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Appendectomy for Presumed Acute Appendicitis in Pregnancy; an Obsolete Concept?

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Introduction: Acute appendicitis (AA) is one of the most common differential diagnoses in a pregnant lady presented with right iliac fossa (RIF) pain. Traditional concept of early exploration has been questioned, as far as recent evidences showed much higher morbidity rates than expected. Mandatory pre-operative imaging (ultrasound or Computer Tomography scan) has been advocated and proven able to significantly reduce its related avoidable morbidity.

Case Presentation: Three cases are presented: Case 1 was a 41-year-old lady who had acute appendicitis which was successfully managed conservatively. Case 2 was a 29-year-old lady at 25 weeks of gestation, presented with 2 weeks history of RIF pain. Open appendectomy was offered for her, as far as obstetric review and ultrasound were inconclusive. Even though, she had a negative appendectomy, and her postoperative period was complicated by recurrent premature uterine contractions. The third case was an unfortunate lady at 30 weeks of gestation. Laparotomy was done for her, as her RIF pain persisted, which was diagnosed by significant fluids at both iliac fossae with other unremarkable obstetric review. Her postoperative period was complicated by paralytic ileus and intra-uterine death.

Conclusions: Our review demonstrated that a pregnant lady suspected of AA poses a great clinical challenge to surgeons, as far as scoring systems are almost unreliable. Positive imaging prior to surgery is warranted, in order to avoid a nontherapeutic surgery which is always associated with high morbidity rates.

Keywords: Appendicitis; Pregnancy; Complications

1. Introduction

Acute appendicitis (AA) is the most common non-obstetric surgical emergency in pregnancy, with an incidence of 0.15 to 2.10 per 1000 pregnancies and mostly occur during second trimester of pregnancy (1-3). Traditionally, early exploration in suspected cases is recommended, because a delay in diagnosis is associated with higher risk of perforation, fetal mortality rate, and post-operative morbidity rate (1, 4). Previous case series have reported a fetal loss rate of 2% - 3% with non-perforated appendicitis 3% with negative laparotomy and up to 20% with perforated appendicitis (4).

Therefore, high negative appendectomy (NA) rate (11% - 50%) has been accepted and justified. Interestingly, there were only few qualitative data supporting the safety of such approach (1). Does the latter approach remains acceptable in an era of evidence-based medicine? This review is to audit our current approach of managing suspected AA in pregnant lady with emphasis on morbidity rate (maternal and fetal) and to recommend an updated care-based evidence on current available evidences.

2. Case Presentation

There were three pregnant ladies admitted in our ward with suspected acute appendicitis from January until June 2014 (during 6 months). During this period, a total of 48 female patients were managed for similar problem, and the incidence of AA was calculated at 6.2% (3/48 patients).

2.1. Case 1

A 41-year-old lady at 6 weeks of gestation was presented with 3 days history of right iliac fossa (RIF) pain associated with low grade fever and nausea. Acute appendicitis was suspected for her, as her ALVARADO and RIPASA (Raja Isteri Pengiran Anak Saleha Appendicitis) scores were 7 and 10 respectively. Obstetric team consultation was also unremarkable. Despite that, an ultrasound was ordered, but it was unfortunately inconclusive (appendix could not be seen). As her pain reduced remarkably within 24 hours of admission, we decided to manage her conservatively and she was discharged in good condition 2 days later with no morbidity (Tables 1 and 2).

Table 1. Clinical Features of Three Pregnant Ladies Suspected of Acute Appendicitis [a]

Parameters	Case 1	Case 2	Case 3
Age, y	41	36	29
Gestational age, weeks	6	30	25
Duration of RIF pain, d	3	5	14
ALVARADO score	7	8	8
RIPASA score	10	8.5	7.5

[a] Abbreviations: RIF, right iliac fossa.

Table 2. Outcome of Cases Managed [a]

Parameters	Case 1	Case 2	Case 3
Time passed for a definitive diagnosis, h	8	33	40
Any imaging done / type (Ultrasound or Computer tomography)	Yes (USG)	Yes (USG)	Yes (USG)
Surgical management (conservative / surgical)	Conservative	Laparotomy	Open appendectomy
Definitive diagnosis	Uncomplicated AA	Red degeneration of fibroid	White appendix
Postoperative morbidity	nil	Paralytic ileus, Intra-uterine death (IUD), Normal appendix	Recurrent postoperative premature contraction. Normal appendix (removed)
Mortality	nil	Nil (fetal death)	nil
Total hospital stay, d	2.5	8.2	5.6

[a] Abbreviations: AA, acute appendicitis; USG, ultrasound.

2.2. Case 2

A 29-year-old lady with 25 weeks of gestation was admitted for 14 days history of persistent RIF pain with nausea and no fever or vomiting. She had localized rebound tenderness at RIF region. Since obstetric review was insignificant, diagnosis of atypical appendicitis was made as her ALVARADO and RIPASA scores were 8 and 7.5 respectively. Her ultrasound was also unremarkable (appendix was not visualized). As her pain persisted, we proceeded with open appendectomy, which was surprisingly normal (white appendix with normal ovaries and tubes). Her postoperative period was complicated by recurrent premature uterine contractions requiring obstetric intervention (Tables 1 and 2).

2.3. Case 3

An unfortunate 36-year-old pregnant lady at 30 weeks of gestation was presented with 5 days history of localized RIF pain with fever and nausea without vomiting. She was admitted to our surgical ward for suspected acute appendicitis as her ALVARADO and RIPASA scores were 8 and 8.5 respectively. Obstetric review revealed oligohyramnios with no other significant finding. Ultrasound demonstrated significant free fluid at both iliac fossa regions, but her appendix could not be seen. We proceeded with laparotomy as her pain persisted. Intra-operatively, her appendix was normal, but she had a large uterine fibroid, which was degenerated. The postoperative diagnosis was red degeneration of fibroid. Her postoperative period was complicated by prolonged paralytic ileus and fetal loss (Tables 1 and 2).

3. Discussion

The incidence of acute appendicitis (AA) in pregnancy in our series was 6.2% (3 from 48 patients) comparable to other large international series such as McGory et al. (3.3%) and Ito et al. (8.9%) (1, 4). The rate of negative appendectomy (NA) in a pregnant lady in the former series was significantly higher than non-pregnant group (36% vs. 14%). Unfortunately, ours was nearly double (66%). In fact, McGory et al. acknowledged that the NA rate in pregnant ladies varied from 3.5% to 100% (4). Atypical presentation is expected, especially close to term period, as a result of anatomical and physiological changes occurring (3). Unreliable biochemical findings with no validated clinical score amplified the diagnostic challenges further (3, 4). It is important to note that, despite of having atypically longer duration of pain (7.3 days), both RIPASA and ALVARADO scores were quite high. In their retrospective review of 29 patients (10 years period), Miloudi et al. demonstrated that fever was only present in 45% of them and acknowledged the unreliability of leucocytes count (5). Similarly, despite of the fact that all of their pregnant

ladies with appendicitis had abdominal pain, fever was present in only 24% of them (6).

Di Saverio et al. established that a truly statistically significant increase in morbidity rate and fetal complications is only observed when perforation occurs (7). Since the incidence of ruptured appendicitis is almost similar in pregnant and non-pregnant women, it seems that the greatest opportunity to improve fetal outcomes is improving diagnostic accuracy and reducing the rate of negative appendectomy in pregnant ladies (4). In general population the reported NA rate, based on histological findings after clinical diagnosis, is as high as 25% (3). Abdominal imaging in suspected cases has been proven able to significantly reduce this rate. Based on their data, Ito et al. strongly believed that, higher NA in pregnant women, compared with men and non-pregnant women, seems to be linked to the lower rate of preoperative imaging (1). Furthermore, highest rate was in the patient in her first trimester with the lowest rate of pre-operative ultrasound and CT scan (1).

Traditionally ultrasound (USG) has been used as the first line investigation for suspected appendicitis in pregnancy. However, there are a number of more recent studies demonstrating large proportions of USG, reported as indeterminate (ranges from 7% to 96%), as the appendix cannot be visualized (3). As in ours, all (100%) the scans were inconclusive. Therefore, many authors strongly advocate use of CT or Magnetic Resonance Imaging (MRI) for those with inconclusive USG (1-3). Flexer et al. managed to reduce the NA rate significantly from 54% (no imaging) or 36% (only USG) to 8% (use of CT) (3). Following negative USG, Ito et al. and Lazarus et al. have established that negative predictive value of CT in pregnancy is as high as 99% and provides important diagnostic information in 30% of cases (1, 8). Although CT scanning during pregnancy should be limited because of the teratogenic risk of ionizing radiation, especially in the first trimester, the use of this imaging modality during second and third trimesters of pregnancy is widely accepted by several radiologic and obstetric specialists. On the other hand, MRI is preferred during the first trimester because it has no radiation risk (1).

Apart from the inherent risk of general anesthesia and possible complications of any abdominal surgery, such as wound infection, incisional hernia and adhesion, few important morbidities following non-therapeutic appendectomy in pregnant ladies worth to be mentioned; They were less likely to have another surgical cause for their pain such as case 3. McGory et al. analyzed 725 NA pregnant patients and noticed that only 15% had another diagnosis, such as mesenteric adenitis, leiomyoma, inflammation of gynecologic organs or ovarian torsion (4). Hence, there were no benefits gained by exploration (1). It is disturbing that NA was associated with a 10% early delivery rate, which is almost as high as early delivery rate for complicated appendicitis (4). One of our patients had fetal loss following a non-therapeutic laparotomy for presumed appendicitis. Such high percentage (33%) cannot reflect the true incidence as the sample size of our study was very small. Negative appendicitis (OR 1.88), complex appendicitis (OR 2.69), and laparoscopic appendectomy (OR 2.31) had considerably higher odds of fetal loss in comparison to simple appendicitis or open appendectomy (4). A review by Ito et al. added some important facts: the preterm delivery rate within 30 days for NA group was higher than in inflamed group, even though it was not statistically significant (7% vs 2% respectively). Similarly with fetal death rate, it was 3% in the former group but only 2% in the latter group (1, 7). In addition, McGory et al. demonstrated that the rate of fetal loss was doubled (4%) with NA with only 2% in simple appendicitis (4). They also noticed that the risk of fetal loss and early delivery with NA was almost as high as complicated appendicitis (4).

Therefore, the current approach to operate presumed appendicitis in pregnant women makes the risk of fetal loss at 23%, even though they have a normal appendix (4). Flexer et al. has proposed an algorithm of managing suspected AA in pregnancy, where all require an USG. Appendectomy is indicated for the positive USGs, otherwise further imaging is necessary before surgery (3, 9).

It is well established that pregnant women have high NA rate which is associated to significant adverse outcomes, both to mother and fetus. Recent evidences highlighted that the policy of early appendectomy without imaging in pregnancy needs re-evaluation. However, diagnostic delay should be avoided and potentially detrimental, as it significantly increases the morbidity and fetal complications, if perforation occurs.

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