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Best evidence topic

Best evidence topic: What is the best management of the appendix-stump in acute appendicitis: Simple ligation or stump invagination?

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ABSTRACT

A best evidence topic has been constructed using a described protocol. The three-part question addressed was: for patients undergoing appendicectomy for complicated acute appendicitis is simple ligation or invagination of the appendix-stump safer? Using the reported search, 587 papers were found. Five studies were deemed to be suitable to answer the question. In conclusion, the literature is more in favour of the appendix stump being managed with simple ligation rather than stump invagination. All 5 studies assessed are prospective, randomised studies, though overall the quality of these studies is poor. The outcomes assessed were incidence of post-operative complications (pyrexia, wound infection, abscess, caecal fistula and post-operative ileus), post-operative length of stay and mean operating time. The analysis indicates no significant difference between the groups in rates of post-operative pyrexia, intra-abdominal abscess or caecal fistula. Only one study showed a significant difference in rates of wound infection in favour of simple ligation. One study demonstrated a significant difference in favour of simple ligation when comparing rates of post-operative ileus. Overall, simple ligation was found to reduce patient length of stay when compared with stump invagination; one study found this difference to be significant. Simple ligation also produced shorter operating times compared with stump invagination – a risk factor for the development of post-operative ileus.

All studies suffered limitations that make the quality of the evidence assessed poor. Although this evidence does favour simple ligation of the stump as compared to invagination, higher quality randomised studies are needed to answer the question definitively.

1. Introduction

This BET was devised using a framework outlined by the International Journal of Surgery [1]. This format was used because a preliminary literature search suggested that the available evidence is of insufficient quality and too homogenous to perform a meaningful meta-analysis. A BET provides evidence based answers to common clinical questions, using a systematic approach to reviewing the literature.

2. Scenario

You are a general surgery trainee assisting a registrar with a laparoscopic appendicectomy, where the appendix has perforated. You ask whether the appendix stump will be invaginated. He informs you that simple ligation of the stump is usually undertaken during laparoscopic appendicectomy, but stump invagination can be done during open appendicectomy. You are familiar with both techniques, and wonder which is associated with better outcomes. You conduct a literature search to source the answer.

3. Three-part question

In [patients with complicated, acute appendicitis] does [simple ligation or stump invagination] incur lower rates of [post-operative complications]?

4. Search strategy

Pubmed, Cochrane, Embase and Google Scholar were employed to source literature. Search terms used were: [simple ligation] OR [stump invagination] OR [stump burial] OR [appendicectomy] AND [post-operative complications].

5. Search outcome

A total number of 587 papers were sourced (1908–2013). This included 11 randomised controlled trials and 1 meta-analysis. The

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Table 1
Papers demonstrating best evidence.

Author, date and country of research	Patient group characteristics (SiV = stump invagination; SiL = stump ligation)	Study type and level of evidence	Outcomes measured	Key results	Additional comments
Watters DAK et al. (1984) [2] UK	103 patients with an uncomplicated AA (n = 99) & complicated AA (n = 4) who underwent appendicectomy SiV = 59 SiL = 44	Prospective randomised study Level 1C	Incidence of wound infection Post-operative LOS (days)	Incidence of wound infection: - SiV = 18.6%; SiL = 18.2% (no significant difference) No significant difference in LOS between the groups (no results or p value provided)	Reports no significant difference in outcomes between groups No description of randomisation process No blinding undertaken No statistical analysis of post-operative LOS undertaken Study assesses both complicated and uncomplicated AA
Engstrom L et al. (1985) [3] UK	735 patients with complicated AA (n = 270) & uncomplicated AA (n = 465) SiV = 374 SiL = 361	Prospective randomised-controlled study Level 1C	*Incidence of post-operative complications:* - Post-operative pyrexia - Wound infection - Post-operative ileus - Intra-abdominal abscess Post-operative length of stay (LOS)	Incidence of post-operative pyrexia: - SiV = 16.3%; SiL = 16.1% ($p > 0.05$) Incidence of wound infection: - SiV = 8.8%; SiL = 8.3% ($p > 0.05$) Incidence of post-operative ileus: - SiV = 1.6%; SiL = 0.3% ($p < 0.05$; statistically significant) Incidence of intra-abdominal abscess: - SiV = 1.6%; SiL = 0.6% ($p > 0.05$) Mean LOS (days): - SiV = 4.6 days; SiL = 4.9 days ($p > 0.05$)	Demonstrates significant difference in terms of incidence of post-operative ileus in favour of simple ligation Study assesses both complicated and uncomplicated AA Randomization process is described but no blinding undertaken
Jacobs PP et al. (1992) [4] Netherlands	134 consecutive appendicectomies performed on patients (age range 4–90) with AA (including complicated AA) SiV = 55 SiL = 79	Prospective randomised-controlled study Level 1C	*Incidence of post-operative complications:* - Wound infection - Post-operative ileus - Intra-abdominal abscess - Post-operative LOS (days)	Incidence of wound infection: - SiV = 7%; SiL = 0% ($p = 0.017$; statistically significant) Incidence of post-operative ileus: - SiV = 2%; SiL = 0 ($p > 0.05$) Incidence of intra-abdominal abscess: - SiV = 1.8%; SiL = 1.3% ($p > 0.05$) Equal mean LOS in both groups (5 days)	Demonstrates significant difference in terms of incidence of wound infection in favour of simple ligation Study assesses both complicated and uncomplicated AA, but numbers of each not provided Randomization process is described but no blinding undertaken
Khan S (2010) [5] Nepal	150 patients with complicated AA (n = 31) & uncomplicated AA (n = 119) who underwent open appendicectomy SiV = 70 SiL = 80	Prospective randomised comparative study Level 1C	*Incidence of post-operative complications:* - Post-operative pyrexia - Wound infection - Post-operative ileus Post-operative LOS (days)	Incidence of post-operative pyrexia: - SiV = 18.57%; SiL = 22.5% ($p > 0.05$) Incidence of wound infection: - SiV = 27.10%; SiL = 30.0%; ($p > 0.05$) Incidence of post-operative ileus at 24–48hr: - SiV = 8.57%; SiL = 10.0% Ileus at 48–72hr: - SiV = 11.42%; SiL = 11.25% Ileus >72hr: - SiV = 5.71%; SiL = 6.05% ($p > 0.05$) No patient developed fistula, residual abscess, adhesional intestinal obstruction, or any other complication Mean LOS (days): - SiV = 5.5 days; SiL = 5.4 days (No P-value provided)	Reports no significant difference in outcomes between the groups Does not report whether difference in LOS is significant Study assesses both complicated and uncomplicated AA No description of randomization process No blinding undertaken

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