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EVALUATION OF CLINICAL OUTCOMES IN PREGNANT WOMEN WITH APPENDICITIS, WHICH WERE OPERATED IN №7 ALMATY CITY HOSPITAL FROM 2015 TILL 2018 YEARS. CASE-SERIES WITHIN PROJECT-BASED LEARNING AT JSC KAZAKH NATIONAL MEDICAL UNIVERSITY

The main goal was to answer the question of how acute appendicitis may be presented, evaluated and operated among Almaty's population. Within this investigation, the retrospective analysis of clinical and diagnostic features, complications, histological changes and outcomes of acute appendicitis in three trimesters were analyzed. Analysis was performed at the basis of City Clinical Hospital №7, Almaty, Kazakhstan
Keywords: acute appendicitis, clinical features, pregnancy, clinical symptoms, complications, morphological structure of appendix

Introduction

According to multiple researches, pregnant women need operations, if not obstetric, but general surgical in the case of appendicitis [1,2]. Physiological and characteristic features may be seen at admission with not clear clinical picture, and with elevated CBC characteristics, including ESR and leukocytes, which physicians may use for the diagnosis' establishment. Moreover, some data suggests that rupture occurs more commonly in the third trimester [2]. It is well-known that any interventions during child-bearing period can increase the risk of unfavorable outcomes [3], especially in perforated cases, where spreading of microbial flora can occur and lead to premature birth and fetal loss [4]. However, the rate of incidence and prevalence varies significantly in different populations [5], and there was no previous investigation of this rate in the Kazakh population. The purpose of this research is to study the clinical effectiveness of health technology for pregnant patients with appendicitis.

Methods

First step, we have conducted the literature review of PubMed database, within the time period of last 10 years, with the following keywords: "appendicitis", "pregnancy" and "surgery", so that our patients became pregnant women, with performed appendectomy as intervention and comparing every trimester as outcomes for the fetus and mother. All investigations were performed in English. Each intern analyzed 3-4 research in the related issues, so that we could start with detailed examination of patient's histories. This is the retrospective observational case-series study. Patient selection was performed by following criteria: all hospitalized pregnant women with suspected appendicitis between Jan 2015 until Dec 2018, to City Clinical Hospital №7, which is a government hospital in Almaty, Kazakhstan. Patient demographics, presenting signs and symptoms, laboratory values, imaging results, details of the surgical intervention, histological results, total length of hospital stay, and maternal and fetal outcomes were documented. Abdominal ultrasonography with graded compression was performed as the initial imaging test. Consultants or senior registrars in the field of general surgery performed the appendectomies. Pre- and post-operative patient care was provided on interdisciplinary basis by the departments of general surgery and obstetrics. Final diagnosis was based upon macroscopic findings during surgery verified by histological examination of the resected specimen. A negative appendectomy was defined as surgical resection of an appendix without histological confirmation of appendicular inflammation. Non-perforated appendicitis was defined as an inflamed appendix without signs of perforation. Complicated appendicitis was defined as appendicitis with evidence of perforation, appendicle abscess, and/or (generalized) peritonitis. The main outcome variables were maternal and fetal morbidity and mortality. BMI was also detected as a factor of outcomes, deficient BMI was defined those who had limit less than 18, normal BMI was defined as 18-25, if more than 25- metabolic syndrome, in the limits 30-35- 1th degree obesity, 35-40- 2nd degree obesity. Spontaneous abortion was defined as the spontaneous, premature expulsion of a non-viable embryo or fetus from the uterus before 20 weeks of gestation. Fetal loss was defined as the spontaneous loss of pregnancy after 20 weeks of gestation. Relevant variables were analyzed using descriptive statistics. Fetal and maternal outcomes were stratified by surgical approach (open versus laparoscopic appendectomy) and final diagnosis (noninflamed appendix, non-perforated appendicitis, and perforated appendicitis). Urgent surgery was defined by performing operation in a less than 2 hours after admission, elective surgery was defined by performing operation during 2 days after admission, and delayed was defined by performing operation more than 2 days after admission. The correspondence was defined by comparing histological findings in these groups. If operation was performed urgently or electively, but appendix showed only cattarhal changes – it was over-diagnosis. If operation was performed on delayed manner and histological findings showed big perforations- it is hypo-diagnosis. Moreover, our patients were classified according to gestational age, namely 1st group till twelve weeks, 2nd group from 13 till 27 weeks, and third group from 28th till 42th weeks. Statistical analyses were performed using Jamovi with p levels <0.05 considered statistically significant.

Results

Demographics: We had 66 patients over the 4-year period, among them in the age group 19 -26 years, we had 23 patients (34,8%), in the age group 27-33 years, 32 patients (48,4%), in the age group from 34 till 40 years -11 patients (16,6%). Mean age was 28 years. 63 patients were Kazakh (95,4%), 1 Russian, 2 uighurs. According to BMI grades, we had 8 cases (12,31%)of deficient BMI, 36 cases (55,38%) of normal BMI, 17 cases (26,15%) of metabolic syndrome, 1st degree obesity in 3 cases (4,62%) and 2nd degree obesity in 1 case (1,54%). Also, 3 groups according to fetal gestational age were formed : those who were operated till 12th week – 1th group 20 patients (30,3%); till 28th week- 2nd group 34 patients (51,5%), more than 28th week- 3rd group- 12 patients (18,2%).

Clinical Sings and Symptoms: The most common signs at presentation were Coher's in 30,3%, Rovzing's in 100%, Bartomier's in 63,6%. 13 (19,6%) patients were admitted with body temperature more than 36,6, but all of them had normal temperature at discharge. 24 patients (36,3%)have had tachycardia (HR more than 90),but it was stabilized till normal values at discharge. 25

patients (37,8%)had leukocytosis (more than 12) at admission. In 12% it did not decrease at discharge. More detailed information of symptoms presented in our cases you can find at Table1.

Hospital stay: Average hospital stay was 7,5 days, with min 4 and max 12 days.

Outcomes and complications: In total we had 22 cases (33,3%) of catarrhal appendicitis, 34 cases (51,5%) of phlegmonous peritonitis, 4 cases (6%) of gangrenous and 2 cases(3%) of chronic appendicitis. Results of over and hypo-diagnosis were presented at Image 1. One patient had an abortion in the 3-4 week of pregnancy and was defined as spontaneous. Other complications included local serous peritonitis in 16,6%, local purulent peritonitis in 12,7% of cases. 2 patients had iron deficiency anemia, and one more had multiple co-morbidities status with cholecistitis, pyelonephritis, consequently, this patient had a delayed growth of fetus. 3 cases were treated non-surgically. According to ClavieneDindo classification [17] we had no surgical complications. There was no mortality in our investigation.

Urgent operations: Among 37 patients, who were operated urgently there was hyperthermia in 6 and leucocytosis in 28 patients. 25 out of 37 (67,6%) were presented with the strong clinical picture of appendicitis and 12 (32,4%) with doubtful symptoms of acute appendicitis. 70% of all patients operated in urgent manner were diagnosed with phlegmonous appendicitis, but a half of them did not verify this diagnosis histologically. 5 patients were diagnosed with catarrhal appendicitis and in 40% this diagnosis was not verified.

Elective operations: Among 24 women who were operated in elective (more than 2 hours after admission) manner, 9 had a sub-febrile fever and 16 had leucocytosis.95% had a significant clinical symptoms of acute appendicitis.66% of 24 women had the diagnosis of acute phlegmonous appendicitis but in one third of them this diagnosis was not approved. 6 patients were suspected with catarrhal appendicitis and one patient with gangrenous appendicitis, all of them had appropriate histological findings. 1 patient had a final diagnosis of cecum insertion with peritonitis.

Non-operated patients: Three women were admitted with suspected appendicitis thus were taken under the clinical survey. Due to their doubtful symptoms, and normal monocyte percentage, the inflammatory origin was suspected. After proper consultations were performed, diagnoses were as following: “urostasis, cholecystitis and ovarian cyst”, and these patients had antibacterial therapy with the good response, consequently discharged without any complications.

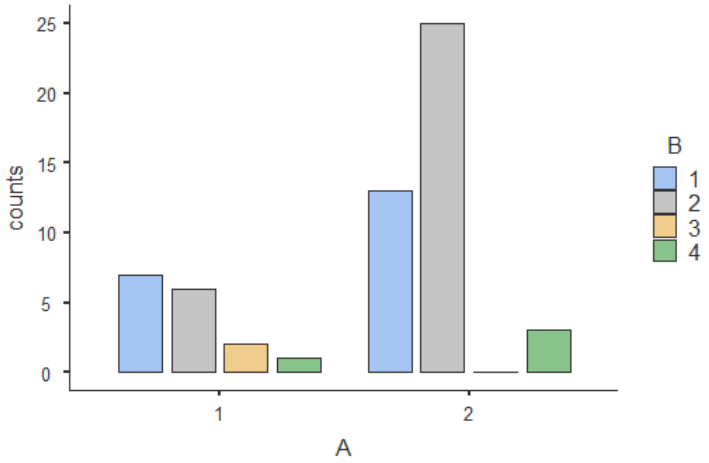

Figure 1 - Descriptive characteristics of patients who were operated in urgent manner

Descriptive characteristics in the table 1 shows patients who were operated in urgent manner (performing operation in a less than 2 hours after admission) was established as a group 1 and elective manner was defined by performing operation during 2 days after admission and defined as a group 2 (Figure 1). The correspondence was defined by comparing histological findings in these groups. If operation was performed urgently or electively, but appendix showed only catarrhal changes – it was over-diagnosis. If operation was performed on delayed manner and histological findings showed big perforations- it is hypo-diagnosis. As a result, we had 12 cases (21%) of over-diagnosis and 6 cases (10,5%) of hypo-diagnosis. Among those cases with hypo-diagnosis three cases were in 3rd trimester, two cases in first trimester, and one in first.

Table 1 - Most common clinical symptoms of our patients, which are presented with numerical data and theirs’ distribution in the normal population

Clinical symptom	N	(%)	P value	95% CI	
				Lower	Upper
Tachycardia	24	36,3	<.001	0.244	0.483
Temperature>37.5° C	13	19,6	<.001	0.0985	0.295
LC>12000 cells/ml	25	37,8	<.001	0.259	0.499
Coher’s sign	20	30,3	<.001	0.189	0.487
Rovzing’s sing	66	100			
Bartomie’s sign	42	63,6	<.001	0.517	0.726
Right lower quadrant pain	20	30,3	<.001	0.189	0.487

Discussion

In the study of Abbasi et al., who analyzed in total 7114 women with appendicitis, results of different populations with the rate of complications were seen [5]. Other uncertainty is the presentation of pregnant and non-pregnant patients remains the same, how it was presented in the research of Segev L et al. [6] or vice versa.

Clinical presentation: The diversity of clinical presentations and the difficulty in the establishment of diagnosis where appendix may be inflamed suggest us to use multiple diagnostic tools to be surer. Particularly in the period over than 28^{th} weeks many symptoms may be considered pregnancy related [8]. Rebound tenderness and muscle guarding are valuable findings in the diagnosis of appendicitis, but due to the forbearance of the covering tissues, these signs are found less frequently in pregnant women [9]. The body temperature is not considered helpful in making the diagnosis but may predict perforation [10]. In our study only one-fifth had temperatures above 37.5C, with or without perforation.

Maternal complications: Foreign guidelines recommend establishing diagnosis and perform required operations as soon as possible [11]. It is possible to compare cases of appendicitis in female regardless their pregnancy status only when appendix is not ruptured [12]. Silvestri MT et al. states that loss of the fetus loss is higher in 4 percent when appendix is ruptured [13]. Unfortunately, in our histories of disease not all data was presented. For example, most of our histories of disease did not have any information about antibiotics used, complications occurred in patient and in fetus. According to Torsten Ueberrueck et al [14] who analyzed more than 9793 appendectomies in pregnant women, the rate of impromptu abortion in the first trimester was 13%. The study by Andersen et al. reported that the preoperative diagnosis was correct in 75% of the cases, whereas 25 % of preoperative diagnosis was incorrect [15]. Usually, when appendix is perforated, and this perforation is open, it can lead to severe sepsis, thus premature birth or even a fetal loss [16].

Fetal complications: B. Andersen et al. reported that 4/12 (33%) aborted spontaneously after the first trimester appendectomy for appendicitis, 4/28 (14%) premature delivery were in the second trimester [15]. What's more, incorrect diagnoses may result in negative appendectomies, putting fetuses at unnecessary risk of spontaneous abortions and premature deliveries [18].

Conservative treatment: In the scientific publications there are cases, which describe conservative treatment of acute appendicitis in pregnant women [19,20]. Varadhan et al. showed in his meta-analysis , that when the diagnosis of acute appendicitis is very uncertain, the expectation policy may be required [21]. In our research, 3 patients were admitted with the doubtful clinical presentation, had antibacterial therapy with good response, and therefore discharged without any complications.

Conclusion

Analysis includes 66 patients over the 4-year period. Complications included local serous peritonitis, local purulent peritonitis and one or more had multiple co-morbidities' status with cholecistitis, pyelonephritis. No single symptom or laboratory finding is diagnostic for acute appendicitis during pregnancy. When in admission it is required to make a diagnosis of acute appendicitis and which will require appendectomy, the strongest clinical judgment with analysis of all factors and sypmtoms may be required. According to ClavieneDindo classification, we had no surgical complications.

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№7 ҚАЛАЛЫҚ КЛИНИКАЛЫҚ АУРУХАНАҒА 2015-2018ЖЖ. АРАЛЫҒЫНДА ЖАТҚЫЗЫЛҒАН ЖҮКТІ ӘЙЕЛДЕРДЕГІ ЖЕДЕЛ АППЕНДИЦИТТІҢ КЛИНИКАЛЫҚ НӘТИЖЕЛЕРІН БАҒАЛАУ

Түйін: Бұл жұмыстың мақсаты – Алматы қаласындағы жүкті әйелдердердің аппендицитті клиникалық ағымын анықтау, сонымен қатар диагнотикасынын және араласуынын ретроспективті бағалауы. Зерттеу аясында жүктіліктің әртүрлі триместрлерінде клиникалық белгілері, асқынулары, соқыр ішектің құрт тәрізді өсіндісіңморфологиялық құрылымы және жедел аппендициттің өршуі мұқият талданды. Деректерді талдау Алматы қаласының № 7 қалалық көпсалалы ауруханаңың мәліметтері негізінде жүргізілді.
Түйінді сөздер: жедел аппендициттің ерекшеліктері, жүктілік, клиникалық белгілері, асқынулары, соқыр ішектің құрт тәрізді өсіндісінің морфологиялық құрылымы

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ОЦЕНКА КЛИНИЧЕСКИХ ИСХОДОВ ОСТРОГО АППЕНДИЦИТА У БЕРЕМЕННЫХ, ГОСПИТАЛИЗИРОВАННЫХ В ГКБ№7 С 2015 ПО 2018 ГОДЫ

Резюме: целью данной работы является определение особенностей клинического течения аппендицита у беременных среди населения города Алматы, также ретроспективная оценка диагностики и вмешательства. В рамках исследовательской работы рестроспективно проанализированы особенности клинических симптомов, осложнений, морфологической структуры червеобразного отростка и исходов острого аппендицита в различных триместрах беременности. Анализ данных проведен на основе данных городской многопрофильной больницы №7 г.Алматы.
Ключевые слова: особенности течения острого аппендицита, беременность, клинические симптомы, осложнения, морфологическая структура червеобразного отростка.