



Acute appendicitis in pregnancy: literature review

Study conducted at the Federal University of Campina Grande, Campina Grande, PB, Brazil

2014

Obstetrics and Gynecology ward

Summery

Introduction : the most common indication for surgery. more often in the second trimester

Methods : a literature review on research of scientific articles

Results : the clinical manifestations are similar, mostly without a classic presentation, difficult diagnosis, needs imaging

Discussion: strongly suspected clinical diagnosis, indications of imaging, differential diagnosis

Conclusion : the imaging study of choice is ultrasound, MRI may be used when the former is not conclusive and, as a last resort, a CT scan

Introduction

- ✓ The most common indication for surgery for non-obstetric conditions.
- ✓ approximately one in 500 to one in 635 pregnancies per year
- ✓ most often in the second trimester
- ✓ Diagnosis is particularly difficult :
 - a. the relatively high prevalence of abdominal discomfort and GI complaints.
 - b. anatomical changes related to the increase in uterine volume
 - c. physiological leukocytosis
- ✓ A ruptured appendix is more common in pregnant women, especially in the third trimester.

Methods

- A search of scientific articles was performed using the terms “appendicitis” and “pregnancy” in the PubMed, Lilacs/SciELO, Scopus and Cochrane Library databases, in addition to Uptodate, last reviewed on February 28th, 2014. 68 scientific articles were analyzed and included in this review

Results

- Pregnant women seem less likely to have appendicitis than non-pregnant women matched by age with a slightly higher incidence in the second trimester of pregnancy.



Clinical characteristics

Typical

Periumbilical pain migrates to RLQ

Anorexia, nausea, vomiting

leukocytosis

Atypical

Heartburn

bowel irregularity

flatulence and/or nonspecific discomfort

Retrocecal appendix

diffuse pain in the right lower quadrant, rather than localized sensitivity

Digital rectal or vaginal examination cause more pain.

Pelvic appendix

can cause sensitivity below McBurney's point.

frequency and dysuria.

rectal symptoms, such as tenesmus

McBurney's sign

- pain upon palpation about 1,5 to 2,0 centimeters from the anterior superior iliac spine in a straight line from that point to the navel .
- This sensitivity may be less prominent during pregnancy because the pregnant uterus lifts and stretches the anterior abdominal wall .



Clinical characteristics

- The largest review, which describes the frequency of clinical signs and symptoms of appendicitis during pregnancy, included 220 cases with 45% relating to acute inflammation and 25%, to perforation.
- limitations :
 - a. the selection of non-consecutive cases
 - b. those diagnosed before the widespread use of current diagnostic imaging procedures.
- Leukocytosis, Microscopic hematuria and leukocyturia , Slight increases in the total serum bilirubin , C-reactive protein .

TABLE 1 Percentage appearance of signs and symptoms of acute appendicitis.

Symptoms	Percentage appearance
Abdominal pain	95% Right lower quadrant: 75% Right upper quadrant: 20%
Nausea	85%
Vomiting	70%
Anorexia	65%
Dysuria	8%
Signs	Percentage appearance
Sensitivity in the lower right quadrant	85%
Pain upon decompression	80%
Abdominal guarding	50%
Rectal sensitivity	45%
Sensitivity in the upper right quadrant	20%

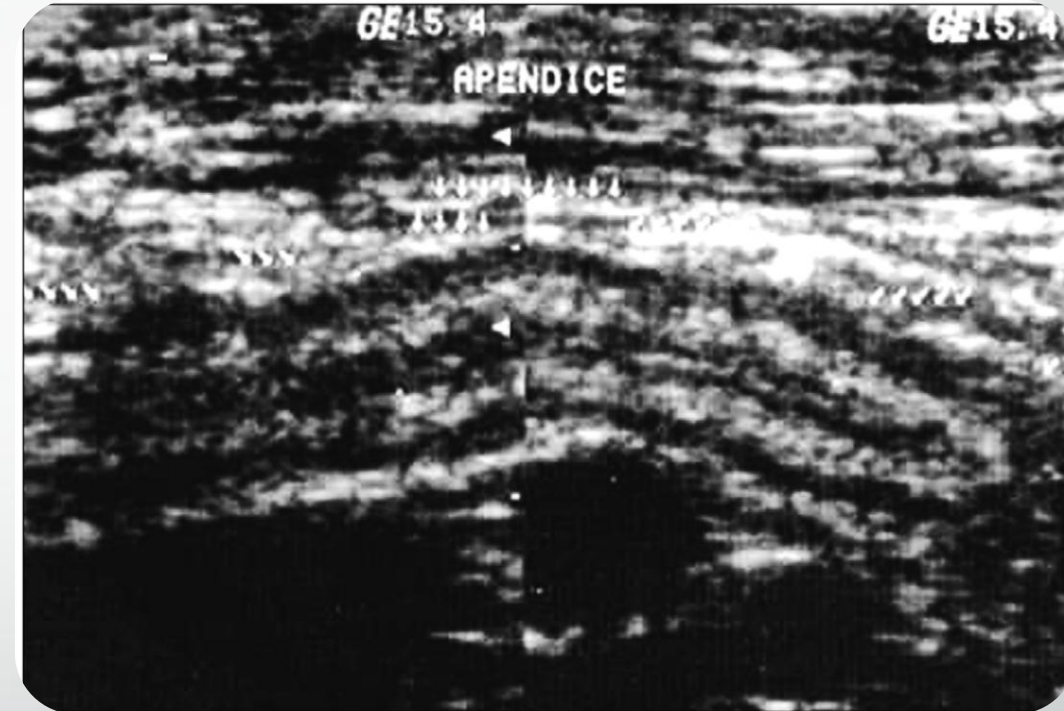
Diagnosis

- Acute appendicitis is a histological diagnosis. Clinical diagnosis should be strongly suspected in pregnant women
- With an atypical presentation, which often occurs during pregnancy, imaging studies are recommended.
- ultrasounds can reveal the possible cause of the patient's symptoms .



Imaging

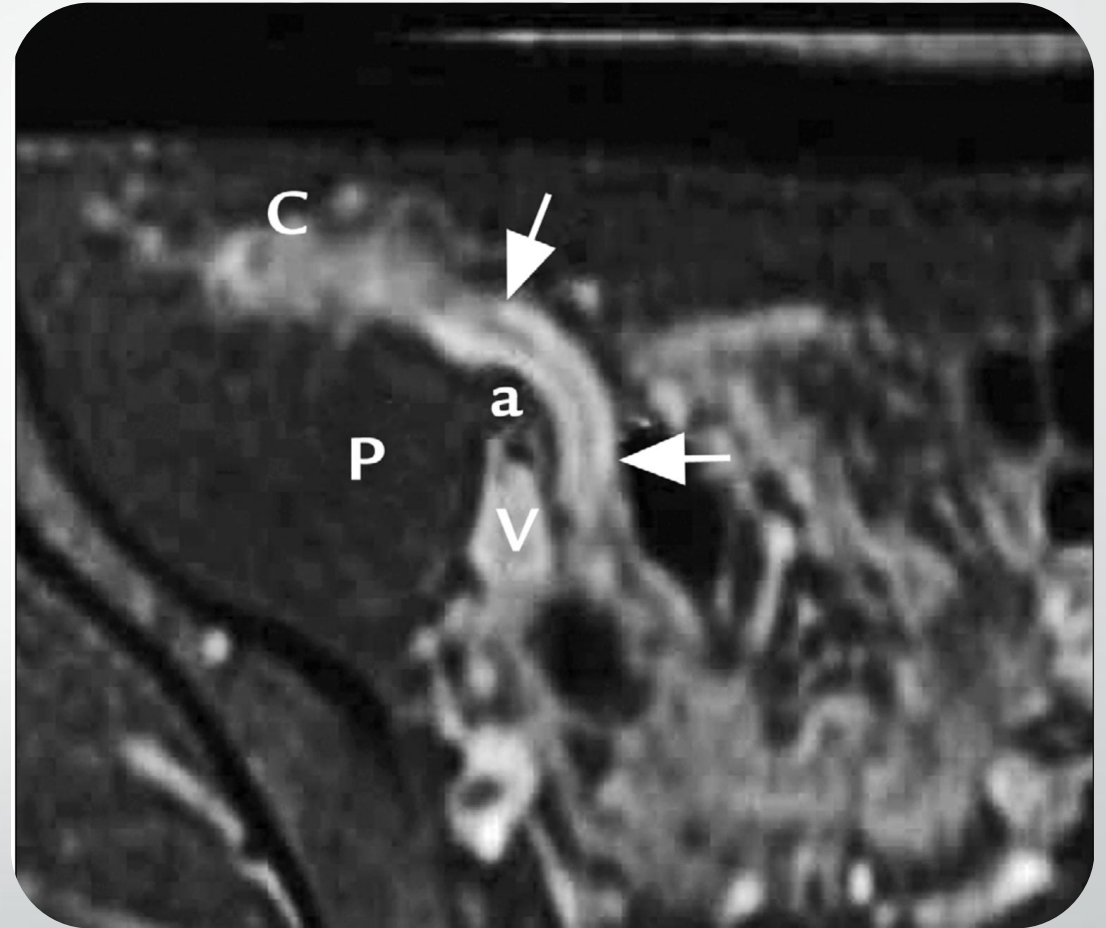
- The initial method of choice for imaging the appendix in pregnancy is ultrasound
- The main finding is the identification of a non-compressible, blind-ended tubular structure in the lower right quadrant, with a maximum diameter exceeding 7 mm .
- in a review of studies on the value of ultrasound diagnostics during appendicitis in pregnancy, sensitivity ranged from 67 to 100% and specificity of 82 to 96%, compared with the general population, in which sensitivity and specificity were 86 and 96%, respectively.
- factors influence the performance of ultrasound diagnosis :
 1. gestational age
 2. BMI
 3. the training and experience of the examiner



Ultrasonography. Appendix with thickened walls (7 mm) and loss of normal stratification.

Imaging

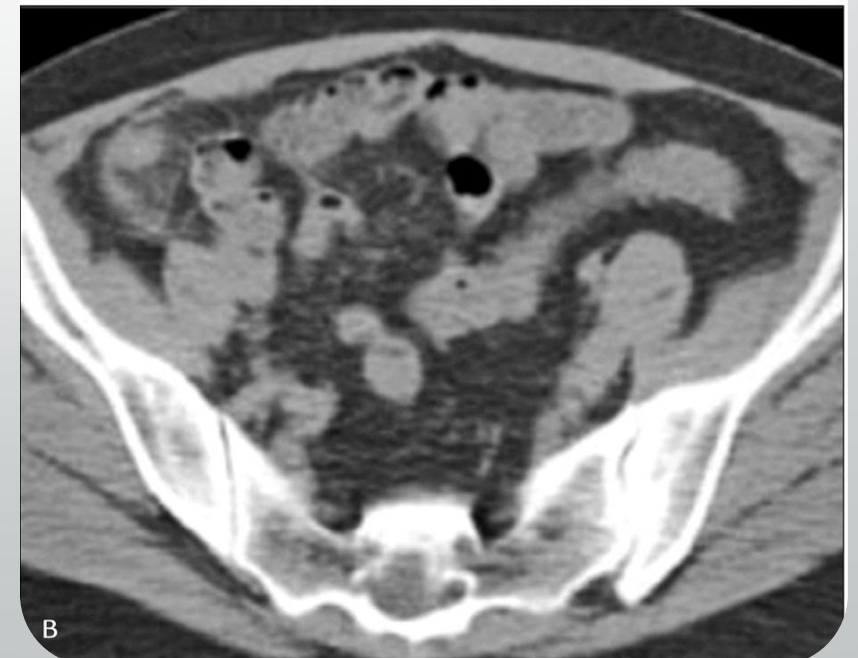
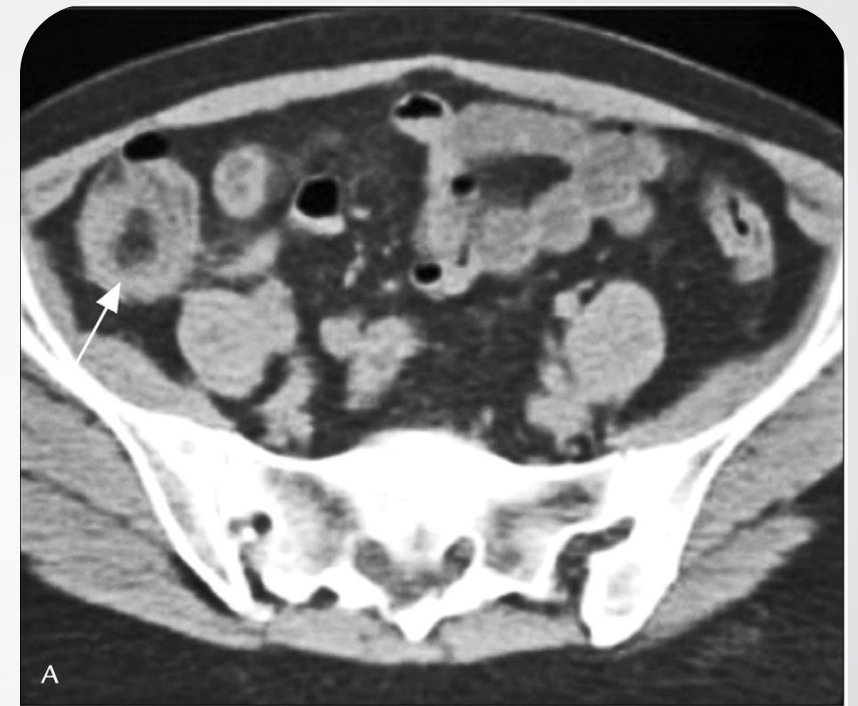
- Nuclear magnetic resonance imaging (MRI) is an excellent method to exclude acute appendicitis in pregnant women
- Gadolinium is not administered routinely because of theoretical concerns about fetal safety, but can be used if essential
- A meta-analysis, evaluating MRI in pregnant women with suspected appendicitis, included six studies with 12 to 148 patients, of which 2 to 14 patients had acute appendicitis confirmed.³⁶ The combined sensitivity was 91% (CI 95% 84-99%), the combined specificity was 98% (CI 95% 87-99%), and positive and negative predictive values were 86 and 99%



Acute suppurative appendicitis. Thickened and inflamed appendix (arrow).

Imaging

- Computed tomography (CT) is generally more available than MRI .
- The main appendicitis findings in CT are inflammation in the lower right quadrant, a hollow elongated tubular structure and/or appendicolith/fecalith
- CT is indicated when the clinical findings and ultrasound results are inconclusive and MRI is not available
- CT in non-pregnant persons : overall sensitivity of 94% (CI 95% 91-95%), specificity of 95% (CI 95% 93-96%), positive predictive value of 13,3% (CI 95% 9,9-17,9%) and negative predictive value of 0,09% (CI 95% 0,07-0,12%).
- meta-analysis of three retrospective studies on pregnant women : sensitivity 85,7% (CI 95% 63,7-96%) and specificity 97,4% (CI 95% 86,2-99,9%). These studies included between 2 and 49 patients with appendicitis
- Computed Tomography. Acute appendicitis. (A) Thickening of the cecum (arrow), (B) blurring of peritoneal fat and thickening of the appendix.



Differential diagnosis

EP

normal early pregnancy

Round ligament pain

Pyelonephritis

pre-eclampsia and HELLP syndrome

Premature detachment of the placenta and uterine rupture

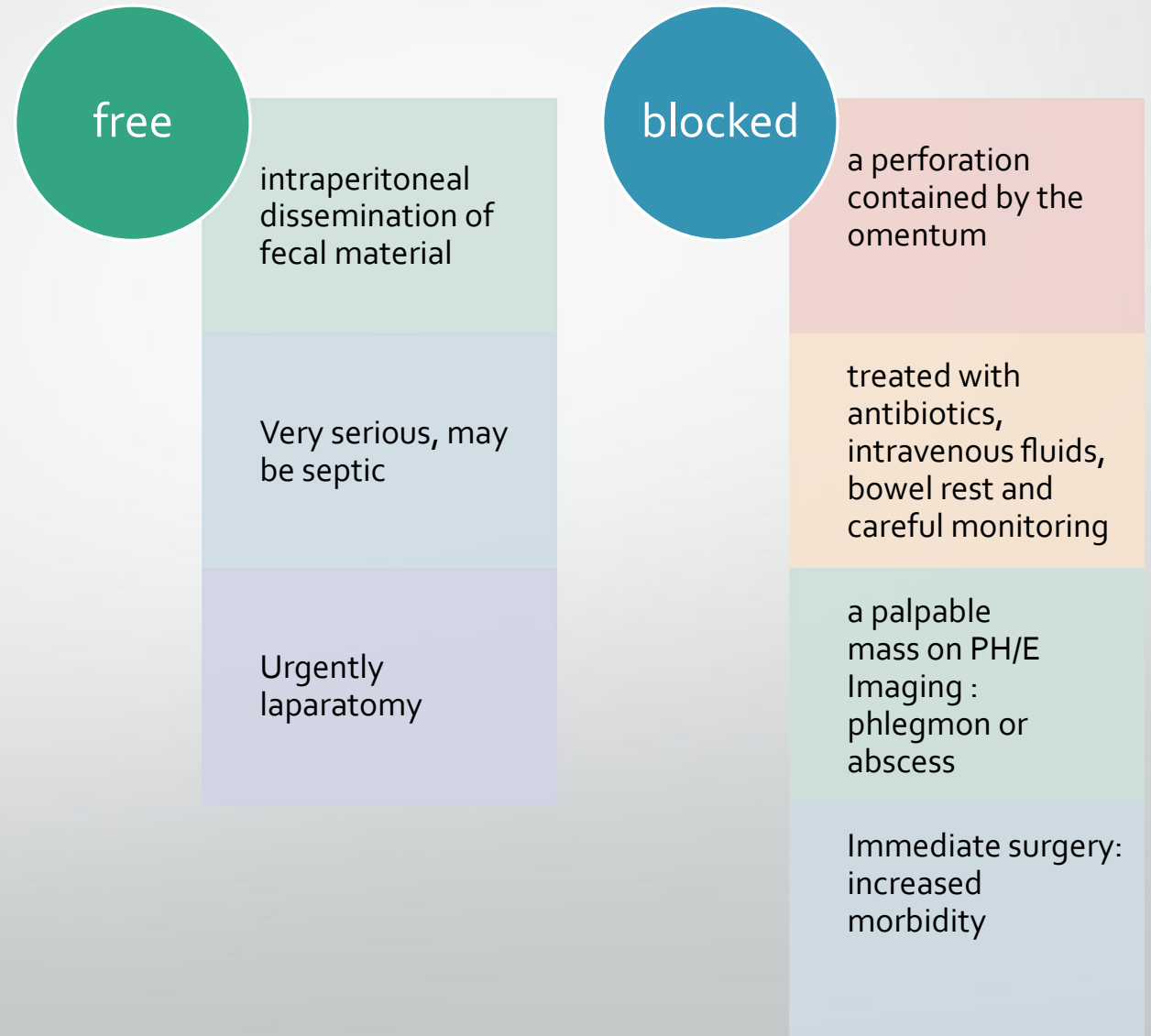
In postpartum patients, ovarian vein thrombophlebitis (OVT)

Discussion

- Immediate diagnosis and surgery are recommended, since surgical intervention delayed for more than 24 hours after onset of symptoms increases the risk of perforation, which occurs in 14 to 43% of such patients.
- Perioperative antibiotics should cover Gram-negative and Gram-positive bacteria (for example, second generation cephalosporin) and also anaerobes (e.g. metronidazole or clindamycin).
- If appendix perforates :
 - a. Morbidity is increased.
 - b. Fetal loss is increased. (36 VS 1,5 %)
- According to difficulties and risks a higher negative laparotomy rate (from 20 to 35%) compared to non-pregnant women is generally considered acceptable.
- A seemingly normal appendix must be removed for histological examination, as it may then reveal acute inflammation
- Cesarean section is rarely indicated at the time of appendectomy

Management of a perforated appendix

- Studies supporting this approach in pregnant women are scarce, and therefore it is not a recommended alternative.



Surgical approach

relatively certain

transverse incision in
McBurney's point

more commonly, on
the point of
maximum sensitivity

Less certain

umbilical midline
vertical incision

it allows for proper
exposure of the
abdomen

Cesarean section

for the usual
obstetrical
indications

Laparoscopic appendectomy

- This procedure can be performed successfully during all 3 trimesters.
- Meta-analyses of observational studies including 500 patients have shown an increase in fetal loss rate with this approach. (7,3 vs 3,3)
- In child-bearing age women through eight randomized clinical trials, laparoscopy was associated with increased rate of specific diagnosis but there was no evidence of reduction in adverse effects.

Conclusion

diagnosis of appendicitis can be difficult during pregnancy, imaging studies are recommended

We recommend ultrasound exams in pregnant patients

If clinical and ultrasound findings are inconclusive, magnetic resonance imaging (MRI) is indicated when available

The decision to perform laparotomy should be based on clinical findings, diagnostic imaging and clinical evaluation

When the diagnosis is relatively certain, appendectomy is suggested to be effected through an incision on the point of maximum sensitivity

When the diagnosis is less certain, we suggest a vertical incision in the lower midline

References

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Thanks for your time and attention