

# Diagnostic and Prognostic Criteria for Acute Appendicitis During Pregnancy

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**Abstract** This article covers modern issues of diagnosis and treatment of acute appendicitis in pregnant women, the difficulties of diagnosing this pathology in the first, second and third trimester of pregnancy, management of patients in the postoperative period, prolongation of pregnancy and discusses issues of delivery after appendectomy. Difficulties in diagnosing acute appendicitis during pregnancy are associated with impaired microcirculation, stagnation in the appendix due to stretching of the anterior abdominal wall and pressure of the enlarged uterus on the intestinal walls. According to the results of our study, in 76.9% (60) of patients, the primary complaints of patients were pain in the lower abdomen, weakness, nausea, and vomiting when visiting a local gynecologist. The condition was regarded as a threat of miscarriage and early toxicosis. To confirm acute appendicitis, pregnant women were sent to the hospital. As pregnancy progresses, the diagnosis of acute appendicitis becomes more difficult.

**Keywords** Acute appendicitis, Pregnancy, Diagnosis, Treatment, Delivery

## 1. Introduction

During pregnancy, various surgical complications can occur. Surgical diseases such as acute appendicitis, according to various authors, occur from 0.75 -0.18%. In the early stages (up to 12 weeks of pregnancy), this pathology varies between 19-32% due to the displacement of the appendix above the McBurney point, in the second trimester up to 44-66% of pregnancy, and significantly lower in the third trimester up to 15-16% (in late pregnancy in 93% of women the appendix is found above the iliac crest), in the postpartum period it is quite rare up to 6-8% and there is practically no description of acute appendicitis (AA) during childbirth [1,2]. It has been established that the optimal surgical approach in 94% of cases in all trimesters of pregnancy is the McBurney incision. Difficulties in diagnosing AA during pregnancy are associated with impaired microcirculation, stagnation in the appendix due to stretching of the anterior abdominal wall and pressure of the enlarged uterus on the intestinal walls. One of the important causes of perinatal and maternal mortality is surgical pathology. In modern literature there is data on the mortality rate from AA depending on the duration of pregnancy (0.3-30%).

The modern classification of AA is catarrhal (simple, superficial), phlegmonous, empyema of the appendix, gangrenous. At their core, all these forms are different stages of the development of a single inflammatory process. Complications of AA may include perforation of the appendix,

infiltrate, abscess, peritonitis and retroperitoneal phlegmon. After appendectomy, the risk of developing postoperative pneumonia increases 4 times and the risk of developing various postoperative purulent-infectious complications increases 8 times [3].

Available sources describe more than 100 symptoms of acute appendicitis, and none of them are the main ones during pregnancy, the same can be said about leukocytosis in the blood (in a normal pregnancy, moderate leukocytosis can be a normal variant). In pregnant women, AA is accompanied by mild pain, slight nausea, single vomiting, pain in the lower abdomen, which may be characteristic of early and late termination of pregnancy; movement of pain (Kocher-Volkovich, Kümmel symptoms). During pregnancy, the localization of pain in the second half of pregnancy is determined above the typical projection and intensifies in the position on the right side (Taranenko-Bogdanov symptom), the defence of the anterior abdominal wall is weakly expressed, especially in late pregnancy (stretching of the anterior abdominal wall and localization of the appendix behind the enlarged uterus) [4].

All modern methods of clinical and laboratory research are applicable in diagnosing AA in pregnant women. Diagnostic errors during pregnancy amount to 11.9–44.0%; underdiagnosis and overdiagnosis are equally observed, 25.0% and 31.0%, respectively. To verify the diagnosis of AA in pregnant women, instrumental examination methods become more important. Among them, the most significant are ultrasound examination, MRI and video laparoscopy [5,6]. According to ultrasound examination, its sensitivity ranges from 20-46.1%, and specificity - from 95.4-100%.

Histological examination is the final stage of diagnosis verification. Once the diagnosis of AA is confirmed, surgical treatment is necessary. Laparoscopic access cannot be the main approach for appendectomy in pregnant women (more than 20 weeks of pregnancy). In each specific case, you need to choose an acceptable method of surgical treatment - laparotomy or laparoscopic appendectomy [7-12]. It is necessary to take into account the influence of the type of surgical intervention on the patient's condition, the effect on the fetus and the course of pregnancy. When performing laparoscopic appendectomy, the risk of fetal death is 5.1% greater than with laparotomy.

The risk of injury to the pregnant uterus when introducing laparoscopic instruments is higher and in such cases it is recommended to perform open laparoscopy according to Hasson. Carboxyperitoneum can adversely affect pregnancy (hypercapnia) and cause disruption of uterine blood flow, as well as tachycardia, hypertension and acidosis in the pregnant woman. When performing endovideosurgical appendectomies use multicomponent balanced anesthesia with artificial ventilation through the endotracheal route. Carboxyperitoneum is maintained at 10-12 mmHg. Art. Before the operation, all pregnant women undergo an ultrasound examination of the fetus, which was also performed after surgery.

Surgical intervention during pregnancy in 17% of cases provokes the development of threatened miscarriage at all stages, premature birth and high perinatal mortality [13-18]. Serious surgical complications include perforation of the appendix, septic shock and intestinal obstruction. Mortality with uncomplicated appendicitis is not observed, while with perforation and peritonitis it is up to 16.7%. In a word, the earlier the diagnosis of AA, the better the prognosis.

The purpose of the study is to determine an algorithm for the diagnosis and treatment of AA in pregnant women.

Material and research methods. A retrospective analysis of the medical history of 78 patients hospitalized in the Andijan branch of the Republican Scientific Center for Emergency Medical Care and the Andijan Regional Perinatal Center for the period 2022-2023 with a diagnosis of acute appendicitis was carried out. To verify the diagnosis of AA, all patients underwent a standard clinical and laboratory examination.

## 2. The Results Obtained and Their Discussion

Hospitalized patients were of different reproductive ages and with different stages of pregnancy. The average age of pregnant women was  $28 \pm 2.8$  years.

According to the results of our study, in 76.9% (60) of patients, the primary complaints of patients were pain in the lower abdomen, weakness, nausea, and vomiting when visiting a local gynecologist. The condition was regarded as a threat of miscarriage and early toxicosis. To confirm AA, pregnant women were sent to the hospital. Difficulties in diagnosis and differential diagnosis increased according to the duration of pregnancy. It should be noted that such

common symptoms as fever, nausea and vomiting during pregnancy can be regarded as pathology associated with pregnancy in the first and second trimester of pregnancy. However, in the third trimester of pregnancy, diagnosing AA becomes most difficult. In patients in the first trimester of pregnancy, in 57.7% (45) cases, clinical symptoms were complaints of pain in the right iliac region. In the second trimester, in 35.8% (28) and in 6.5% (5) of patients in the third trimester, the most common symptoms were pain in the right mesogastric region. In the postpartum period, in 4 patients, the diagnosis of AA did not present any difficulties, but differential diagnosis was carried out with purulent-septic diseases (postpartum ulcer, metroendometritis, subinvolution of the uterus, lochio-hematometra, etc.)

In 34.6% (27) cases, the diagnosis of AA was confirmed by data from a general clinical examination in a hospital setting. In the first 6-12 hours from the moment of illness, 71.8% (56) of patients were admitted and 28.2% (22) were hospitalized before the day. Every third pregnant woman was operated on more than 24 hours after the onset of the disease.

The diagnosis of AA was made after clinical laboratory and instrumental examination. All patients underwent an ultrasound examination, as well as an MRI of the pelvic organs, and other surgical pathologies (cholecystitis, pancreatitis) of the abdominal cavity, acute gynecological pathology (torsion of an ovarian cyst, threatened and incomplete abortion) were excluded. In some cases, laparoscopy was performed to diagnose AA. Symbiosis of diagnostic parameters in the presence of leukocytosis, rapid pulse, tachycardia against the background of normal body temperature, which indicated severe destructive AA in 5.1% (4). At the same time, catarrhal appendicitis was not always characterized by leukocytosis in 34.6% (27). However, for phlegmonous appendicitis, leukocytosis was a characteristic diagnostic sign in 60.3% (47).

Symptoms of Kocher, Sitkovsky, Bartomier -Mikhelson were positive in all stages of pregnancy and all patients underwent appendectomy using the McBurney (Volkovich-Dyakonov) surgical approach and laparoscopic approach, 84.6% (66) and 15.4% (12), respectively.

In the third trimester of pregnancy, during surgical treatment, preference was given to a pararectal incision for better examination of the appendix, pouch of Douglas, posterior surface of the uterus and to exclude abdominal abscess. Drainage of the abdominal cavity through a contra-aperture incision was performed in 7.6% (6) cases. Relaparotomy – 2.6% (2).

In 92.2% (72) of patients, the postoperative wound was sutured tightly. In the postoperative period, broad-spectrum antibiotics were prescribed, taking into account sensitivity and embryotoxic effects on the fetus. Additionally, detoxification and restorative therapy was carried out. All patients experienced wound healing by primary intention. Regarding the threatening termination of pregnancy and the development of clinical signs of the threat of premature birth, maintenance therapy was prescribed in 87.2% (68) cases. Patients who underwent

appendectomy during pregnancy were delivered independently in 92.3% (72) of cases and in 7.7% (6) due to various obstetric pathologies were delivered by cesarean section.

### 3. Conclusions

Typically, AA is most common in the first trimester of pregnancy. Difficulties in diagnosis lie in the erased clinical picture of this surgical pathology during pregnancy. However, it should be noted that positive symptoms of peritoneal irritation are characteristic of all trimesters of pregnancy. Clinical and laboratory (determination of procalcitonin, C-reactive protein, D- Dimer, serum lactate, etc.) and instrumental research methods (ultrasound examination, MRI and laparoscopic diagnostics) are of great diagnostic and prognostic importance.

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