

Twin In-vitro Fertilisation Pregnancy Complicated with Appendicular Perforation: A Case Report

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ABSTRACT

Appendicitis is an infection and inflammation of the appendix, a finger-shaped pouch that projects from the colon. It is a frequent and severe disorder that can appear anytime during pregnancy. It needs to be diagnosed and treated immediately. Otherwise, there would be a high risk of morbidity and mortality. Diagnosis is challenging due to the absence of the disorder's typical clinical image, the ambiguity of its symptoms, and the frequency with which they occur during pregnancy. Due to the gravida uterus's ability to displace the appendix within the abdomen, pregnancy may conceal the diagnosis and make it challenging to examine the patient physically. Obstacles in diagnosis caused by pregnancy lead to significantly increased risk to both the mother and foetus and raise the possibility of foetal loss following a negative appendectomy. Usually, the biochemical and analytical tests used to diagnose this disease are unreliable during pregnancy. This is a case of a 38-year-old female primigravida who was 31 weeks pregnant with twins conceived via In-Vitro Fertilisation (IVF) and was diagnosed with acute appendicitis. She had surgery without complication and had a necrosed appendix, which was confirmed by histopathology. This report covers, in general terms, how to diagnose, treat, and manage a ruptured appendix with surgery and antibiotics with multidisciplinary management of such patients to improve their outcomes.

Keywords: Antibiotics, Infertility, Laparoscopy, Surgery

CASE REPORT

A 38-year-old female primigravida who conceived through IVF, at 31-weeks gestational age with twin pregnancy came to the casualty with pain in the lower abdomen in the past two days, sudden in onset, dull aching, not radiating to the back. It was associated with three-four episodes of vomiting. History of nausea and dizziness present for one day. No complaints of vaginal discharge, bleeding or leaking per vaginum. History of pulmonary tuberculosis ten years ago, for which treatment was taken for six months after diagnosis. Negative history for diabetes mellitus, hypertension, bronchial asthma, epilepsy or thyroid disorder in the past.

On examination, she had a fever of 101°F, a pulse of 100/minute and a blood pressure of 100/68 millimetres of mercury in a sitting position. SpO₂ was 97% on room air, and respiratory rate was 28 per minute. Per abdomen examination, the uterus was 34 weeks in size, the uterus was relaxed, multiple foetal parts were palpated, and the Foetal Heart Sounds (FHS) were present and regular at

142 and 150 beats per minute. On auscultation, hypoactive bowel sounds were present. On palpation, right lower quadrant tenderness with voluntary guarding was present. The pelvic examination was normal. Non stress test was done to check for foetal well-being. The patient was advised nil by mouth and pulse, blood pressure and FHS of both babies were monitored.

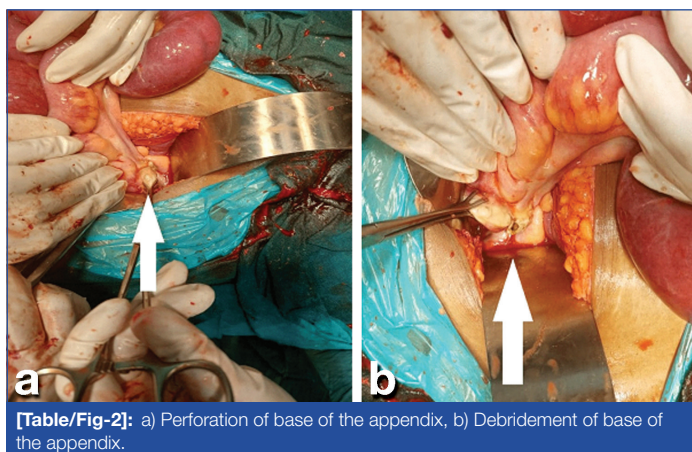
Her blood tests revealed leucocytosis 16600/cu mm, as well as a rise in C-reactive protein 50 mg/dL, as shown in [Table/Fig-1] [1]. The patient was managed conservatively with intravenous hydration of ringer's lactate and dextrose five percent and an injection of paracetamol was given. Injection dexamethasone and injection of magnesium sulphate was given for lung maturity and neuroprotection. Injection ceftriaxone one gm intravenous 12 hourly was started.

After four hours of admission, the patient complained of increased right-sided lower abdominal pain, not relieved by tocolysis and analgesia, with a temperature of 103°F.

S. No.	Investigations	Measured value on the day of admission	Measured value on the second day	Measured value on the discharge day	Normal range [1]
1	Haemoglobin (gm%)	10.6	10.1	9.8	11-15
2	Total leucocyte count (per cumm)	16600	19200	14600	4000-11000
3	Platelets (lacs/cumm)	2.2	1.6	1.1	1.5-4.5
4	Serum glutamic oxaloacetic transaminase (u/L)	75	40	38	14-36
5	Serum Glutamic Pyruvic Transaminase (u/L)	68	44	36	<35
6	Total protein (g/dL)	6.9	5.2	8.1	6.3-8.2
7	Total bilirubin (mg/dL)	1	0.7	0.5	0.2-1.3
8	Serum urea (mg/dL)	20	18	22	7-17
9	Serum creatinine (mg/dL)	0.9	0.5	0.5	0.5-1.04
10	Sodium(mmol/L)	146	142	150	137-145
11	Potassium (mmol/L)	4.8	3.5	4.2	3.5-5.1
12	C-reactive protein (mg/dL)	50	46	8	1-3

[Table/Fig-1]: Blood investigations of the patient [1].

Obstetric ultrasonography was done, which was suggestive of intrauterine live fetuses F1 and F2 corresponding to an average gestational age of 30.5 and 30.1 weeks, effective foetal weight 1636 grams and 1501 grams, Deepest Vertical Pocket (DVP) 1 and 1.5 cm, respectively. Oligohydramnios with multiple dilated bowel loops was seen in the right lower quadrant. A decision of emergency caesarean section with exploratory laparotomy was made after consultation with the general surgeon. A midline incision was given, incision deepened in layers. Rectus sheath opened by sharp dissection, muscle and peritoneum separated. Pus with the faecal matter was seen in the peritoneal cavity [Table/Fig-2a]. Lower segment was well formed, and a trans-curvilinear incision was given on the uterus. First, both babies were delivered by incision on the lower segment of the uterus and handed over to a paediatrician. After uterine closure, urgent exploration for perforation of the base of the appendix was done. Bowel delivered out. The bowel loop was found congested and dilated. Perforation of 1×0.5 cm seen at the appendicular base. Pus flakes were present around the perforation. The appendix and mesoappendix were ligated, and appendicectomy was done. Edges of perforation freshened. Perforation closed with vicryl 5-0 primarily. Appendicular stumps were closed with thorough wash [Table/Fig-2b].



[Table/Fig-2]: a) Perforation of base of the appendix, b) Debridement of base of the appendix.

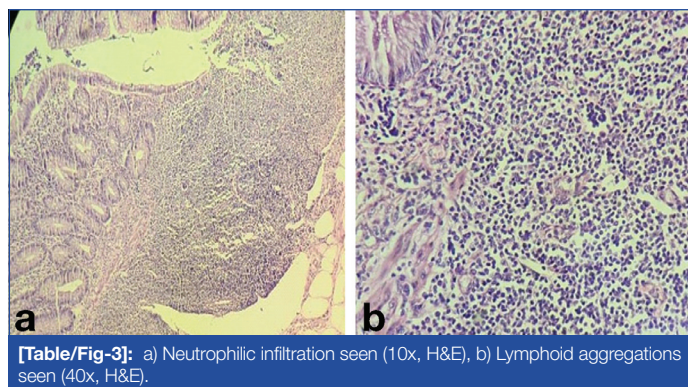
The patient was moved to the recovery room after the abdomen was closed in layers. Skin closed with ethilon 2.0 interrupted mattress sutures. The recovery process was unremarkable. Both babies had uncomplicated neonatal intensive care unit stay. She had an uneventful postoperative recovery. Patients total leucocyte count at the time of discharge was 14,600/cumm and C-reactive protein was 8 mg/dL [Table/Fig-1]. The patient has stable vitals when discharged.

Histopathology of dilated and swollen irregular yellowish-brown tissue pieces aggregating 3×1×0.5 cm was suggestive of acute appendicitis with a focal peri appendiceal abscess seen. Section stained with Haematoxylin and Eosin (H&E) shows variable inflammatory infiltrate comprising neutrophils and lymphocytes involving all the layers of the appendiceal wall [Table/Fig-3a,b]. Section from both cords and the body of the placenta was unremarkable at microbiology and histopathology exam.

DISCUSSION

The most frequent surgical complication during pregnancy that needs non obstetric abdominal surgery is acute appendicitis, which occurs between 1:1250 and 1:1500 pregnancies. Almost 50% of the cases are present during the second trimester [2].

The first symptom, according to the patient, was the development of pain in the abdomen. The inflammatory process is preceded by symptoms like vomiting and nausea followed by pain, which is in the periumbilical area initially and gradually localised to the right iliac fossa. Later, fever and leucocytosis develop. Instead of localised tenderness, patients with a retrocaecal appendix frequently report a dull aching pain in the lower right abdominal quadrant. These



[Table/Fig-3]: a) Neutrophilic infiltration seen (10x, H&E), b) Lymphoid aggregations seen (40x, H&E).

patients will likely experience more pain during vaginal and rectal examination than during abdominal palpation [3]. A detailed history and clinical study are typically sufficient to diagnose acute appendicitis. However, because of the different physiological and anatomical changes that take place during pregnancy, it could be difficult to detect during pregnancy. Similar pregnancy-related symptoms include vomiting, nausea, abdominal discomfort, and anorexia. Also, the enlarging uterus displaces the appendix laterally and superiorly, pulling it away from McBurney's point. Despite the appendix being visible in the upper right quadrant, 84% of pregnant women who arrive with appendicitis experience pain in the lower right quadrant [3,4].

The bacteria residing in the appendix produce gas, which along with the continuous mucus secreted, leads to appendicular obstruction, ultimately causing distension and increasing intraluminal pressure. These further causes were increasing impairment in venous drainage, initially leading to mucosal ischaemia, which progresses to full-thickness ischaemia and eventually results in wall perforation. The appendiceal walls become necrotic and ischaemic due to the worsening vascular and lymphatic damage. The early stages of appendicitis predominantly harbour aerobic organisms. In contrast, mixed anaerobes and aerobes are commonly found in the later stages, evidenced by the overgrowth of bacteria in the occluded lumen. *Escherichia coli*, *Pseudomonas*, *Pepto streptococcus*, and *Bacteroides*, are common microorganisms. The risk of perforation of the appendix is significant once a considerable amount of inflammation and necrosis occurs. This can further lead to a localised abscess and even grave consequences like peritonitis [4,5].

The most severe complication of acute appendicitis is appendix perforation. As much as 43% of appendices can perforate during pregnancy, compared to 19% in the general community. With gestational age, the risk of the perforation also rises, with the third trimester seeing the highest incidence of a perforated appendix. The appendix can perforate, allowing the materials to exude into the abdominal cavity. This can lead to peritonitis, preterm labour, miscarriage, and foetal or maternal death [6]. Premature contraction and preterm labour are more common in those with ruptured appendices. Appendicitis itself and the complications of the surgery increase the risk of preterm labour contractions; the risk of preterm labour is maximum in the first week following surgery. Appendicitis is associated with a 1.5%-9% risk of foetal loss, whereas perforation increases the risk to 35%. Maternal death percentages are significantly lower, ranging from 0 to 2% [7].

Due to pregnancy's physiologic hyperleukocytosis, it is challenging to interpret the blood count. The CRP level can be standard. It has been demonstrated that ultrasonography has good diagnostic sensitivity in the first and second trimesters for pregnancies affected by appendicitis. Because of its accuracy, helical computed tomography scanning (CT scan) is used to detect appendicitis. However, due to radiation exposure, it is definitely not advised during pregnancy, especially in the first trimester. In a second-trimester woman during pregnancy, magnetic resonance imaging provided a conclusive diagnosis of perforated appendicitis. However, the

long-term implications of the static magnetic field on the baby are still unknown appendicitis is the most frequent surgical emergency arising during pregnancy [8].

Early surgical management is advised as soon as acute appendicitis is diagnosed. According to literature, the risk of appendix perforation is considerably lower when surgery is performed within 24 hours. An appendectomy should be performed immediately once acute appendicitis is diagnosed. The surgical approach is determined by several characteristics, including the gestational age, the degree of appendicitis, the patient's weight, prior abdominal incisions, and the surgeon's personal preferences. If required, a relatively simple appendectomy can be performed in the first trimester using an expanded McBurney incision. For patients in their final trimesters, the right flank incision should be performed higher and more profoundly. Early mobilisation after surgery is beneficial for preventing thromboembolism since pregnancy has a higher incidence of deep vein thrombosis [9].

The prognosis for both the mother and the foetus is made worse by the degree of acute appendicitis and the delay in receiving treatment. According to Pastore, surgery within 24 hours of the start of symptoms lowers the risk of maternal/foetal morbidity and fatality. A perforated appendix increases the foetal mortality rate from 5% following appendicitis to almost 20%. Similarly, perforated cases also result in higher maternal mortality [10].

CONCLUSION(S)

Pregnancy-related physiological, anatomical and biochemical alterations that may cause a delay in the diagnosis of acute appendicitis endanger both the mother's and the foetus' lives.

Abdominal ultrasound is necessary in the diagnosis process. Rapid diagnosis and appropriate treatment are therefore essential. An appendectomy is the best course of action. A team approach involving sensitised obstetricians and surgeons is likely to reduce serious morbidities.

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