

What is the best management strategy for complicated appendicitis in pregnancy?

Immediate operative intervention for complicated appendicitis in pregnancy is associated with the **lowest risks** of perinatal and maternal infectious morbidities.

Ashbrook M, et al. Management of complicated appendicitis during pregnancy in the US. *JAMA Network Open*. 2022;5:e227555. doi:10.1001/jamanetworkopen.2022.7555.

EXPERT COMMENTARY

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to September 2015. Complicated appendicitis refers to individuals with appendiceal perforation with peritonitis (a free perforation) or phlegmon/abscess (a walled-off perforation). Women included in the study were identified using ICD-9 codes for both pregnancy and complicated appendicitis; they were categorized into 3 groups: immediate operative management, successful nonoperative management, and failed nonoperative management (defined as surgical intervention >1 day after admission). The clinical and other outcomes of interest included maternal death, preterm labor/delivery or pregnancy loss, amniotic infection, sepsis, pneumonia, antenatal hemorrhage, and premature rupture of membranes. Outcomes included are those that occurred during the hospitalization for appendicitis; outcomes that may have occurred between discharge from the appendicitis hospitalization to the delivery hospitalization are not included in this study.

A total of 8,087 pregnant women with complicated appendicitis were included in this study, of whom 954 (11.8%) had successful nonoperative management, 2,646 (32.7%) had failed nonoperative management, and 4,487 (55.5%) had immediate operative management. First, when comparing successful nonoperative management to immediate operative management, there were no differences in preterm labor/delivery or pregnancy loss, or antenatal hemorrhage; however, successful nonoperative management was also associated with higher risks of maternal infectious complications, including risks of amniotic infection, pneumonia, and

Over the last decade, the management of acute appendicitis in the nonpregnant adult has evolved such that some authorities favor first-line nonoperative therapy in the appropriate candidate, including some individuals with complicated appendicitis. While the conventional teaching regarding appendicitis in pregnancy has always been immediate surgery, favorable outcomes from nonoperative management in the nonpregnant population have led to an increasing application of conservative therapy in pregnancy, particularly among patients with uncomplicated appendicitis. However, optimal management of complicated appendicitis in pregnancy is unclear, as the risks of both operative and nonoperative management can be significant.

Details about the study

This retrospective cohort study using data from the National Inpatient Sample (NIS) focuses on outcomes of various management options among pregnant women with complicated appendicitis from January 2003

doi: 10.12788/obgm.0241

FAST TRACK

For every 1 day that surgery was delayed in the group of women who failed nonoperative management, the odds of preterm labor/delivery or pregnancy loss, antenatal hemorrhage, sepsis, amniotic infection, and pneumonia increased

sepsis. When comparing failed nonoperative management (women who required surgical intervention during the index hospitalization) to immediate operative management, failed conservative management was associated with higher risks of preterm labor/delivery or pregnancy loss, antenatal hemorrhage, amniotic infection, pneumonia, and sepsis. For every 1 day that surgery was delayed in the group of women who failed nonoperative management, the odds of preterm labor/delivery or pregnancy loss, antenatal hemorrhage, sepsis, amniotic infection, and pneumonia increased.

Study strengths and weaknesses

Database studies have inherent limitations that are overcome with strength in numbers. In this study, our understanding of outcomes associated with management of complicated appendicitis assumes that women were correctly identified as both being pregnant and having complicated appendicitis (as opposed to uncomplicated appendicitis but miscoded). Clinical data that may have led to selection of one management strategy over another, or specific clinical management decisions, are not possible to extract from the NIS. For instance, did nonoperative management systematically include percutaneous guided drainage if an abscess was noted, and appropriately targeted antibiotic therapy? If delayed operative intervention with IV antibiotics to allow for “cooling off” of the abdomen prior to surgery was planned, this strategy would have been included in the failed nonoperative management group, when in fact nonoperative management was never the plan. Whether gestational age (which is not known in this study), or any other clinical data contributed to the initially chosen management strategy is not known.

The treating clinicians, obstetricians and surgeons alike, would like to know the pregnancy outcome when considering the various management strategies for complicated appendicitis. However, this study only provides insight into the outcomes for the hospitalization for appendicitis. Whether or

not women categorized as successful nonoperative management go on to require surgery or have preterm labor in the future, or whether women with successful immediate surgical management might be readmitted with complications, is not known. This is a significant limitation of the database, which does not allow for linking of individual hospitalizations, and rather can provide only a snapshot in time.

This study includes a fairly long timespan—2003 to 2015—during which the management of complicated appendicitis was actively evolving. Early in this time frame, nonoperative management outside of pregnancy was uncommon, and nonoperative management may have been even rarer and perhaps reserved for the most ill of pregnant women on presentation (for whom surgery may have been considered too risky without a short time with IV antibiotics to “cool off” the abdomen). As time progressed over the study span, nonoperative management was likely offered with greater frequency and among women with lesser degrees of illness. However, the year of presentation was not controlled for in this study.

Finally, given the differences noted in management strategy by race/ethnicity and type of hospital, it is not clear how this bias influences the findings from this study. ●

WHAT THIS EVIDENCE MEANS FOR PRACTICE

Immediate operative intervention for complicated appendicitis in pregnancy remains a mainstay of management. Perinatal risks associated with surgical intervention are low and are comparable in many respects to successful nonoperative intervention. However, characteristics that predict successful nonoperative intervention are not known, and nonoperative therapy still carries higher risks of maternal infectious complications. When nonoperative intervention is the chosen approach in pregnant women with complicated appendicitis, clinicians must maintain a low threshold for conversion to operative management to avoid maternal morbidity. In addition, clinicians must closely monitor women discharged after successful appendicitis treatment for subsequent complications, as the long-term risks of conservative management or delayed operative intervention are not clear.