

**ACUTE APPENDICITIS DURING PREGNANCY: NO PLACE FOR MAYBE****Ionuț Negoï<sup>1,2</sup>, Sorin Păun<sup>1,2</sup>, Sorin Hostiuc<sup>1,3</sup>, Alin Moldoveanu<sup>4</sup>, Mircea Beuran<sup>1,2</sup>**<sup>1</sup>Carol Davila University of Medicine and Pharmacy Bucharest, Romania<sup>2</sup>General Surgery Department, Emergency Hospital of Bucharest<sup>3</sup>National Institute of Legal Medicine Mina Minovici<sup>4</sup>Polytechnic University of Bucharest, Faculty of Automatic Control and Computers, Bucharest, Romania.

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**Abstract**

*Acute appendicitis is the most common abdominal non-obstetrical emergency in pregnant women; its management however is supported by a low level of evidence. The main objective of this study was to evaluate the clinical management of pregnant women with acute appendicitis. We have reviewed the hospital database selecting the pregnant women with acute appendicitis managed in the last 24 months. 8 appendectomies were performed in pregnant women. Mean age was 27.2±6.1 years. All patients had a history of right lower abdominal pain of 36 hours or less. General anesthesia was used in 12.5% of cases and spinal anesthesia in the remaining of cases. In all cases appendectomy was performed through a McBurney's incision with a mean operating time of 36.25 minutes. There was no maternal or fetal mortality. The diagnosis of acute appendicitis is challenging in pregnant women. A prompt, but a non-negative appendectomy should always be aimed, and no unnecessary risks should be taken.*

**Keywords:** acute appendicitis, pregnancy, surgery

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**Introduction**

Acute abdominal pathologies with non-obstetrical causes are found in about one to 500 – 700 pregnancies, 0.2 – 2% of cases requiring a surgical intervention [1]. For these patients the clinical picture is often unclear and nonspecific, with a difficult differential diagnosis [2–4]. The surgeon, either gynecologist or emergency specialist should always remember that any delay in diagnosis can put both, the mother and the fetus at significant risks. Current evidence shows that in pregnant women the risk of premature delivery is increased both by the perforation of the appendix, and by negative appendectomies [5].

The main objective of this study was to evaluate the clinical picture and the outcomes in pregnant women with a surgical procedure for acute appendicitis.

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**Materials and methods**

We have reviewed the hospital database, selecting pregnant women that suffered a surgical procedure for acute appendicitis in the last 24 months. We recorded the following data: demographics, clinical data, imagistic findings, operative data and early morbidities. We used descriptive statistics, using SPSS version 2.0 for Mac as statistical software.

**Results**

Eighth appendectomies were performed in pregnant women during the study interval of 24 months.

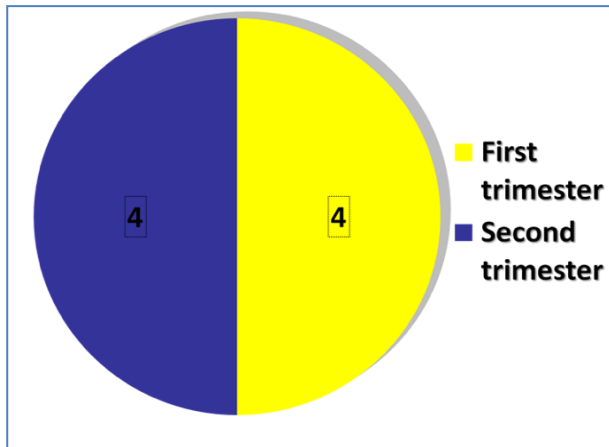


Figure 1 - Gestational age at presentation

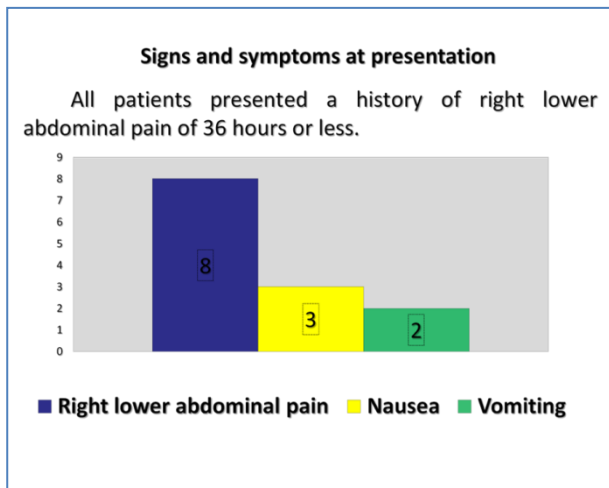


Figure 2 - Clinical picture at admission.

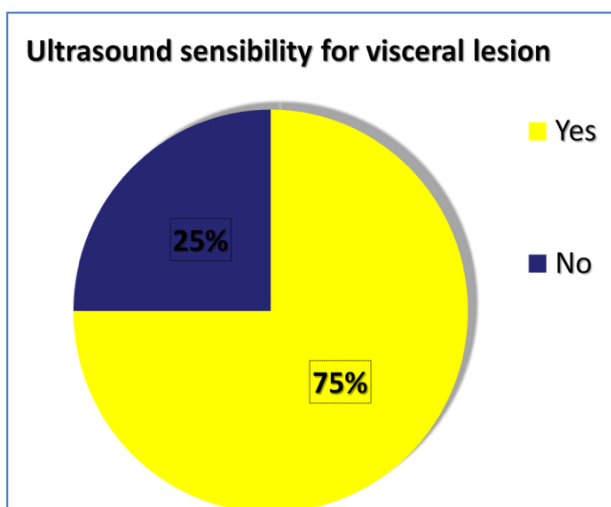


Figure 3 - Ultrasound sensibility regarding detection of visceral pathology.

Mean age was  $27.2 \pm 6.10$  years. All patients had a history of right lower abdominal pain of 36 hours or less. The general anesthesia was used in one case and spinal anesthesia in the remaining seven. In all cases appendectomy was performed through a McBurney's incision with a mean operating time of 36.25 minutes. There was no maternal or fetal mortality. The most common signs and symptoms at presentation were right lower abdominal pain, nausea and vomiting (Figure 2).

Ultrasound properly identified the appendicitis in six cases (75%) (Figure 3).

**Discussions**

The incidence of acute appendicitis decreases during pregnancy, the third trimester being associated with the lowest risk [6]. According to Zingone et al. the frequency of acute appendicitis is 53% lower during the last trimester in pregnant compared to non-pregnant women [6].

A population-based study, including 7.114 women with appendicitis among 7.037.386 births, showed a twofold increase in the risk for sepsis, septic shock, transfusion, pneumonia, bowel obstruction, postoperative infection, and length of stay > three days for pregnant, compared to non-pregnant women with appendicitis [7].

A nationwide study coming from Taiwan, which compared women with and without acute appendicitis during pregnancy found a higher risk for low birth weight - OR = 1.82 (95%CI=1.43 to 2.30), preterm birth - OR =1.59 (95%CI=1.25 to 2.02), small for gestational age, OR=1.33 (95%CI=1.12 to 1.60), cesarean section OR=1.24 (95%CI= 1.07 to 1.44), and congenital anomalies OR=2.07 (95%CI= 1.07 to 4.03) [8].

Abbasi, by comparing patients with appendicitis and delivery during the same in-hospital stay with patients with delivery but without appendicitis has found a higher risk of preterm delivery for the first subgroup (OR = 2.68, 95%CI = 2.31 to 3.11) [9].

The examining physician should always be aware of the difficulty in diagnosis of acute appendicitis in pregnancy. Although we didn't use it in any of the eight presented cases, the

Magnetic Resonance Imaging (MRI) seems to be very useful and reproducible in this setting [10]. For example Vu et al. investigated the accuracy of MRI in 19 pregnant patients with unclear ultrasonography (US) findings but with a clinical suspicion of acute appendicitis [11]. The MRI suggested acute appendicitis only in one case, who was certified by the surgery and pathology report [11]. Oto et al. found that MRI as a diagnostic tool for pregnant patients with acute abdominal pain has a sensitivity of 90%, a specificity of 98.1% and an overall accuracy of 97.5% [12].

In an article published by Israel et al the evaluation of pregnant patients with acute appendicitis was superior with MRI compared to ultrasound. Even in cases with an observable appendix, the sensitivity and negative predictive values of MRI were higher (100% versus 50% and 100% versus 66%, respectively) [13].

According to the latest European Association for Endoscopic Surgery Consensus Conference, from 2015, the laparoscopic approach should be preferred in all patients with acute appendicitis [14]. In pregnant women with acute appendicitis the level of evidence supporting the surgical approach is low. Although laparoscopy has the benefit of identifying other intra-abdominal pathologies, some studies suggest a higher risk for fetal loss with this approach [15]. In their study of 3133 pregnant patients from a group of 94789 appendectomies, McGory et al. found on multivariate analysis that complicated disease (OR = 2.69) and negative disease (OR = 1.88) are predictors for fetal loss [15].

A comparison of laparoscopic with open approach in acute appendicitis during pregnancy found no difference in fetal loss, APGAR score, birth weight and preterm delivery. The negative prognostic factors were maternal temperature greater than 38 degrees Celsius, leucocytes > 16000/mmc, and > 48 hours from the onset of symptoms to hospital admission [16].

A systematic review of the literature comparing open approach to laparoscopic in pregnant patients, published in 2014, concluded that there is no strong evidence to support any of it from the point of fetal or maternal safety [17]. Although this systematic review showed a higher rates of fetal loss in laparoscopic group [17], for maternal outcomes, a population based study published in Surgical Endoscopy this year

concluded that surgery should be preferred to nonoperative approach, and that laparoscopy offers the same maternal complication rate as the open approach [18].

## Conclusions

The diagnosis of acute appendicitis is challenging in pregnant patients. A prompt, but a non-negative appendectomy should always be aimed, leaving no place for unnecessary additional risks.

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