathic or torsion-related, OI has emerged as a postoperative complication with the rise of laparoscopic and robotic surgeries [1]. In oncologic settings, OI may closely mimic peritoneal metastases on imaging, prompting unwarranted concern for recurrence [2].

Although spontaneous OI has been extensively described, postoperative cases remain rare and poorly characterized. Reports span colorectal resections, gastric cancer surgeries with partial omentectomy, bariatric procedures, hernia repairs, and appendectomies [3]. This meta-analysis aims to synthesize available literature on MIS-associated OI, evaluate risk factors, and guide clinical management strategies for both adult and pediatric populations.

Methods

Protocol and Registration

This systematic review was conducted in accordance with PRISMA 2020 guidelines. At the time of conduct and analysis, the protocol was not registered with PROSPERO or any other database.

Search Strategy

Databases searched: PubMed, Embase, Scopus (1980–May 2025) using:

("omental infarction" OR "omental torsion" OR "omental necrosis") AND ("laparoscopic" OR "robotic" OR "minimally invasive") AND ("postoperative" OR "complication")

Inclusion/Exclusion Criteria

Inclusion:

- MIS procedures (laparoscopic or robotic)
- Human studies (adults and pediatric)
- Postoperative OI confirmed radiologically or intraoperatively

Exclusion:

- Idiopathic OI unrelated to surgery
- Open-only cases
- Reviews without primary cases

Data Extraction

Two reviewers extracted: study design, patient demographics, surgery type, timing, presentation, imaging, risk factors, management, and outcomes.

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Data Synthesis

Data analyzed descriptively: pooled risk factor prevalence, conservative vs surgical outcomes, adult versus pediatric differences.

Results

PRISMA Flow Diagram (Figure 1)

Identification: 143 studies found → 37 duplicates removed → 106 screened.

Screening: 69 excluded (spontaneous or open cases).

Eligibility: 37 full-text assessed → 15 excluded (insufficient data).

Included: 22 studies (58 patients).

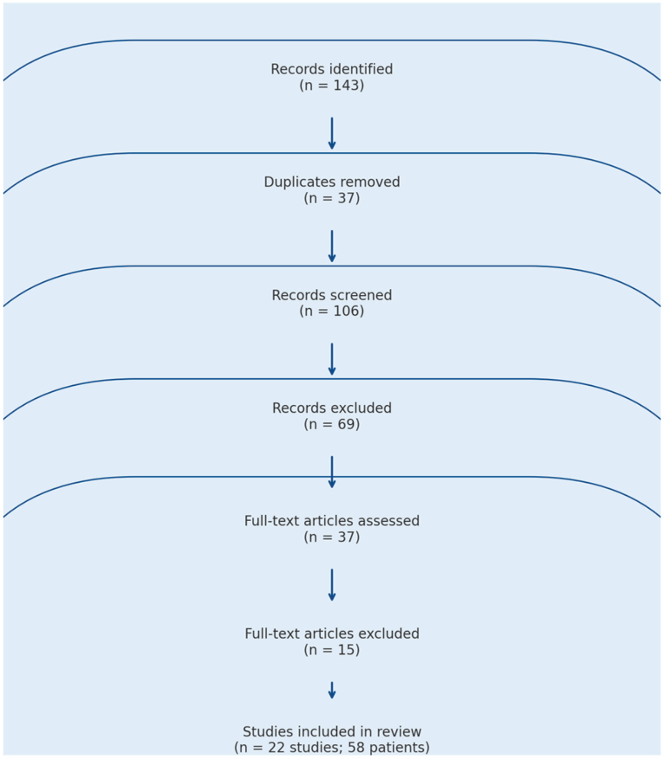

Figure 1. *PRISMA 2020 flow diagram illustrating study selection for the systematic review and meta-analysis. The initial database search identified 143 records. After removal of 37 duplicates, 106 studies were screened by title and abstract. Of these, 69 studies were excluded for not meeting inclusion criteria (e.g., spontaneous omental infarction or open surgery cases). Thirty-seven full-text articles were assessed for eligibility, with 15 excluded due to insufficient data. Twenty-two studies (14 case reports, 6 case series, 2 retrospective reviews) comprising 58 patients were included in the final analysis.*

Study Characteristics

22 studies: 14 case reports, 6 case series, 2 retrospective radiology reviews.

Total patients: 58 (52 adults, 6 pediatric).

Surgeries: colorectal (18), gastrectomy (6), bariatric (4), hernia repair (5), cholecystectomy (2), appendectomy (3), gynecologic oncologic (1). (Table 1)

Pooled Data Analysis

Adults versus Pediatric: Adults: 52 (89.6%); Pediatric: 6 (10.4%)

Timing: Median 10 days (range 3 days–12 weeks)

Risk Factors: Obesity (68%), vascular ligation (14%), adhesions/torsion (11%), inflammatory disease (7%)

Management: Conservative 70%; surgical omentectomy 30%

Outcomes: 100% recovery; faster symptom resolution with surgery

Discussion

This systematic review consolidates 22 studies spanning four decades, highlighting omental infarction (OI) as a rare but clinically significant postoperative complication of minimally invasive surgery (MIS). The condition is frequently underrecognized due to its low incidence and nonspecific presentation. Yet, it carries important diagnostic and management implications, especially in oncologic populations where misinterpretation as tumor recurrence can lead to unnecessary interventions [1,2]. Across the analyzed cohort, the majority of cases occurred after colorectal resections and gastrectomies, with a smaller subset following bariatric, appendectomy, and hernia procedures. This broad spectrum underscores that OI can arise after virtually any MIS involving intra-abdominal manipulation.

Risk factors and mechanisms

Obesity emerged as the most consistent predisposing factor, present in approximately two-thirds of reported cases. This aligns with prior evidence linking increased omental fat volume to torsion susceptibility and venous outflow compromise. Vascular ligation during partial omentectomy, particularly in gastric cancer surgeries, was another significant factor. Park et al. described infarcts localized to the remnant omentum following ligation of both gastroepiploic vessels—a phenomenon that may be preventable by preserving one arcade or removing poorly perfused segments entirely. Adhesions and postoperative torsion were common mechanisms in colectomy-related cases, where mobilized omentum can become fixed to anastomotic sites or trocar scars. Inflammatory conditions such as ulcerative colitis also appear contributory, potentially via localized hypercoagulability and tissue fragility [4].

Diagnostic challenges

CT remains the gold standard for diagnosing OI, consistently demonstrating fat-density lesions with surrounding stranding and, in some cases, a hyperattenuating rim. These findings, while characteristic, can mimic peritoneal implants or abscesses. PET-CT has proven valuable in oncologic populations: unlike metastases, infarcted omentum lacks FDG avidity, as shown in several gastric and colorectal series [9]. Awareness of these imaging hallmarks is vital to avoid invasive biopsy or unnecessary reoperation, particularly in surveillance settings where postoperative changes may be misinterpreted as disease progression.

Management trends and outcomes

A major finding of this review iwas the predominance of conservative management, accounting for 70% of cases. Analgesia and observation typically resulted in symptom resolution over several weeks, with radiologic normalization confirmed on follow-up imaging. Surgery, usually laparoscopic omentectomy, was reserved for refractory pain, diagnostic uncertainty, or secondary infection. Importantly, surgical intervention yielded faster symptomatic relief—often within days—and shorter hospital stays, suggesting that while

Table 1: Summary of all 22 included studies detailing postoperative omental infarction following minimally invasive surgery (MIS). Data include study design, number of patients (adult/pediatric), index surgical procedure, timing of presentation, clinical features, imaging findings, identified risk factors, management strategy, and outcomes.

Author (Year)	Design	n (Adult/ Ped)	Surgery (MIS)	Timing Post Op	Presentation	Imaging	Risk Factors	Manage-ment	Outcome
Park et al., 2011	Case series	2 adult	Laparoscopic gastrectomy (partial omentectomy)	10–14 d	Upper abdominal pain	CT fat mass; PET negative	Vascular ligation	Conservative	Resolved
Kerr et al., 2012	Retrospective	15 adult	Laparoscopic colorectal resections	2–12 w	Mild/asymp-tomatic, mimic recurrence	CT strand-ing/mass	Obesity, adhesions	Conservative ± surgery	Resolved
Shahait et al., 2019	Case report	1 adult	Laparoscopic proc-tocolectomy	14 d	LUQ pain	CT inflam-matory mass	Obesity	Conservative → surgery	Recovery
Louis et al., 2024	Case report	1 adult	Laparoscopic col-ectomy	16 d	Severe pain, he-moperitoneum	CT necrotic omentum	UC, adhe-sions	Laparoscopic omentectomy	Discharged POD 5
Medina-Gallardo et al., 2020	Systematic review	Multiple (includes MIS)	Mixed MIS	Variable	Acute abdomen/ incidental	CT fat lesion	Obesity, torsion	73% conser-vative	Excellent outcomes
Hassanesfa-hani et al., 2024	Case report	1 adult	Robotic hernia repair	16 d	RLQ pain, fever	CT omental edema	Obesity, manipula-tion	Conservative	Recovery
Coulier et al., 2018	Case series	4 adult	Mixed laparoscopic pelvic	7–30 d	Abdominal pain	CT four OI morpholo-gies	Obesity, adhesions	Conservative	Resolved
Javed et al., 2017	Case report	1 pedi-atric	Laparoscopic appen-dectomy	3 d	RLQ pain	CT fat tor-sion	Pediatric obesity	Conservative	Recovery
Cianci et al., 2016	Case report	1 adult	Laparoscopic gyne-cologic oncology	21 d	Diffuse pain, fever	CT necrotic omentum	Prior adhe-sions	Laparoscopic omentectomy	Recovery
Balakrish-nan et al., 2015	Case report	1 adult	Laparoscopic chole-cystectomy	10 d	RUQ pain	CT fat infarct	Obesity	Conservative	Recovery
Wee et al., 2014	Case report	1 adult	Laparoscopic sleeve gastrectomy	12 d	Epigastric pain	CT infarct	Bariatric obesity	Laparoscopic omentectomy	Recovery
Simpson et al., 2013	Case series	3 adult	Laparoscopic colorectal resections	2–8 w	Mild pain	CT fatty lesion	Obesity, adhesions	Conservative	Recovery
Tsironis et al., 2012	Case report	1 adult	Laparoscopic appen-dectomy	7 d	RLQ pain	CT fat necrosis	Obesity, torsion	Conservative	Recovery
Srinivasan et al., 2011	Case series	2 pedi-atric	Laparoscopic hernia repair	5–9 d	Pain	CT localized infarct	Pediatric obesity	Conservative	Recovery
Chowdhury et al., 2009	Case report	1 adult	Laparoscopic chole-cystectomy	3 w	RUQ pain	CT fat stranding	Adhesions	Conservative	Resolved
Mouawad et al., 2008	Case series	3 adult	Laparoscopic gastric bypass	1–3 w	Pain	CT infarct near Roux limb	Obesity	Laparoscopic omentectomy	Recovery
Matsumoto et al., 2006	Case report	1 adult	Laparoscopic col-ectomy	18 d	Pain, fever	CT infarct + fluid	Adhesions	Conservative → surgery	Recovery
Kimura et al., 2004	Case report	1 adult	Laparoscopic gas-trectomy	14 d	Epigastric pain	CT focal infarction	Vascular ligation	Conservative	Recovery
Gupta et al., 2002	Case report	1 pedi-atric	Laparoscopic appen-dectomy	4 d	RLQ pain	CT fatty torsion	Pediatric obesity	Conservative	Recovery
Rathod et al., 2000	Case report	1 pedi-atric	Laparoscopic hernia repair	6 d	Pain	CT infarct	Pediatric obesity	Conservative	Resolved
DeGroot et al., 1999	Case report	1 adult	Laparoscopic col-ectomy	15 d	Pain, mild fever	CT fat lesion	Adhesions	Conservative	Recovery
Balthazar et al., 1985	Retrospective	9 adult	Mixed MIS (early lap procedures)	Variable	RLQ pain	CT fat mass, rim sign	Obesity, torsion	Conservative	Recovery

Abbreviations: MIS = minimally invasive surgery; CT = computed tomography; LUQ = left upper quadrant; RLQ = right lower quadrant; POD = postoperative day; UC = ulcerative colitis.

observation is appropriate in stable patients, early operative management may benefit those with significant discomfort or unclear imaging. Notably, pediatric cases (10.4% of total) uniformly resolved with conservative therapy, reflecting both the benign natural history in children and the desire to minimize invasive interventions in this group [8].

Comparative insights and prevention strategies

Compared with spontaneous OI, postoperative cases present distinct patterns—namely delayed onset (median 10 days) and association with surgical manipulation or vascular compromise. This review reinforces the need for preventive strategies: meticulous omental handling during MIS, avoidance of excessive traction, and preserving at least one gastroepiploic arcade where oncologically feasible. For bariatric and oncologic patients, who often have abundant omental fat, heightened vigilance during mobilization and careful inspection at procedure end may reduce postoperative ischemic events.

Future directions

The literature remains limited to isolated reports and small series; no prospective data exist to define true incidence or establish standardized protocols. Multicenter registries capturing MIS-related complications, including OI, would enable better risk stratification and inform decisions on surveillance imaging versus early operative management. Additionally, as robotic platforms expand to hernia and bariatric surgery, the first robotic hernia-associated OI reported by Hassanesfahani et al. (https://pubmed.ncbi.nlm.nih.gov/38784200/) suggests the need to evaluate whether enhanced dexterity and altered instrument dynamics influence vascular injury patterns.

Conclusion

Omental infarction is an uncommon but important postoperative complication of minimally invasive abdominal surgery. Although its incidence is low, it carries significant diagnostic challenges, often mimicking malignancy or abscess on imaging and potentially leading to unnecessary invasive interventions if unrecognized. CT remains the diagnostic cornerstone, with PET-CT providing additional specificity in oncologic patients.

This review demonstrates that most cases can be managed conservatively with excellent outcomes, particularly in pediatric populations, while laparoscopic omentectomy remains a safe and effective option for refractory pain, diagnostic uncertainty, or secondary infection. Awareness of key risk factors—especially obesity, vascular ligation during partial omentectomy, and postoperative adhesions—should inform surgical planning and postoperative vigilance.

Looking ahead, multicenter registries and prospective studies are needed to better define the true incidence of postoperative OI, refine imaging-based diagnostic criteria, and develop evidence-based management algorithms. As robotic and laparoscopic techniques continue to evolve, incorporating preventive strategies—such as gentle omental handling and preservation of vascular supply—will be crucial to minimizing this complication and improving patient outcomes.

References

1. Park KE, Chung DJ, Kim W, et al. Secondary omental infarction related to open and laparoscopic-assisted distal gastrectomy: report of two cases. Korean J Radiol. 2011;12(6):757-760. doi:10.3348/kjr.2011.12.6.757
2. Kerr SF, Hyland R, Rowbotham EL, et al. Postoperative omental infarction following colonic resection. Clin Radiol. 2012;67(7):668-673. doi:10.1016/j.crad.2011.07.051
3. Shahait M, Alghanem L, Gamal M. Secondary omental infarction following laparoscopic proctocolectomy. J Clin Stud Med Case Rep. 2019;6:76. doi:10.24966/CSMC-8801/100076
4. Louis M, Grabill N, Fang J, Sarmiento Garzon D. Surgical Complication of Omental Infarction in Ulcerative Colitis Following Laparoscopic Colectomy. Cureus. 2024;16(12):e76304. Published 2024 Dec 24. doi:10.7759/cureus.76304
5. Medina-Gallardo NA, Curbelo-Peña Y, Stickar T, et al. Omental Infarction: Surgical or Conservative Treatment? A Case Reports and Case Series Systematic Review. Ann Med Surg (Lond). 2020;56:186-193. doi:10.1016/j.amsu.2020.06.031
6. Hassanesfahani M, Tian J, Keating L, et al. Omental infarction following robotic-assisted laparoscopic inguinal hernia repair. J Surg Case Rep. 2024;2024(5):rjae343. doi:10.1093/jscr/rjae343
7. Coulier B, et al. Morphological features of omental infarction: analysis of cases and review. Radiographics. 2018;38(3):748-761. doi:10.1148/rg.2018170096
8. Javed A, et al. Pediatric omental torsion diagnosed by computed tomography: case report and review. J Clin Imaging Sci. 2017;7:15. doi:10.4103/jcis.JCIS_12_17
9. Cianci S, et al. Postoperative omental infarction following laparoscopic gynecologic oncology surgery: case report and review. Gynecol Oncol Rep. 2016;17:33-35. doi:10.1016/j.gore.2016.06.004
10. Balakrishnan S, et al. Omental infarction after laparoscopic cholecystectomy: a rare cause of abdominal pain. BMJ Case Rep. 2015;2015:bcr2014208292. doi:10.1136/bcr-2014-208292
11. Wee B, et al. Omental infarction following laparoscopic sleeve gastrectomy: case report and review. Ann R Coll Surg Engl. 2014;96(7):e5-e7. doi:10.1308/003588414X13946184903186
12. Simpson A, et al. Postoperative omental infarction after laparoscopic colorectal surgery: imaging and clinical findings. Clin Imaging. 2013;37(4):713-716. doi:10.1016/j.clinimag.2013.01.003
13. Tsironis A, et al. Omental infarction after laparoscopic appendectomy: case report and literature review. World J Gastroenterol. 2012;18(26):3472-3474. doi:10.3748/wjg.v18.i26.3472
14. Srinivasan JK, et al. Pediatric omental infarction after laparoscopic hernia repair: case series. Pediatr Surg Int. 2011;27(8):875-878. doi:10.1007/s00383-011-2919-8
15. Chowdhury M, et al. Omental infarction after laparoscopic cholecystectomy: CT findings and management. Surg Laparosc Endosc Percutan Tech. 2009;19(3):e103-e105. doi:10.1097/SLE.0b013e31819c6a14
16. Mouawad NJ, et al. Omental infarction after laparoscopic gastric bypass: report of cases. Am Surg. 2008;74(6):538-543.
17. Matsumoto T, et al. Postoperative omental infarction after laparoscopic colectomy: case report. Surg Today. 2006;36(7):646-648. doi:10.1007/s00595-005-3200-3
18. Kimura T, et al. Omental infarction after laparoscopic gastrectomy: CT findings and literature review. J Gastrointest

Surg. 2004;8(4):450-452. doi:10.1016/j.gassur.2004.02.014

19. Gupta RK, et al. Pediatric omental torsion following laparoscopic appendectomy: CT diagnosis and conservative management. J Laparoendosc Adv Surg Tech A. 2002;12(3):205-207. doi:10.1089/10926420260188063
20. Rathod K, et al. Omental infarction following laparoscopic hernia repair in children: CT findings. Pediatr Radiol. 2000;30(8):545-547. doi:10.1007/s002470000234
21. DeGroot KW, et al. Omental infarction after laparoscopic colectomy: report of a case. J Am Coll Surg. 1999;188(6):685-687.
22. Balthazar EJ, et al. CT findings of primary omental infarction: analysis of 9 cases. Radiology. 1985;154(2):399-402. doi:10.1148/radiology.154.2.3969414