



Contemporary Management Strategies for Appendicular Abscess: A Narrative Review

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Abstract

Introduction: Appendicular abscess is a complication arising from the perforation of the appendix, occurring in approximately 10% of acute appendicitis cases. It is diagnosed through clinical examination, leucocytosis, and imaging techniques such as ultrasound or computed tomography (CT). Management traditionally involves a conservative approach, including intravenous fluids, antibiotics, and percutaneous drainage. However, with advancements in laparoscopic surgery, immediate appendectomy has gained preference, while interval appendectomy is now reserved for patients with recurrent symptoms. **Methods:** This narrative review explores the various management strategies for appendicular abscess. Relevant literature was reviewed to assess the effectiveness of conservative treatment, percutaneous drainage, and surgical interventions, including laparoscopic and interval appendectomy. **Results:** Conservative management remains the first-line treatment for appendicular abscess, focusing on infection control and symptom relief. The shift towards laparoscopic appendectomy has been observed, with evidence supporting its safety and feasibility. Interval appendectomy, once routinely performed, is now limited to cases with recurrent symptoms, reflecting a change in clinical practice. **Conclusion:** The management of appendicular abscess has evolved over time, with a growing preference for early laparoscopic intervention in select cases. While conservative treatment remains a viable approach, interval appendectomy is no longer routine. Further studies are needed to refine treatment protocols and optimize patient outcomes.

Keywords: Appendectomy; Appendicular Abscess; Appendicular Mass; Complicated Appendicitis; Laparoscopic Appendectomy; Percutaneous Drainage

Introduction

An appendicular abscess typically results from the perforation of the appendix and falls under the broader term "appendicular mass". This term describes a clinical spectrum arising from an appendix perforation, leading to the formation of a mass in the right iliac fossa. The components of this mass include the cecum, terminal ileum, omentum, and the perforated appendix. An appendicular mass can present as either a phlegmon or an abscess (Garba & Ahmed, 2008). Diagnosis of an appendicular abscess or mass involves a thorough clinical examination of the abdomen, which may reveal a palpable mass in the right iliac fossa. Additional diagnostic methods include blood investigations, which may indicate leucocytosis or elevated C-reactive protein levels, along with imaging techniques such as ultrasound or computerised tomography. The management of an appendicular abscess is categorised into conservative treatment and surgical intervention. In stable patients, conservative management includes intravenous antibiotic therapy and percutaneous drainage of the abscess. However, in unstable patients, an immediate appendectomy is required, followed by intravenous antibiotic

administration. For stable patients, immediate appendectomy is generally discouraged due to the increased risk of complications such as postoperative abscess formation and enterocutaneous fistula development (Ahmed *et al.*, 2005; Becker, Fichtner-Feigl, & Schilling, 2018; Tannoury & Abboud, 2013).

Traditionally, an interval appendectomy was performed eight weeks after conservative treatment. However, it is no longer considered a routine necessity due to the low recurrence rates. For older patients (above the age of 40), performing computerised tomography or colonoscopy is recommended to identify any underlying pathology in the colon and avoid missing lesions such as malignancies (Demetrashvili *et al.*, 2019). Interval appendectomy can be performed using either an open or laparoscopic approach. However, laparoscopic interval appendectomy is associated with better outcomes compared to open interval appendectomy (Rashid *et al.*, 2013).

The World Society of Emergency Surgeons (WSES), in their guidelines for the management and treatment of acute appendicitis, recommends that patients with an appendicular mass or abscess can be managed with an immediate laparoscopic appendectomy. However, when laparoscopic surgical services are unavailable, conservative treatment with intravenous antibiotics and percutaneous drainage of the abscess may be utilised (Di Saverio *et al.*, 2020). Similarly, the European Association of Emergency Surgeons (EAES), in their guidelines for the diagnosis and management of acute appendicitis, advocates for conservative or non-operative treatment for patients presenting with an appendicular mass or abscess (Gorter *et al.*, 2016).

The necessity of performing an interval appendectomy is now being questioned due to the low recurrence rates of right iliac fossa pain. Patients below the age of 40 are not required to undergo elective interval appendectomy. However, for patients above the age of 40, further investigation using imaging modalities such as computerised tomography (CT) and colonoscopy is recommended (Koirala *et al.*, 2016; Panahi *et al.*, 2020).

There is no current consensus in the management of appendicular abscess; therefore, this review article examines its diagnosis and management. The role of percutaneous drainage of appendicular abscess and immediate surgery is evaluated. This study conducted a literature review using PUBMED, the Cochrane database of systemic reviews, Google scholar and semantic scholar looking for randomised control trials, non-randomised trials, observational and cohort studies, clinical reviews, systemic reviews, and meta-analysis from 1980 to 2024. The following keywords were used, "complicated appendicitis", "appendicular mass", "appendicular abscess", "appendectomy", "laparoscopic appendectomy" and "percutaneous drainage" (Figure 1). All articles were in English, and all articles were assessed by manual cross referencing of the literature. Commentaries, case reports and editorials were excluded from this review. Adult and pediatric patients were included in this study and pregnant patients with acute appendicitis were excluded.

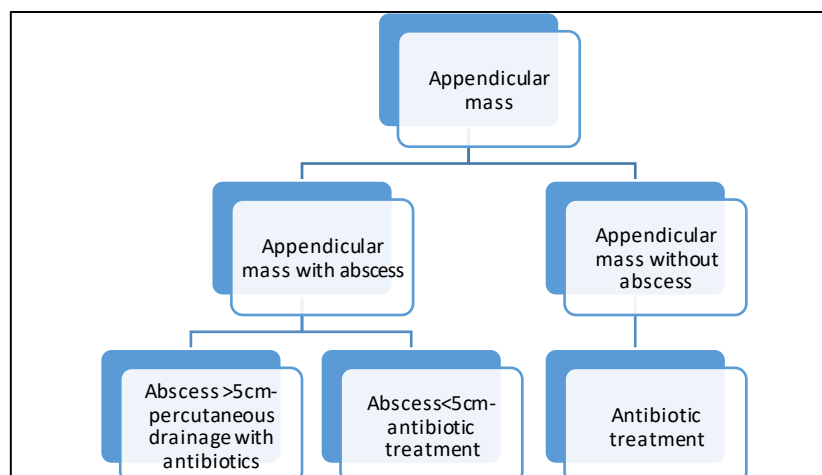


Figure 1: Flowchart Showing the Management of Appendicular Mass and Abscess

Discussion

Conservative Treatment of Appendicular Abscess

Conservative treatment of an appendicular abscess involves initiating intravenous antibiotics, administering analgesics, monitoring vital signs, and keeping the patient fast. This management approach was popularised by Ochsner and Sheeren and was associated with a success rate of 80% to 90%, with a low incidence of complications. Following conservative treatment, an interval appendectomy was traditionally performed after eight weeks to prevent recurrence (Coccolini *et al.*, 2018; Elsaady, 2019; Tingstedt *et al.*, 2002).

A systematic review and meta-analysis on the nonsurgical treatment of appendiceal abscess or phlegmon was conducted by Andersson *et al.* This study included 20 studies with a total of 59,448 patients. Conservative treatment was found to have a success rate of 92.8% and a recurrence rate of 7.4%. Additionally, percutaneous drainage of the abscess was required in 19.7% of cases that underwent conservative management. Due to the low recurrence rates, interval appendectomy was not routinely performed, and high-risk patients were monitored using computerised tomography and colonoscopy (Andersson & Petzold, 2007).

A meta-analysis comparing conservative treatment and appendectomy for complicated appendicitis was conducted by Simillis *et al.* This study included 17 studies with a total of 1,572 patients, of whom 847 underwent conservative treatment and 725 underwent appendectomy. The findings indicated that conservative treatment was associated with a lower wound infection rate, reduced intra-abdominal abscess formation, and a lower incidence of intestinal obstruction compared to immediate appendectomy (Simillis *et al.*, 2010). Additionally, another meta-analysis by Fugazzola *et al.* compared early appendectomy and conservative management in children with complicated acute appendicitis. This study included 1,288 patients and found that conservative treatment had a success rate of 90% and a recurrence rate of 15.4%. However, the length of hospital stay was shorter for patients who underwent immediate appendectomy (Fugazzola *et al.*, 2019).

Percutaneous Drainage of Appendicular Abscess

Percutaneous drainage is a well-established technique for managing patients with complicated appendicitis accompanied by abscess formation. This procedure can be performed using the Seldinger technique under ultrasound or computerised tomography guidance. When combined with conservative treatment, percutaneous drainage is associated with improved outcomes, a lower risk of recurrence, and a reduced hospital stay (Roach *et al.*, 2007; Shinde *et al.*, 2020; Zavras & Vaos, 2020). In children above the age of 13 years, percutaneous drainage of an appendicular abscess is linked to a lower incidence of interval appendectomy and better overall outcomes. Additionally, the use of intravenous antibiotics further reduces the recurrence rate (Luo *et al.*, 2016). A prospective study conducted by Zerem *et al.* compared the therapeutic effectiveness of percutaneous drainage combined with antibiotics versus antibiotics alone. This study included 50 patients and concluded that percutaneous drainage, when combined with intravenous antibiotics, is a safe and effective approach with low recurrence rates (Zerem *et al.*, 2007).

The size of an appendicular abscess significantly impacts its outcome. Abscesses smaller than 5 cm are associated with better outcomes and fewer complications, whereas larger abscesses (greater than 5 cm) often require continuous drainage for several days (Lasson *et al.*, 2002). Image-guided percutaneous drainage using computerised tomography has shown a higher success rate and improved outcomes. However, ill-defined abscesses are typically linked to poorer prognoses (Marin *et al.*, 2010). Several factors influence the success of percutaneous drainage of an appendicular abscess, including the presence of a low-grade abscess without multiloculation, the use of computerised tomography-guided drainage, and the trans gluteal approach (Fagenholz *et al.*, 2016). A systematic review on the treatment of appendicular mass was conducted by Olsen *et al.*, which included 48 studies with a total of 3,772 patients. The study concluded that percutaneous drainage of an appendicular abscess in both

adults and children may reduce the risk of treatment failure. However, it was also associated with a moderate risk of complications (Olsen *et al.*, 2014) (Table 1).

Table 1: The Recurrence Rate After Percutaneous Drainage of Appendicular Abscess

Study	Study type	Year	N=numbers	Recurrence rate - percutaneous drainage	Recurrence rate- conservative treatment and no percutaneous drainage
Zerem <i>et al.</i>	Prospective study	2006	50	4%	32%
Marin <i>et al.</i>	Retrospective study	2010	41	10%	15%
Luo <i>et al.</i>	Retrospective study	2016	1255	3.33%	6.79%

Interval Appendectomy After Percutaneous Drainage of Abscess

Interval appendectomy was traditionally performed following conservative treatment of an appendicular abscess to prevent recurrence. However, given that the recurrence rate for appendicitis ranges from 5% to 25%, with a complication rate of 23% associated with the procedure, the necessity of performing an interval appendectomy has been questioned. Several studies have indicated that, due to the low recurrence rate, there is no clear justification for routinely performing an interval appendectomy (Corfield, 2007; Tekin *et al.*, 2008; Willemsen *et al.*, 2002).

A systematic review conducted by Darwazeh *et al.* examined whether an interval appendectomy should be performed after conservative management of perforated appendicitis and phlegmon. The review included 21 studies with a total of 1,943 patients, of which 1,400 underwent conservative treatment and 543 underwent an interval appendectomy. The morbidity rate for conservative treatment was 13.3%, with a recurrence rate of 12.4%. The morbidity rate for interval appendectomy was 10.4%. The study concluded that interval appendectomy was associated with minimal benefit and resulted in increased costs and morbidity (Darwazeh *et al.*, 2016).

An open label randomised controlled trial, the CHINA study, compared active observation versus interval appendectomy after successful non-operative treatment of an appendicular mass in children. This study, conducted by Hall *et al.*, included 106 patients, with 52 undergoing interval appendectomy and 54 undergoing conservative treatment. The recurrence rate for patients who received conservative treatment was 12%, while the complication rate for those who underwent interval appendectomy was 6%. The study concluded that interval appendectomy should not be performed routinely and that a wait-and-see approach might be more suitable for treating patients with recurrent symptoms (Hall *et al.*, 2017). Additionally, Hall *et al.* conducted a systematic review to assess the justification for performing an interval appendectomy after successful conservative treatment for appendicular mass in children. This review included 3 studies with 127 cases, revealing a 20% recurrence rate after conservative treatment and a 3.4% complication rate following interval appendectomy. The study concluded that interval appendectomy may not be necessary after the completion of conservative treatment (Hall *et al.*, 2011).

Early Laparoscopic Appendectomy for Appendicular Abscess

Early or immediate appendectomy was traditionally not favoured in the management of appendicular abscesses due to the increased risk of wound infection, intra-abdominal abscess formation, and intestinal obstruction. However, with the introduction of laparoscopic appendectomy, there has been a shift towards performing immediate appendectomy. This is attributed to the reduced risk of postoperative infections, early ambulation, and decreased postoperative nausea and vomiting (Cueto *et al.*, 2006; Forsyth *et al.*, 2017). Several studies have demonstrated that laparoscopic appendectomy for appendicular abscess is associated with reduced symptoms of pain, vomiting, and a shorter length of hospital stay. While the risk of intra-abdominal abscess formation was initially higher compared to open appendectomy, this risk has been decreasing over the years as laparoscopic appendectomy techniques and surgeon experience have improved (Ball *et al.*, 2004; Khiria *et al.*, 2011; Kirshtein *et al.*, 2007; Yau *et al.*, 2007).

A systematic review and meta-analysis comparing laparoscopic appendectomy versus open appendectomy in adults with complicated appendicitis was conducted by Athanasiou *et al.* The study included 26 studies, with 2,188 patients undergoing laparoscopic appendectomy and 2,551 patients undergoing open appendectomy. Laparoscopic appendectomy was associated with a reduced wound infection rate, faster recovery, and a shorter length of hospital stay. The intra-abdominal abscess rate was similar between the two groups. This study concluded that laparoscopic appendectomy was associated with better outcomes compared to open appendectomy (Athanasiou *et al.*, 2017). Another systematic review and meta-analysis comparing laparoscopic versus open appendectomy in adults with complicated appendicitis was conducted by Markides *et al.* (2010). They found that laparoscopic appendectomy was associated with reduced wound infection rates, and the intra-abdominal abscess rate was comparable to that of open appendectomy (Markides *et al.*, 2010).

A meta-analysis was conducted by Low *et al.*, comparing laparoscopic appendectomy with open appendectomy in paediatric patients with complicated appendicitis. Thirty-nine studies included 3,402 patients who underwent laparoscopic appendectomy and 4,522 patients who underwent open appendectomy. Patients who underwent laparoscopic appendectomy had a shorter hospital stay and a lower incidence of surgical site infection. The intra-abdominal abscess rate was similar between both groups; however, the study concluded that laparoscopic appendectomy should be the procedure of choice in paediatric patients with an appendicular abscess (Low *et al.*, 2019).

Conclusion

There is no consensus on the optimal management for a patient presenting with appendicular abscess, the treatment approach is largely determined by the patient's clinical presentation and the experience of the treating surgeon. Conservative treatment is a safe and effective option, particularly when combined with percutaneous drainage of the abscess, which is associated with better outcomes. The size of the appendicular abscess plays a critical role in determining the success of percutaneous drainage. If laparoscopic surgical expertise is available, immediate appendectomy should be performed, as this addresses the underlying issue and reduces the risk of recurrence. Immediate appendectomy is also cost-effective. Routine interval appendectomy is not necessary, as patients can be monitored using imaging techniques such as computerised tomography or colonoscopy for further assessment.

Conflict of Interest

The authors declare no conflict of interest.

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