

# Management of a Walled-off Perforated Appendix in a 39<sup>th</sup> Week Gestational Pregnancy: A Case Report

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**Abstract Background:** One of the most common surgical problems that requires emergent intervention during pregnancy is acute appendicitis [1]. The incidence of appendicitis during pregnancy is 1 in 766 births, with 16% of the diagnoses occurring within the third trimester [1,2]. Acute appendicitis, with subsequent wall-off perforation, can pose a great risk to both the mother and the fetus. Thus, it is extremely important to recognize and correctly diagnose acute appendicitis, in all trimesters of pregnancy. **Case Presentation:** This case report discusses a 30-year-old G1P0 with a gestation age of 39.6 who presented to the hospital with complaint of flank pain that waxed and waned. The medical team consisting of labor and delivery nurses, obgyn attending physician and a general surgery attending. Possible etiologies for such presentation including UTI, nephrolithiasis, pyelonephritis, uterine abruption, uterine rupture or musculoskeletal causes were all effectively ruled out. MRI was then performed and suggested appendicitis with associated appendicolith. The risk of perforation and potential complication was discussed amongst the patient, obstetrician and general surgeon. The patient was given an active participation in the decision making and ultimately decided that she would like to proceed with cesarean and appendectomy. **Conclusions:** Given the nonclassical presentation of acute appendicitis in pregnancy, a closer evaluation for the underlying etiology is warranted. Acute appendicitis in pregnancy should not be excluded based on clinical evaluation alone, as there is great risk posed to the mother and fetus if missed. Imaging should be performed if no other underlying etiology can account for the clinical features. Any diagnostic uncertainty may delay surgical intervention resulting in risk of maternal morbidity and potential fetal mortality. In term patients, expeditious delivery followed by appendectomy may be warranted.

**Keywords:** pregnancy, acute appendicitis, management

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## 1. Introduction

Appendicitis is known to be the most common cause of acute abdomen for both adults and children [3]. It is also known to be the most common cause of non-obstetrical emergent surgeries in pregnant women, with the majority of cases occurring during the 1<sup>st</sup> and 2<sup>nd</sup> trimester and much lower rates during the 3<sup>rd</sup> trimester [4,5]. Acute appendicitis during pregnancy, however, poses a risk to not only the vitality of the mother, but also to that of the fetus. If left untreated, the appendix has a high risk of perforation which commonly leads to sepsis and may result in fetal demise [6]. Furthermore, it is important to note that the management of appendiceal perforation depends on the nature of perforation, being either free or wall-off. A free perforation of the appendix can cause dissemination of fecal material and pus into the

intraperitoneal cavity. These patients present quite ill and may actually be septic. A wall-off perforation consists of a perforated appendix that has been walled off by surrounding intra-abdominal structures, such as the omentum, but can present diffusely if peritonitis arises. It is important to note that there is limited evidence in the best approach to pregnant women with a wall-off perforation.

As the diagnosis of acute appendicitis may be made clinically by classic patient presentation (right lower quadrant pain, fever, leukocytosis, etc.) in the general population, obstetrical patients often have an atypical presentation. This is because the enlarging uterus often times migrates the appendix cephalad from its typical right lower quadrant position [13]. Pain from acute appendicitis, in this patient population, may present localized in the mid or even right upper side of the abdomen. As a result, imaging is necessary for diagnosis [1]. Ultrasonography is firstly used, and if it proves to be inconclusive then MRI

without gadolinium may be required [7]. CT scans may also be used following inconclusive results from an US, if an MRI is unavailable; however, the CT has to be taken into consideration in order to pose as little risk of radiation to the fetus as possible [8,9].

Current recommendations in the setting of acute appendicitis in obstetrical patients is prompt surgical intervention, either laparoscopic or open appendectomy. Particularly in this population, immediate diagnosis and surgical treatment is a must as the risk for perforation steadily increases with time [10,11].

## 2. Case Presentation

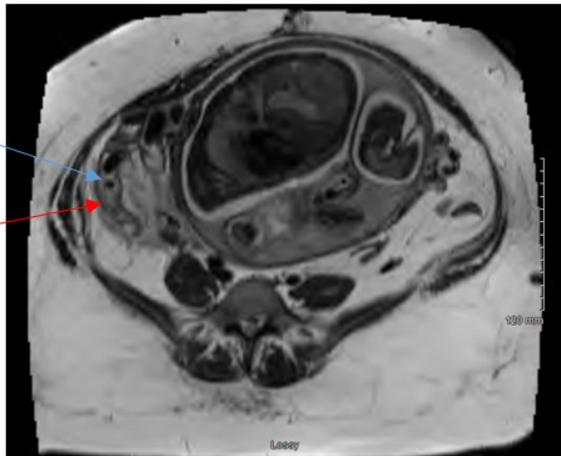
The patient is a 30 year old G1P0 Caucasian female at 39 weeks and 5 days who initially presented to Labor and Delivery with contractions and low back pain for two hours. She described the pain as dull, non-radiating, and rated it as a 9 out of 10 on the pain scale. She denied any leakage of fluid, vaginal bleeding, headaches, vision changes, or lower extremity edema at this time. Obstetric history was complicated by morbid obesity with a BMI of 56.1 kg/m<sup>2</sup>, chronic hypertension, and gestational diabetes mellitus with an A2 White Classification. Home medications included methyldopa, metformin HCl, and prenatal vitamins. Gynecological history was notable for menarche at the age of 13 followed by regular periods, and no history of abnormal pap smears or sexually transmitted diseases. Past medical history revealed migraine headaches, which were treated conservatively with NSAIDs as needed. Surgical history revealed a laparoscopic cholecystectomy at the age of 15. Family history was noncontributory. Patient denied tobacco, alcohol, or illicit drug use.

Vital signs and physical exam, including a pelvic exam, were unremarkable during this time, except for an elevated blood pressure of 142/88 mmHg and a pulse of 120 bpm. Fetal movements were present. It was determined that the patient was stable, and she was discharged home on Tylenol for the pain and Vistaril to help with sleep.

The patient presented the next day to the Emergency Room with an acute onset of contractions and severe abdominal pain. The pain was localized to the right lower quadrant, without radiation. She described the pain as sharp and constant, and rated it as 9 out of 10 on the pain scale. She also experienced nausea since the onset of her symptoms, but denied any vomiting, leakage of fluid or vaginal bleeding, fever, changes in bowel movements, or dysuria. There were no aggravating or alleviating factors at this time.

Vital signs were significant for a blood pressure of 145/74 mmHg, a pulse of 127 bpm, and a temperature of 100.0 F. The physical exam was conducted by both the obstetrician and the general surgeon. It was unremarkable except for diffuse tenderness in the right and middle lower quadrants with rebound tenderness and a positive Rovsing's sign. Fetal movements were positive at the time of presentation with contractions occurring every 3 to 5 minutes. Urinalysis revealed no abnormalities. The complete blood count demonstrated a leukocytosis of 23.4

$\times 10^3/\text{ul}$  (range, 4.0–10.0  $\times 10^3/\text{ul}$ ) with a neutrophilia of 19.9  $\times 10^3$  (range, 1.4–6.5  $\times 10^3/\text{ul}$ ). Renal Ultrasound was ordered to rule out kidney stone, pyelonephritis or possible hydronephrosis. However, results from this study showed a normal renal sonogram with no evidence of renal calculi, hydronephrosis or perinephric fluid. To avoid the risk of radiation during pregnancy, a pelvic MRI without contrast was ordered, shown in Figure 1, which revealed high suspicion for appendicitis in the base of the appendix with associated appendicolith.



**Figure 1.** MRI slice of the patient shows a gravid uterus with the red arrow showing an enlarged appendix. Blue arrow shows the associated appendicolith

The patient's situation was discussed at length amongst the physicians involved in her care. The possibility of laparoscopic appendectomy was discussed but anticipated to be a futile effort due to the size of the uterus. Laparotomy was also discussed, however, it was not performed due to expected post-operative pain, which would have made it significantly difficult for the patient to have a successful vaginal delivery. Due to the length of symptoms and potential risk of morbidity without immediate action, the decision was made to proceed with induction of labor followed by laparoscopic appendectomy. The patient was evaluated and bishop score was calculated. The calculation resulted in a score <6 and thus decision to place a cervical ripening balloon with concurrent Pitocin was made. Patient tolerated balloon placement well and Pitocin was initiated. The obstetrician and the surgeon spoke at length concerning time to delivery. They then spoke with the patient together. The patient was presented all the facts including possibility of failed induction, possibility of appendix rupture, infections, and potential time line of events. The patient then requested to move forward with a cesarean section followed by appendectomy. She was given the risks and benefits of cesarean including risk of complication with future deliveries that could result in repeat cesarean section. The patient understood all facts presented and requested to proceed with cesarean. The patient was then taken to the operative suit, placed under spinal anesthesia and the neonate was delivered without complications via cesarean section. The general surgeon then began his portion of the case, finding that the appendix had actually already perforated, forming a

walled-off perforation. After significant dissection and lysis of adhesions which had formed secondary to the infection, the surgeon followed by removing the appendix. Gross pathology is shown in Figure 2. The patient had an uneventful recovery and continues to do well at this time.



**Figure 2.** Acute suppurative appendix with perforation. Sectioning of the appendix revealed a small amount of blood-tinged mucoid material with a 1.5 x 1 x 1 cm fecalith within the mid portion of the appendix

### 3. Discussion

This case presents a unique clinical scenario in which an obstetrical patient needed emergent surgical intervention for acute appendicitis with an associated appendicolith during the third trimester. Seeing as though this diagnosis poses great risks for the mother and fetus, especially in the third trimester, it is important to recognize appendicitis in pregnant women as it can present in an uncharacteristic pattern.

For pregnant women not at term with acute appendicitis, an appendectomy does not require immediate delivery. Studies have shown that there is a low chance of surgical site dehiscence in the future with a vaginal delivery [12]. In fact, performing a caesarian immediately following an appendectomy is not recommended, as an intrauterine infection and adhesions can develop [12]. However, for our situation, the latency to delivery, with associated risk of failed induction and patient request, prompted us to pursue the cesarean section. Further review of literature, there has been limited case reports of a woman at-term with concurrent wall-off perforated appendix needing urgent treatment. In this case, for women at term with acute appendicitis, the decision of whether to do an appendectomy (laparoscopic vs. open), followed by a cesarean section is a matter of clinical judgement.

### Conflicts of Interest

The authors' report no potential conflicts of interest.

### Financial Disclosure

There was no financial support or funding for this case report.

### Compliance with Ethical Standards and Informed Consent

Informed patient consent was obtained for publication of this case report.

### References

- [1] Tamir, I. L., Bongard, F. S., & Klein, S. R. (1990). Acute appendicitis in the pregnant patient. *Am J Surg*, 160(6), 571-575; discussion 575-576.
- [2] Weingold, A. B. (1983). Appendicitis in pregnancy. *Clin Obstet Gynecol*, 26(4), 801-809.
- [3] Snyder, M. J., Guthrie, M., & Cagle, S. (2018). Acute Appendicitis: Efficient Diagnosis and Management. *Am Fam Physician*, 98(1), 25-33.
- [4] Segev, L., Segev, Y., Rayman, S., Nissan, A., & Sadot, E. (2017). Acute Appendicitis During Pregnancy: Different from the Nonpregnant State? *World J Surg*, 41(1), 75-81.
- [5] Arer, I. M., Alemdaroglu, S., Yesilagac, H., & Yabanoglu, H. (2016). Acute appendicitis during pregnancy: case series of 20 pregnant women. *Ulus Travma Acil Cerrahi Derg*, 22(6), 545-548.
- [6] Zingone, F., Sultan, A. A., Humes, D. J., & West, J. (2015). Risk of acute appendicitis in and around pregnancy: a population-based cohort study from England. *Ann Surg*, 261(2), 332-337.
- [7] Smith, M. P., Katz, D. S., Lalani, T., Carucci, L. R., Cash, B. D., Kim, D. H., . . . Rosen, M. P. (2015). ACR Appropriateness Criteria(R) Right Lower Quadrant Pain--Suspected Appendicitis. *Ultrasound Q*, 31(2), 85-91.
- [8] Long, S. S., Long, C., Lai, H., & Macura, K. J. (2011). Imaging strategies for right lower quadrant pain in pregnancy. *AJR Am J Roentgenol*, 196(1), 4-12.
- [9] Hurwitz, L. M., Yoshizumi, T., Reiman, R. E., Goodman, P. C., Paulson, E. K., Frush, D. P., . . . Barnes, L. (2006). Radiation dose to the fetus from body MDCT during early gestation. *AJR Am J Roentgenol*, 186(3), 871-876.
- [10] Bickell, N. A., Aufses, A. H., Jr., Rojas, M., & Bodian, C. (2006). How time affects the risk of rupture in appendicitis. *J Am Coll Surg*, 202(3), 401-406.
- [11] Yilmaz, H. G., Akgun, Y., Bac, B., & Celik, Y. (2007). Acute appendicitis in pregnancy--risk factors associated with principal outcomes: a case control study. *Int J Surg*, 5(3), 192-197.
- [12] Mazze, R. I., & Kallen, B. (1991). Appendectomy during pregnancy: a Swedish registry study of 778 cases. *Obstet Gynecol*, 77(6), 835-840.
- [13] House, J. B., Bourne, C. L., Seymour, H. M., & Brewer, K. L. (2014). Location of the Appendix in the Gravid Patient. *The Journal of Emergency Medicine*, 46(5), 741-744.
- [14] Halvorsen, A. C., Brandt, B., & Andreassen, J. J. (1994). [Appendicitis in pregnancy. Complications and treatment]. *Ugeskr Laeger*, 156(9), 1308-1310.

