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An Update to Interval Appendectomy: Narrative Review Article

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ABSTRACT

An interval appendectomy is performed following completion of non-operative treatment of complicated appendicitis to prevent recurrence. Interval appendectomy is usually performed 8 to 12 weeks after the completion of non-operative treatment, and it can be performed as an open or laparoscopic procedure. Recent evidence has questioned the need for performing an interval appendectomy due to the low recurrence rate following non-operative treatment, and interval appendectomy is also associated with some morbidity from the procedure. In this review, we will look at the indications for interval appendectomy in complicated and uncomplicated appendicitis and the risk factors for performing this procedure.

INTRODUCTION

Acute appendicitis is one of the most common general surgical emergencies that is seen in young adults. It can be divided into uncomplicated and complicated appendicitis. Complicated appendicitis includes perforation of the appendix, appendicular abscess, and appendicular mass formation. Traditionally, appendectomy has been the gold standard for the management of acute appendicitis, but non-operative management has become another form of treatment for this condition(Becker et al., 2018; Dahiya et al., 2024; Kojima et al., 2019; Lai et al., 2005). Patients who undergo non-operative treatment for complicated appendicitis have traditionally undergone an interval appendectomy at 8 to 12 weeks after completion of this therapy. An interval appendectomy is performed to prevent recurrence and to confirm the presence of any atypical pathology, but now the indication for performing an interval appendectomy is being questioned(Coccolini et al., 2018; Garba & Ahmed, 2008; Tannoury & Abboud, 2013)

The choice of performing an interval appendectomy after completion of non-operative treatment remains an area of controversy. With the reported recurrence rate following conservative treatment ranging from 4% to 20%, some have questioned the need for performing an interval appendectomy. Another reason for performing an interval appendectomy is to obtain tissue diagnosis and not miss any atypical pathology. Interval appendectomy is also associated with a morbidity rate of 12% to 22% (Corfield, 2007; Perez & Allen, 2018; Quartey, 2012).The World Society of Emergency Surgeons (WSES), in their guidelines for the management of acute appendicitis, have not recommended performing an interval appendectomy following non-operative treatment as a routine, and high-risk patients can be evaluated with computerized tomography and colonoscopy(Di Saverio et al., 2020).The European Association of Emergency Surgeons(EAES), however, did not place any recommendations on whether an interval appendectomy should be performed or not, with the treating surgeon often deciding on this(Gorter et al., 2016).The Society of American Gastrointestinal Surgeons (SAGES) has, however, recommended that an interval appendectomy be performed for both adult and pediatric patients who have undergone non-operative treatment, but this is a conditional recommendation based on the current evidence that is available(Kumar et al., n.d.).

As there is no current consensus in the indication for performing an interval appendectomy, we have conducted this review article looking into the role of performing an interval appendectomy following non-operative treatment for complicated and uncomplicated acute appendicitis in children and adults. We conducted a literature review using PUBMED, the Cochrane database of systematic

reviews, Google Scholar, and Semantic Scholar, looking for randomized controlled trials, non-randomized trials, observational and cohort studies, clinical reviews, systematic reviews, and meta-analyses from 1990 to 2025. The following keywords were used: "complicated appendicitis", "non-operative treatment", "acute appendicitis", "Interval appendectomy ", "laparoscopic appendectomy", and "delayed appendectomy". 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.

DISCUSSION

Interval appendectomy following complicated appendicitis

Willemsen et al conducted a retrospective study on 233 patients with an appendicular mass who were managed with conservative treatment and 205 patients who underwent interval appendectomy. The mean duration of hospital stay was 5 days, and the postoperative morbidity rate was 17.6% in the interval appendectomy group. The histology of the appendix specimen following interval appendectomy revealed chronic appendicitis in 59%, acute appendicitis in 5%, and a normal appendix in 30% of the cases (Willemsen et al., 2002). Tekin et al conducted a retrospective study on 94 patients who were diagnosed with an appendicular mass and had undergone conservative treatment. The recurrence rate was 10.1% in 6 months and 2.2% at 1-year follow-up. This study concluded that due to the low recurrence rate, routine interval appendectomy need not be performed(Tekin et al., 2008).

A systematic review of perforated appendicitis and phlegmon, and whether an interval appendectomy was indicated or not, was conducted by Darwazeh et al. A total of 21 studies with 1943 patients were included in this study, with 1400 patients managed non-operatively and 543 undergoing an interval appendectomy. The morbidity and length of hospital stay for non-operative treatment were 13.3% and 9 days, respectively, while the interval appendectomy group had 10.4% morbidity and a 5-day hospital stay. Non-operative treatment and interval appendectomy were associated with similar morbidity, but interval appendectomy incurred an additional cost(Darwazeh et al.,2016.).

A prospective randomized controlled trial comparing laparoscopic interval appendectomy against open interval appendectomy in the management of patients with appendicular mass was conducted by Rashid et al. A total of 100 patients were randomized to 50 who underwent laparoscopic interval appendectomy and 50 who underwent open interval appendectomy. The laparoscopic group was associated with a shorter duration of ileus, reduced hospital stay, and earlier return to work(Rashid et al., 2013).A systematic review and meta-analysis comparing early versus interval appendectomy for the management of complicated appendicitis was conducted by Akingboye et al. A total of 6 studies with 9264 patients were included, of which 1352 underwent interval appendectomy and 7912 underwent early appendectomy. There were no significant differences in postoperative morbidity, wound infection rate, and length of hospital stay between the two procedures(Akingboye et al., 2021).A retrospective study that compared immediate appendectomy with interval appendectomy in the management of complicated appendicitis had concluded that interval appendectomy should be performed in patients with prolonged duration of symptoms and having extensive inflammation or phlegmonous appendicitis(Liew et al., 2024).

Bufo et al conducted a retrospective study on performing an interval appendectomy following conservative treatment for perforated appendicitis. A total of 87 patients were divided into 46 who underwent emergency appendectomy and 41 who underwent interval appendectomy. There were no differences between the two procedures in the postoperative morbidity and length of hospital stay between the two procedures(Bufo, 1998).A systematic review on the justification of performing an interval appendectomy following successful non-operative treatment of an appendicular mass in children was conducted by Hall et al. A total of 3 studies with 127 cases were included in this study, and the incidence of complications following interval appendectomy was 3.4%, the incidence of malignancy following interval appendectomy was 0.9% and mean hospital stay for interval appendectomy was 3 days(Hall et al., 2011).

An open label randomized controlled trial comparing active observation versus interval appendectomy after successful non-operative treatment of an appendicular mass in children was conducted by Hall et al. A total of 106 patients were included, of which 52 underwent interval appendectomy and 54 underwent active observation. The recurrence rate following active observation was 11% and the complication rate following interval appendectomy was 6%. This study showed that interval appendectomy need not be performed as a routine(Hall et al., 2017).

A systematic review and meta-analysis on the risk of appendiceal neoplasm after an interval appendectomy for complicated appendicitis was conducted by Peltrini et al. A total of 8 studies with 480 patients were included in this study, and the prevalence of neoplasm following interval appendectomy was 11% with mucinous neoplasm accounting for 43% of the cases, followed by adenocarcinoma in 29% and neuroendocrine tumors in 21% of the cases(Peltrini et al., 2021).A comprehensive literature review on the clinical outcomes following non-operative treatment of acute appendicitis by Lee et al concluded that due to the recurrence rate of 10% -30%, interval appendectomy is only indicated for patients who are above 40 years of age, due to the increased risk of appendicular neoplasm(Lee & Park, 2025).

Table I

Study	Study type	Year	N=numbers	Morbidity rate (%)	Mean hospital stay(days)
Willemsen et al	Retrospective study	2002	206	17.6%	5
Lai et al	Retrospective study	2006	70	10%	4.4
Tekin et al	Retrospective study	2008	94	14.6%	8.6

Table shows the morbidity rate and length of hospital stay following interval appendectomy following non-operative treatment for complicated appendicitis.

Interval appendectomy following uncomplicated appendicitis

As non-operative treatment of acute appendicitis is associated with a low recurrence rate, which varies between 8% to 30%, the indication of performing an interval appendectomy as a routine has been questioned. As interval appendectomy is also associated with morbidity, most surgeons now opt to perform it in patients who develop recurrence. Interval appendectomy is indicated in high-risk patients, like those who are above the age of 40, with the presence of an appendicolith on computerized tomography. Laparoscopic interval appendectomy is the preferred method due to its reduced postoperative morbidity, length of hospital stays, and early ambulation(*Bass*,2006; Sakorafas, 2012).

Kaminski et al conducted a retrospective study on the role of routine interval appendectomy following non-operative treatment for acute appendicitis. A total of 1012 patients had undergone non-operative treatment, of which 148 underwent an interval appendectomy, and the remaining 864 did not. Recurrence occurred in 5% of the cases, and the length of stay for the patients who developed recurrence was 4 days, while the length of stay for the interval appendectomy was 6 days. This study concluded that due to the low recurrence rate, routine interval appendectomy need not be performed following non-operative treatment for acute appendicitis(Kaminski et al., 2005.).

A meta-analysis comparing antibiotic therapy and appendectomy for the treatment of acute uncomplicated appendicitis in children was conducted by Huang et al. The study included a total of 5 studies with 404 patients. Non-operative treatment was associated with a success rate of 90.5% and the presence of an appendicolith was associated with a higher risk of failure of non-operative treatment for acute appendicitis. Due to the low recurrence rate of non-operative treatment, interval appendectomy should be reserved for selected cases only(Huang et al., 2017).

Risk factors for failure of non-operative treatment

Tsai et al performed a clinical analysis on 30 patients who had undergone non-operative treatment, and 7 patients developed recurrence and required an interval appendectomy. The presence of a calcified appendicolith on computerized tomography and prolonged symptoms of acute appendicitis were some of the risk factors that can lead to recurrence and the need for performing an interval appendectomy(Tsai et al., 2006).The presence of periappendiceal fluid collection on computerized tomography is a predictor of complications following non-operative treatment of acute appendicitis, and hence the need for performing an interval appendectomy in these patients(Kanaka et al., 2022).

The presence of an appendicolith is associated with an increased incidence of failure of non-operative treatment of acute appendicitis and is an indicator for performing an interval appendectomy. This is important in determining the timing of surgical intervention (Khan et al., 2019)**.** The appearance of an appendicolith in pediatric patients who present with acute appendicitis is associated with an increased risk of complicated appendicitis and its associated complications(Singh et al., 2014)**.** A retrospective study on appendicolith appendicitis was conducted by Taib et al. A total of 310 patients with acute appendicitis were included in this study, and 45 patients were diagnosed with complicated appendicitis, and appendicolith was seen in 25.5% of the cases. This study showed that the presence of appendicolith is associated with a higher risk of failure of non-operative treatment, and hence, an early or interval appendectomy should be performed for these patients(Taib et al., 2024). A large prospective study on the impact of an appendicolith and its characteristics on the severity of acute appendicitis was conducted by Sula et al. A total of 3085 patients were diagnosed with acute appendicitis, of which 35.7% presented with both features of acute appendicitis and appendicolith, and 21.5% developed complicated appendicitis. The presence of a large appendicolith, the presence of it at the base of the appendix, and appendiceal wall enhancement around the appendicolith were all risk factors for failure of non-operative treatment and an increased risk of developing complications(Sula et al., 2024).

Oktay et al looked at the prevalence of appendicolith in children with acute appendicitis to assess its correlation with disease severity. Computerized tomography was performed in 77 patients, and the prevalence of appendicolith was detected in 32.5% of the cases. Perforated appendicitis was detected in 25% of those cases with appendicolith. The presence of appendicolith in the appendix in children who had undergone non-operative treatment was associated with poor outcomes, and an operative procedure in the form of an early or interval appendectomy will be required(Oktay et al., 2023)

CONCLUSION

An interval appendectomy need not be performed now as a routine following non-operative treatment for both uncomplicated and complicated appendicitis due to the low recurrence rate. An interval appendectomy is usually indicated for older patients and those who demonstrate an appendicolith on ultrasound or computerized tomography. Laparoscopic interval appendectomy is the preferred method of performing this surgery. However, there is still the presence of morbidity following this procedure, and the indication of performing it falls in the hands of the treating surgeon.

CONFLICT OF INTEREST- There is no conflict of interest

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