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Management Of Acute Appendicitis During Pregnancy: A Retrospective Observational Study Of 18 Cases

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Abstract:
Background*: Introduction: Appendicitis is the predominant acute abdominal complication during pregnancy. In the event of appendix perforation, an increased susceptibility to preterm delivery and additional complications during pregnancy ensue.*
Objective: *To evaluate pregnancy outcomes following appendicectomy, surgical modalities employed and associated complications.*
Materials and Methods*: A retrospective cohort study based on a prospectively maintained database involving pregnant individuals, both with and without a history of appendicectomy, was conducted at Sri Hospital from January 2014 to December 2023. Pregnant women with acute appendicitis received prioritized surgical intervention, and minimal invasive surgery (MIS) constituted the standard of care. Data encompassing preoperative ultrasound imaging, laparoscopic approaches, intraoperative observations, final histopathological findings, duration of hospitalization, pregnancy outcomes, and complications within a 30-day postoperative period were documented in a local appendicectomy registry.*
Results*: Over the course of 10 years, 18 pregnant women were diagnosed with appendicitis (first trimester, 7; second trimester, 6; third trimester, 5). Among these, 6 women were managed conservatively, and 12 underwent laparoscopic appendicectomy (first trimester, 3; second trimester, 7; third trimester, 2). One patient had no to mild inflammation of the appendix. One patient experienced foetal loss.*
Conclusion: *The implementation of standard laparoscopic surgical procedures and the emphasis on expeditious surgical intervention in pregnant individuals are correlated with reduced risks of perforation, preterm birth, and related complications. Nevertheless, maintaining a low threshold for surgical intervention is likely to increase the likelihood of encountering instances characterized by negative exploration*
Key Word*: Acute appendicitis; Pregnancy; Laparoscopic appendicectomy; Complication*

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I. Introduction

Appendicitis ranks among the prevalent acute abdominal conditions, with a lifetime occurrence ranging from 7% to 9%. Pregnancy seems to have a protective effect against acute appendicitis [1,2]. Appendicitis during pregnancy necessitates precise diagnosis; judicious selection of timely and appropriate management strategies; and a multidisciplinary approach comprising a radiologist, obstetrician, anesthesiologists, surgeon, and pediatrician. Clinical examination, blood investigations, and imaging via ultrasound of the abdomen were routinely carried out. Computer tomography is often avoided due to the risk of radiation to the foetus. There are multiple scoring systems for diagnosing acute appendicitis, with the Alvarado & RIPASA scoring system being the most commonly used [3,4].

The aim of this study was to evaluate pregnancy outcomes following appendicectomy, surgical modalities employed and associated complications.

II. Material And Methods

Data pertaining to pregnant women undergoing appendicectomy for acute appendicitis were systematically documented prospectively in a registry at the Dept of Surgery of Sri Hospital, Bengaluru, India. Information regarding preoperative imaging, the chosen laparoscopic approach, intraoperative observations, histopathological findings, total duration of stay in hospital, and complications within the 30-day postoperative period was prospectively documented in this appendicectomy registry.

The aim of this study was to evaluate the factors contributing to the increased risk of adverse outcomes within 30 days following appendicectomy, encompassing both surgical and medical complications, hospital readmission, and the necessity for subsequent surgical reintervention.

Study Design: Retrospective observational study
Study Location: This was a tertiary care hospital-based study done combinedly by the Department of Obstetrics & Gynecology and the Department of Surgical Gastroenterology at Sri Hospital, Bengaluru, India.
Study Duration: January 2014 to December 2023.
Sample size: 300 patients.
Subjects & selection method: The study population was drawn from consecutive pregnant women with a clinical diagnosis of Acute Appendicitis who presented to Sri Hospital, Bengaluru between from January 2014 to December 2023.

Inclusion criteria:
1. Pregnant women with clinical & radiological diagnosis of Acute Appendicitis
2. Aged ≥ 18 years,
3. All Trimesters of pregnancy

Exclusion criteria:
1. Pregnant women with genetic disorders
2. Pregnant women with incompatible fetal anomalies
3. Incomplete medical records

Procedure methodology:

Pregnant individuals presenting with suspected appendicitis receive prioritized consideration for surgical intervention, with the operative decision being executed within a timeframe of 6 hours.

Standard antibiotic therapy is determined by the extent of appendix inflammation based on clinical, laboratory and radiological parameters. In the absence of suspected inflammation, antibiotic administration is withheld. In the case of a phlegmonous appendix, a single intravenous dose of 1.5 grams of metronidazole was administered, whereas for a complicated appendicitis i.e gangrenous or perforated, intravenous doses of piperacillin tazobactam were given. In instances of a perforated appendix, piperacillin tazobactam was administered intravenously three times daily until bowel function is restored, followed by oral of ciprofloxacin 500 mg twice daily and metronidazole 400 mg three times daily thereafter.

For laparoscopic appendicectomy, standard port placements depending on gestation status were placed as depicted in Fig. 1. and in accordance with the guidelines established by the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES).

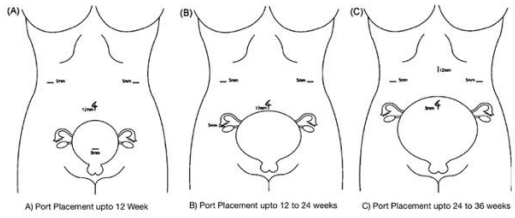

Fig: 1: Port placement for laparoscopic appendicectomy during pregnancy

All surgical patients received perioperative prophylactic systemic tocolysis, including intramuscular and vaginal administration of progesterone prior to 22 weeks of gestation, and oral calcium channel inhibitors between 22 and 35 weeks of amenorrhea. Foetal cardiac auscultation was conducted for all participants.

Statistical analysis:

The results are presented as the number (percentages), mean (±standard deviation) or median (interquartile range).

III. Result

Of the 18 patients who were suspected of having acute appendicitis, 6 women were managed conservatively with IV antibiotics and did not need to undergo appendicectomy. These included women in the first trimester, 1; second trimester, 3; and third trimester, 2.

Among the surgical group of 12 pregnant women, the average age of those who underwent surgery was 29 ± 5 years. Laparoscopic appendicectomy was performed for 3 women in the First Trimester, 7 women in the Second Trimester and 2 women in the Third Trimester, and the operative outcomes following surgery are shown in Table 1.

Table 1: Outcomes Following Lap Appendicectomy

Variable	1st Trimester (n=3)	2nd Trimester (n=7)	3rd Trimester (n=2)	Total (n=12)
Ileus	0	1	0	1
SSI	1	1	0	2
Deep SSI		1	1	2
Clavien–Dindo I	1	1	1	3
Clavien–Dindo II	0	1	1	2
Pre-Term Labour	0	1	0	1
Pre-Term Delivery	0	0	0	0
Full Term Delivery	2	7	2	11
Foetal Loss	1	0	0	1

No reoperation occurred within 30 days in those who underwent laparoscopic appendicectomy, but one patient who was initially managed conservatively had to be readmitted after 2 weeks for surgery. Two pregnant women were re-hospitalised within a 30-day timeframe, both due to contractions necessitating cerclage. There were no fatalities reported within the 30-day period. Subsequently, one patient underwent spontaneous abortion three weeks post-surgical intervention.

Histopathological examination was performed for all 12 patients; three patients had evidence of perforation, eight had evidence suggestive of acute appendicitis, and one had normal to mild inflammation of the appendix.

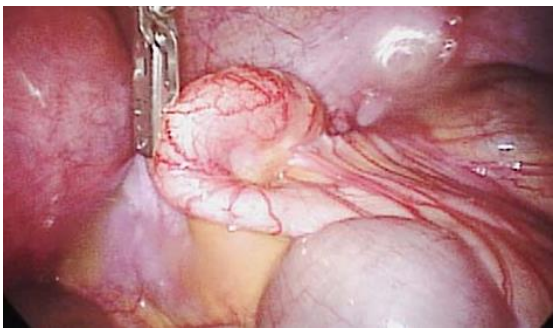

Fig: 2: Inflamed appendix at the 30th gestational week

IV. DISCUSSION:

Among abdominal organ diseases, acute appendicitis is the most common disease requiring emergency surgery and is among the most common non-obstetrical surgical emergencies during pregnancy [5,6]. The precise identification of appendicitis in pregnant women holds paramount significance in the clinical context [7]. An accurate diagnosis helps to mitigate complications and the occurrence of negative appendicectomy. Furthermore, delayed diagnosis may augment maternal and foetal mortality and morbidity.

The principal diagnostic modality for identifying appendicitis in pregnant women is abdominal ultrasound, and CT is generally omitted due to concerns about foetal radiation exposure. MRI is the preferred alternative when complications are suspected or when diagnostic uncertainty is present, although its usage is limited by limited availability.

Given the recent advancements in technology and accrued expertise, numerous studies, including several meta-analyses, have substantiated that laparoscopic procedures do not entail an elevated risk of maternal or obstetric complications, and there is sufficient evidence to support that laparoscopic appendicectomy is feasible at all weeks of gestation [8,9].

As indicated by prior research, the incidence of foetal loss subsequent to appendicectomy during pregnancy varies between 3% and 36%, and there is an elevated risk of foetal loss in patients where the appendix perforates or when there is generalized peritonitis or the presence of an abscess [10].

At our medical facility, laparoscopic appendectomy has been conducted in pregnant individuals since 2014 in accordance with the guidelines established by the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES). Andersson et al. identified a correlation between appendicitis and pregnancy, which exhibited an inverse proportionality primarily in the third trimester [11]. In contrast, our own observations indicate that a majority of patients were diagnosed during the first and second trimesters of pregnancy. According to our observations, our clinical results suggest that, in patients with appendicitis facing similar conditions of severity or complexity, the incidence of postoperative complications subsequent to laparoscopic appendicectomy during pregnancy aligns with rates reported in other published studies. [1,2,5,6].

V. Conclusion

The implementation of standard laparoscopic surgical procedures and the emphasis on expeditious surgical intervention in pregnant individuals are correlated with reduced risks of perforation, preterm birth, and related complications. Nevertheless, maintaining a low threshold for surgical intervention may increase the likelihood of encountering instances characterized by negative laparoscopic interventions.

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