MRI Evaluation of Acute Abdominal Pain in Pregnant Women

Dr Bianca Mazini Dr Vincent Dunet Pr Alban Denys Dr Canniff Emma Pr Sabine Schmidt Kobbe

Purpose

The diagnosis of abdominal pathology in pregnant women can be challenging. This is due to the anatomical and physiological changes during pregnancy and the limited use of radiation.

Abdominal MRI is useful in making the diagnosis when ultrasound is inconclusive.

The aim of this presentation is to help radiologists interpret abdominal MRI in pregnant women with acute abdominal pain not related to pregnancy and to know the differential diagnoses.

The protocole in our institution

Axial T2 (+/- FS)

Coronal and sagittal T2

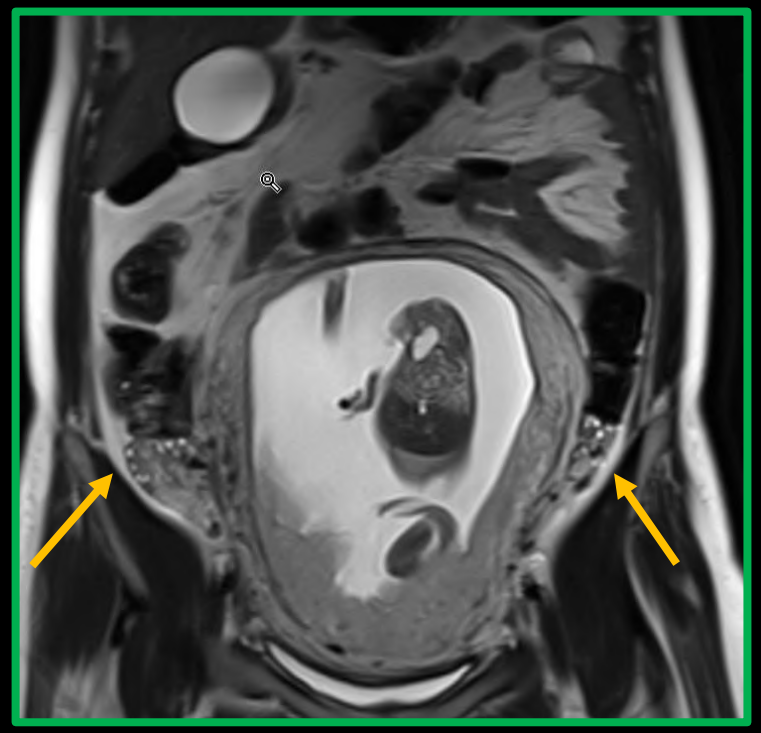
Diffusion

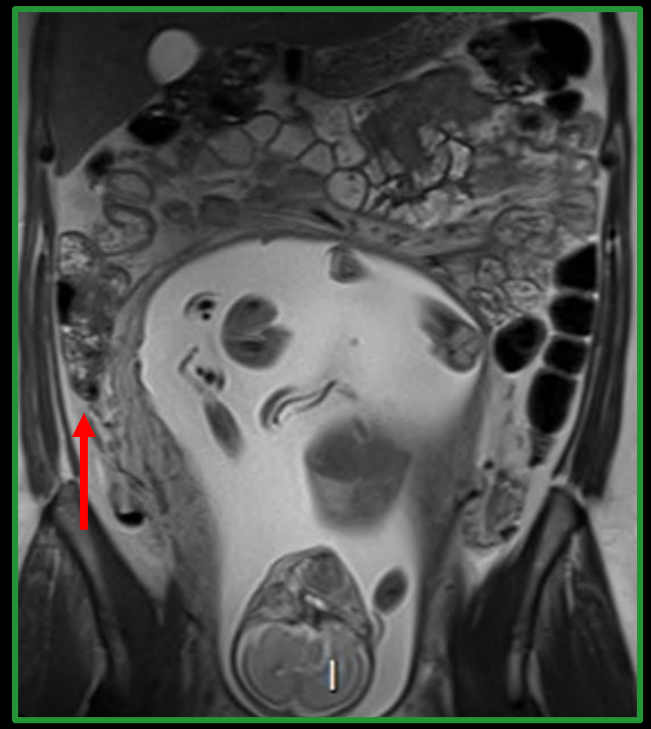
Axial T1 without contrast

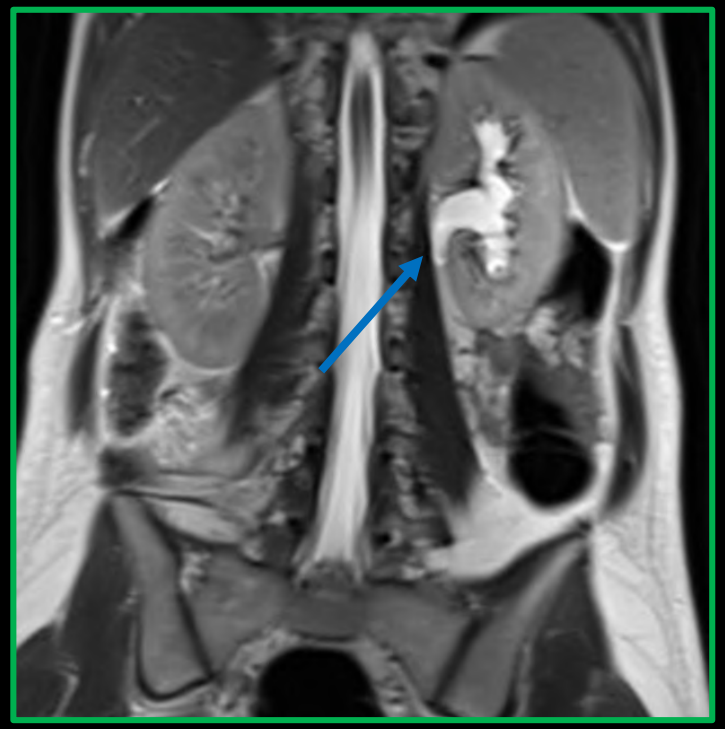
+ Buscopan iv 20 mg/ml *(if: 3Tesla)*

NO IV CONTRAST
(NOT RECOMMENDED)

Normal MRI during pregnancy



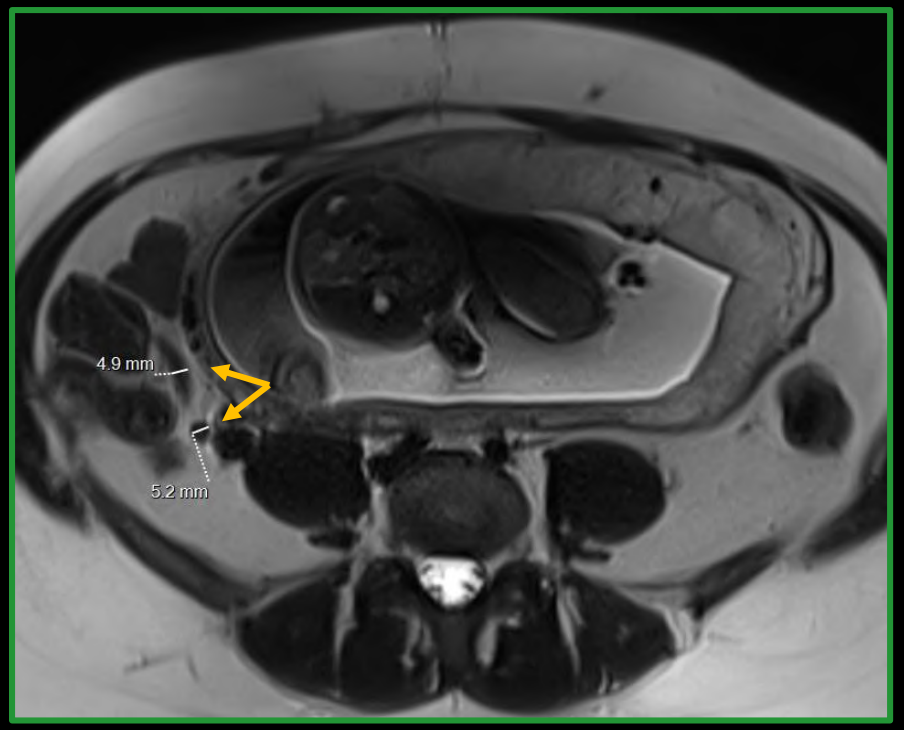


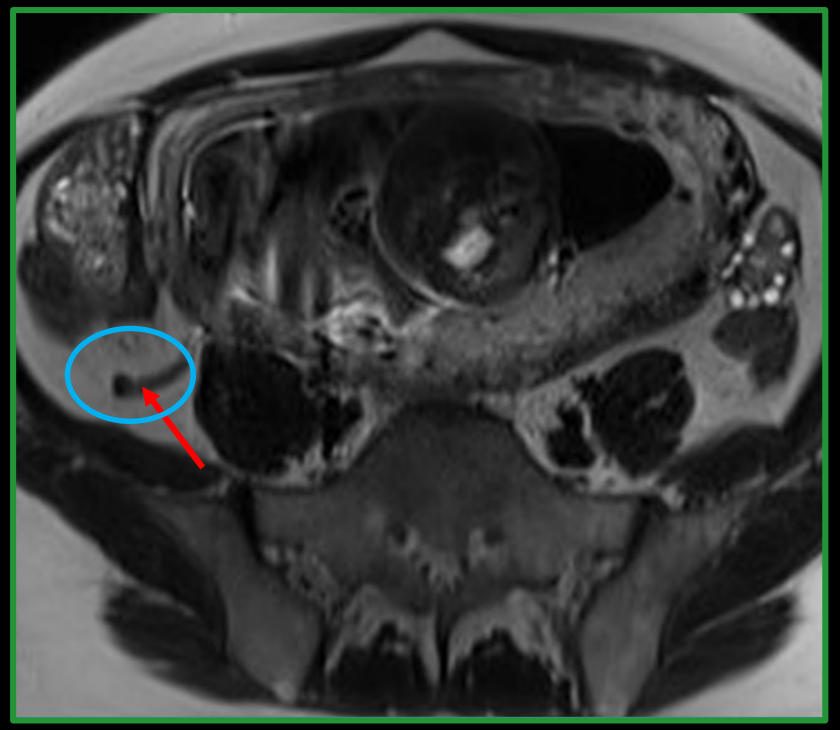


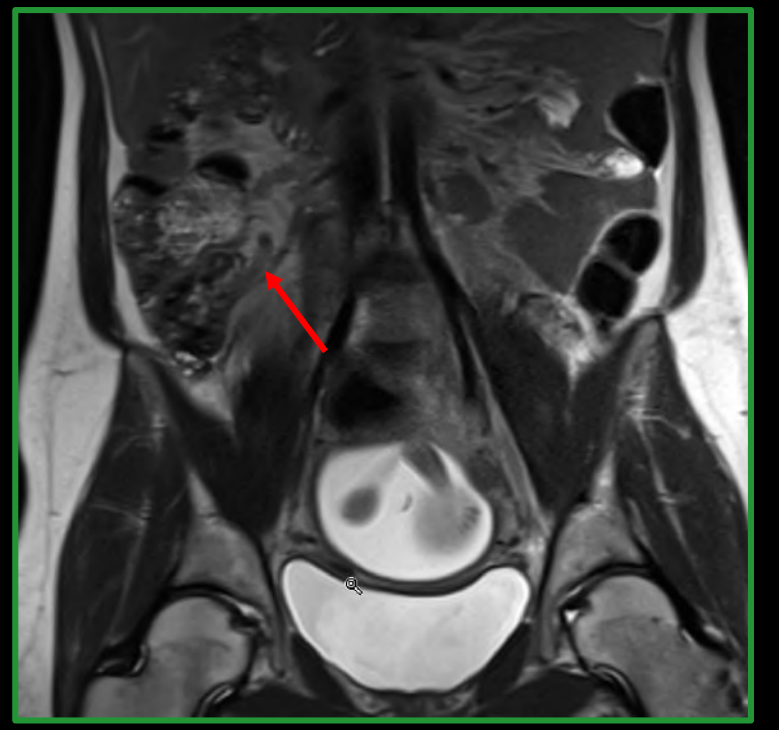
Anatomical changes due to pregnancy occur during the 2nd and 3th trimester. Main changes are:

Adnexal structures are displaced superiorly and laterally (yellow arrows)
Caecum is displaced superiorly (red arrow)
Physiological hydronephrosis is visible in up to 90% of women (R>>L) (blue arrow)

Normal appendix on MRI







NORMAL APPENDIX CHARACTERISTICS:

Appendix diameter < 6 mm and wall thickness < 2 mm (yellow arrows)
Low luminal signal intensity in T1 and T2 (red arrows)
No periappendicular fat stranding or fluid (blue circle)

What should we look for?

ACUTE ABDOMINAL PAIN IN PREGNANT WOMEN

URINARY TRACT
Physiological hydronephrosis leads to urinary stasis resulting in renal calculi and urinary tract infections.

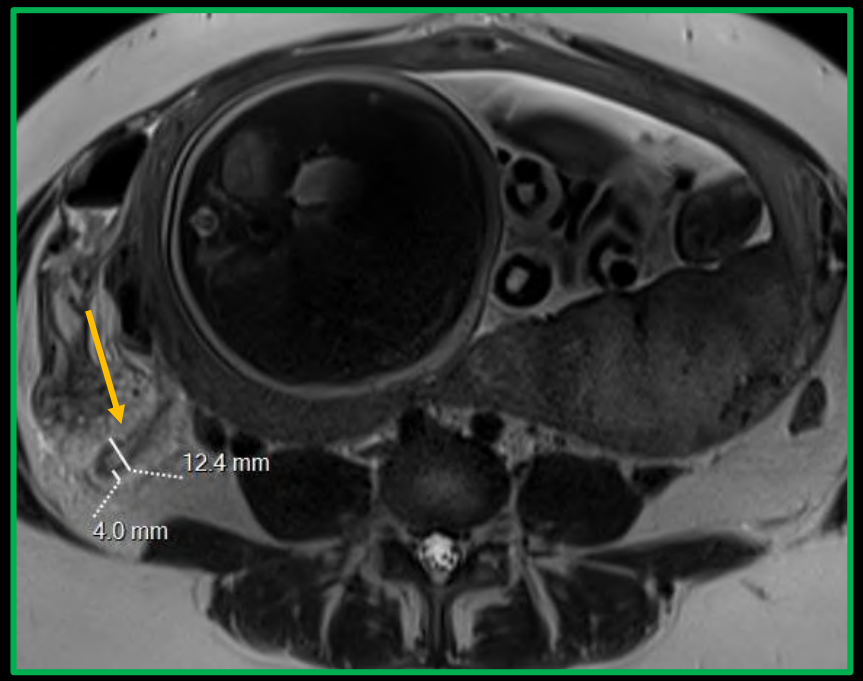
GYNAECOLOGICAL
Most common pathologies encountered: ovarian torsion, adnexal masses, leiomyoma degeneration.

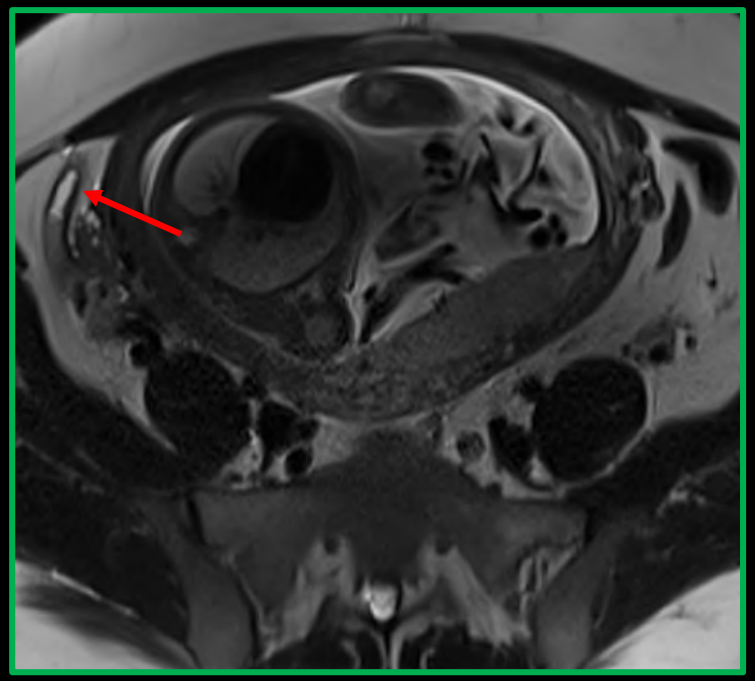
OTHERS GASTROINTESTINAL PATHOLOGIES:
Most common pathologies encountered: inflammatory bowel disease and acute pancreatitis.

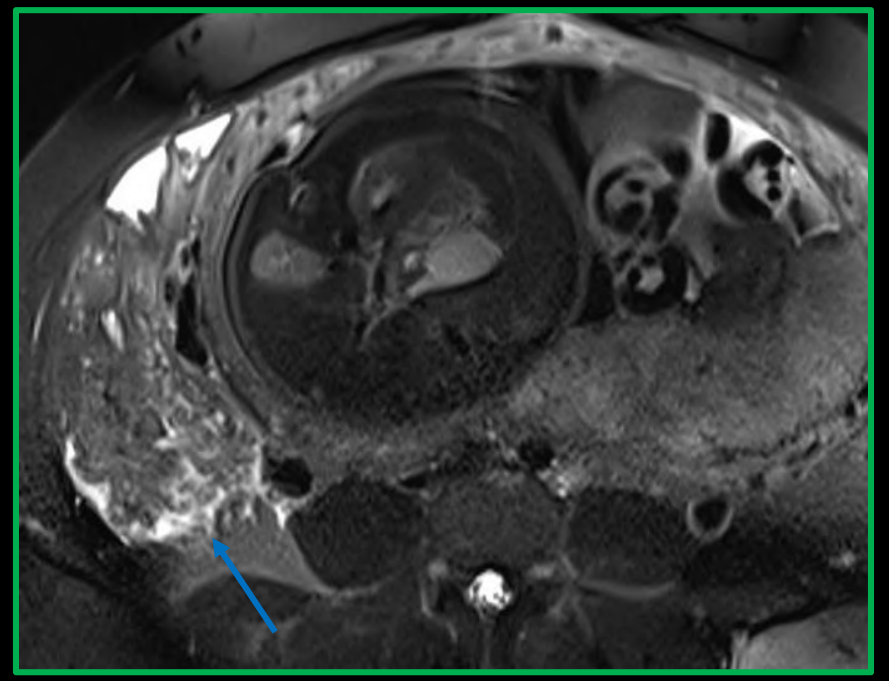
APPENDICITIS
The most common indication for emergent extra-uterine surgery during pregnancy.
Incidence: 0.02 to 0.07% of pregnant patients.
MRI sensibility 100%, specificity 94%

HEPATOBILIARY
2 to 4% of pregnant patients have cholelithiasis.
Acute cholecystitis is the 2nd most common indication for emergent extrauterine surgery during pregnancy.

Acute appendicitis



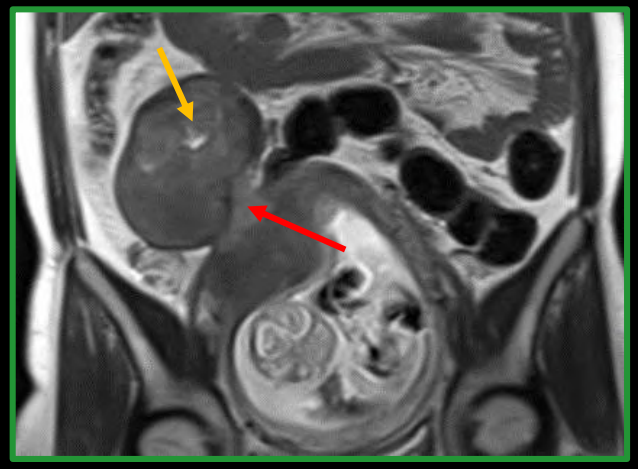
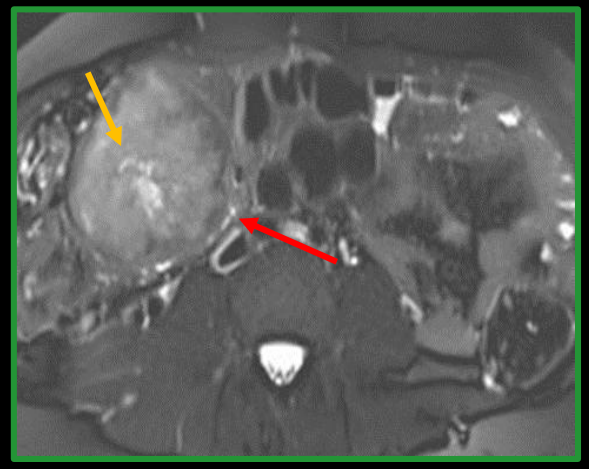
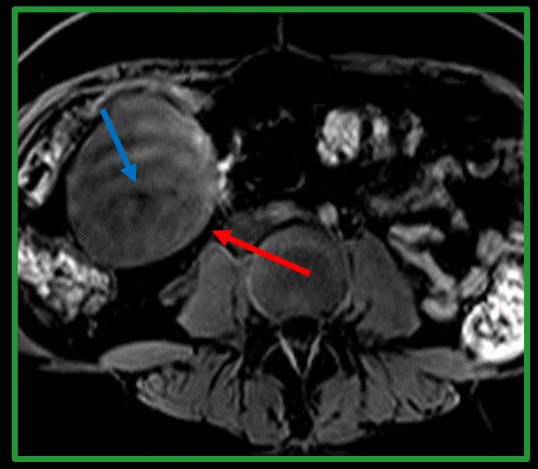




ACUTE UNCOMPLICATED APPENDICITIS

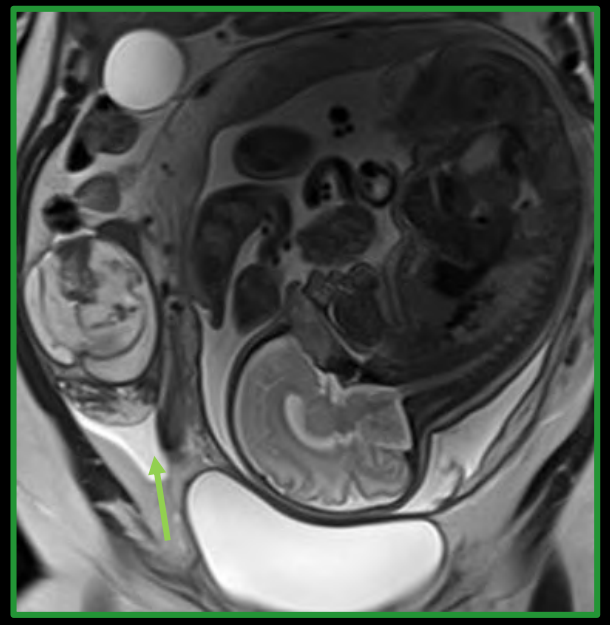
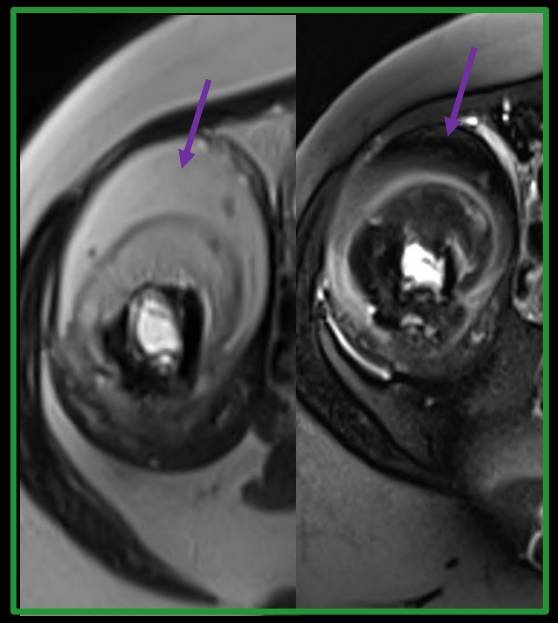
Appendix diameter >6 mm, wall thickness > 2mm (yellow arrow)
Intraluminal fluid (red arrow)
Peri-appendicular fat stranding (blue arrow)

Gynecological pathologies

POSSIBLE FIBROID TORSION

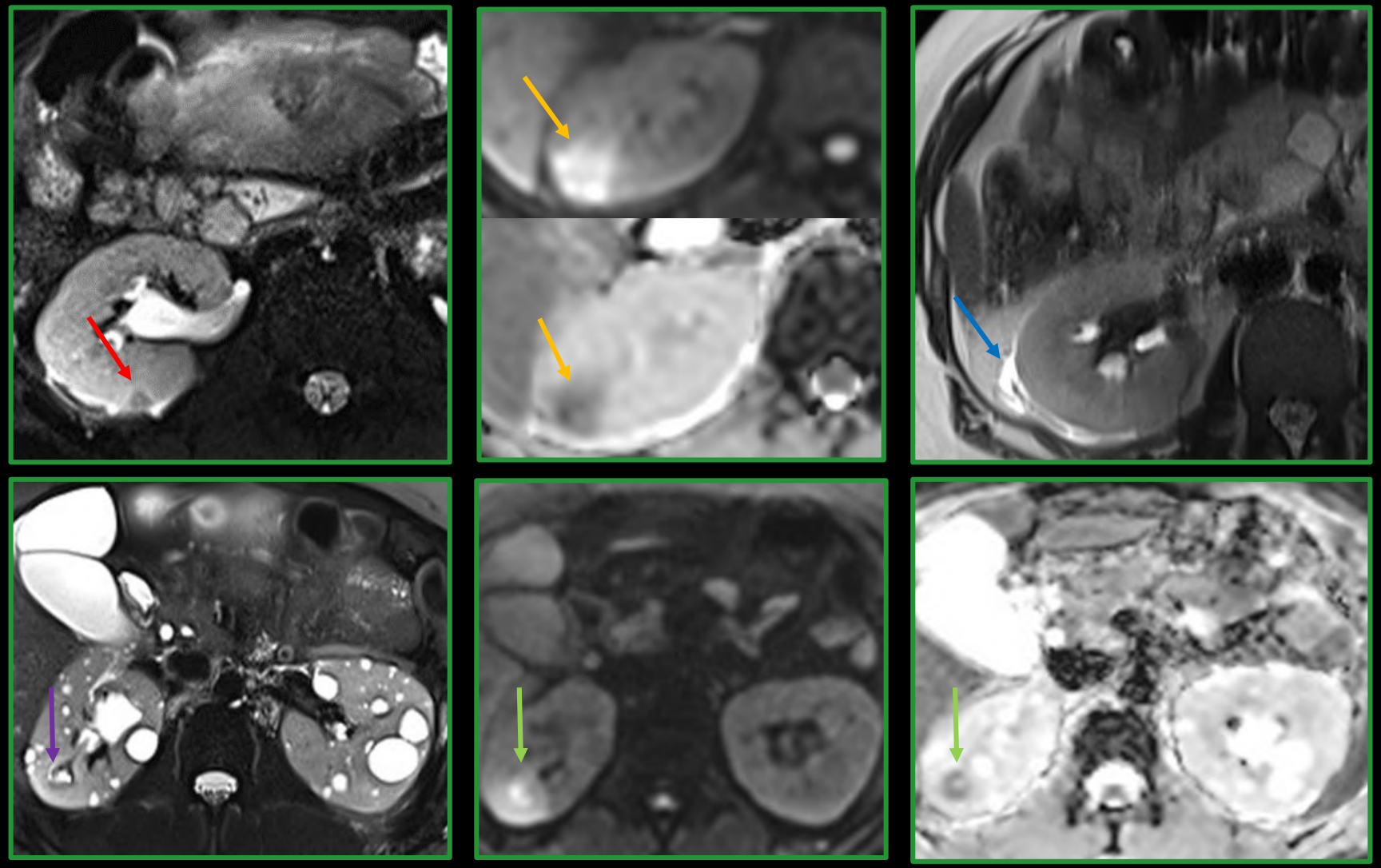
Uterine mass compatible with a large subserosal fibroma (red arrow)
Heterogenous appearance with hyperT2 (yellow arrow) and hypoT1 (blue arrow) foci

OVARIAN TORSION CAUSED BY OVARIAN TERATOMA

Enlarged right ovary (rose arrow)
Ovarian mass containing fat: hyperT2 with loss of signal in FS sequences (purple arrows)
Periovarian free fluid (green arrow)

Urinary tract pathologies



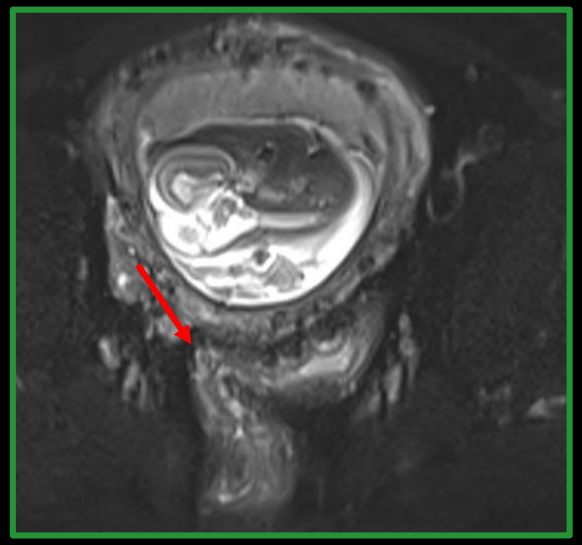
RIGHT ACUTE PYELONEPHRITIS

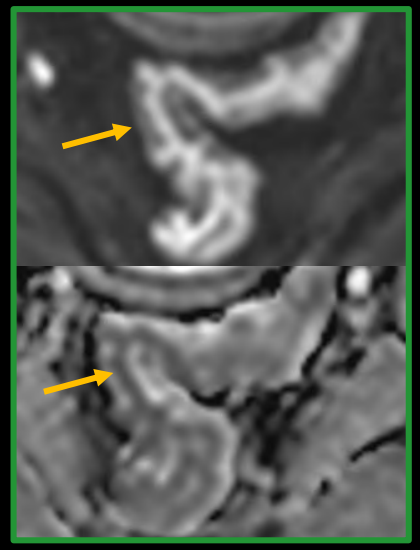
Triangular zone of low signal on T2-weighted sequence (red arrow)
Restricted diffusion (yellow arrow)
Peri-renal free fluid (blue arrow)

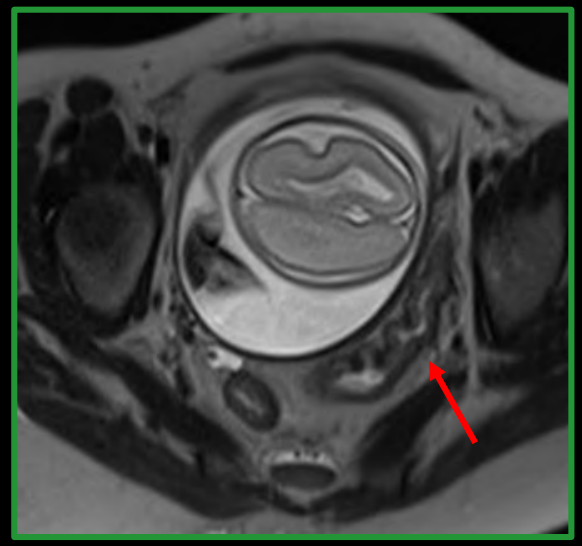
POLYCYSTIC RENAL DISEASE COMPLICATED BY A CYST INFECTION

Fluid collection(high T2) with peripheral low signal (purple arrow)
Peripheral restricted diffusion (green arrow).
These findings are consistent with a cyst infection.

Gastrointestinal pathologies



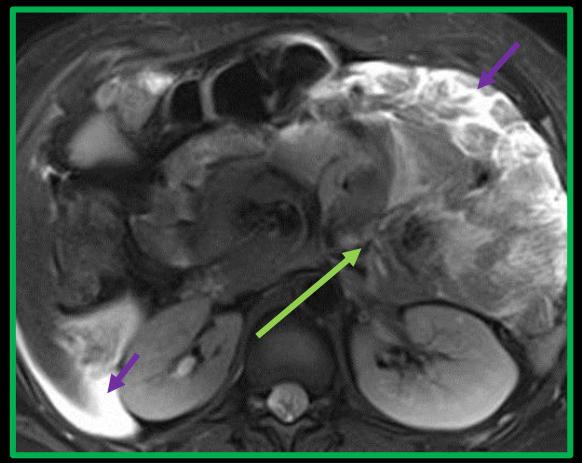


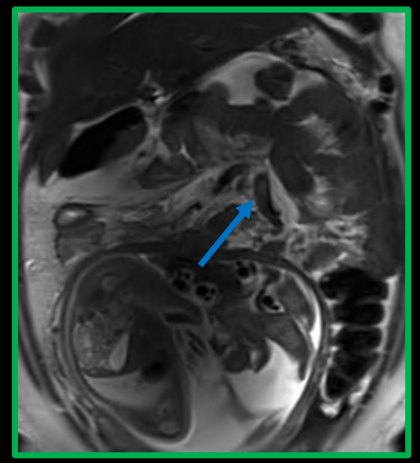


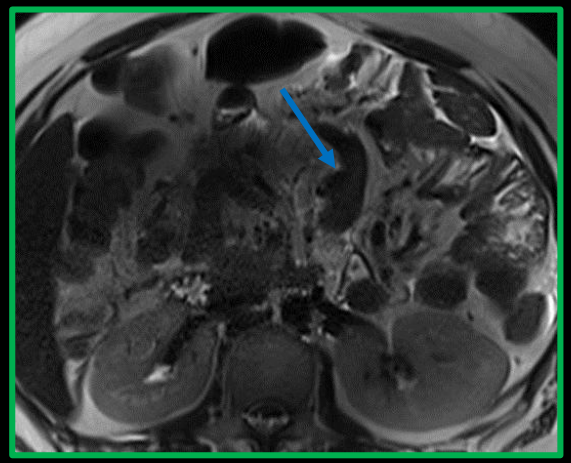
ULCERATIVE COLITIS

Diffuse sigmoid and colonic wall thickening (red arrow)
Diffusion restriction within the bowel wall (yellow arrow)

Although wall enhancement cannot be assessed due to the absence of contrast, you should consider underlying inflammatory bowel disease.



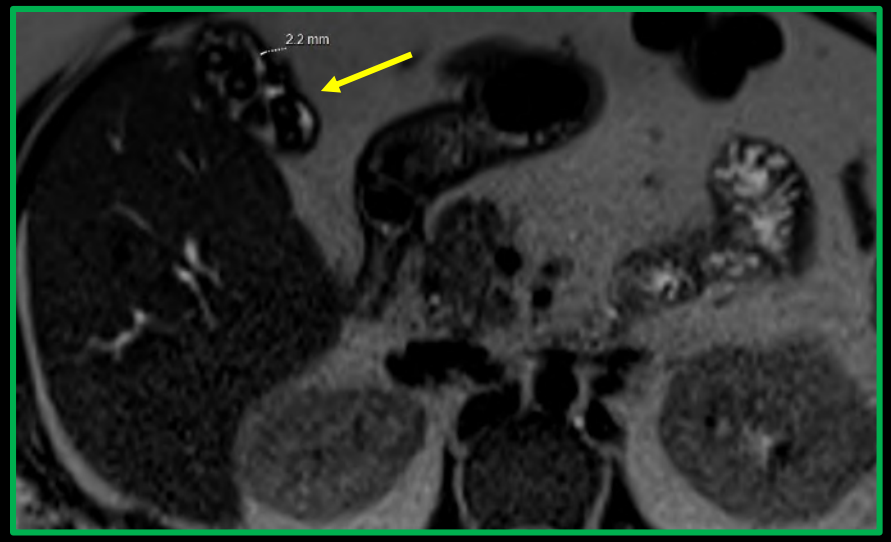


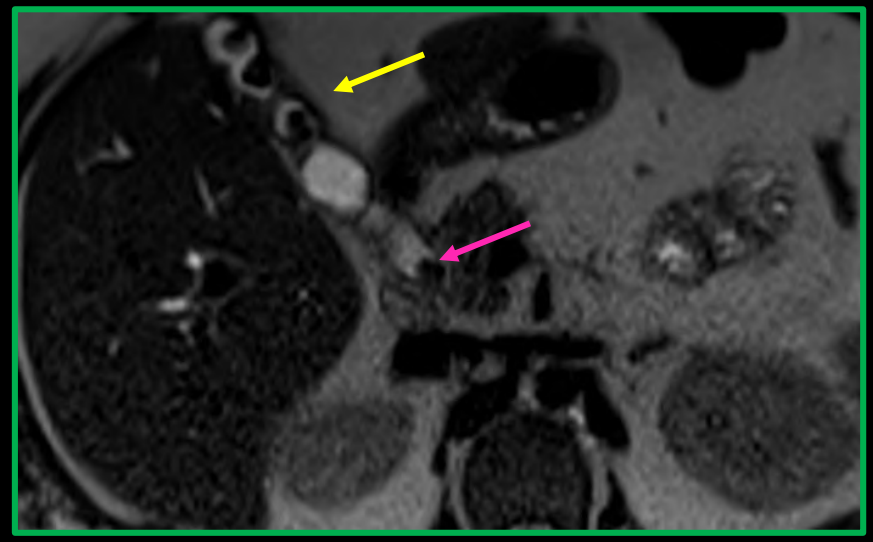


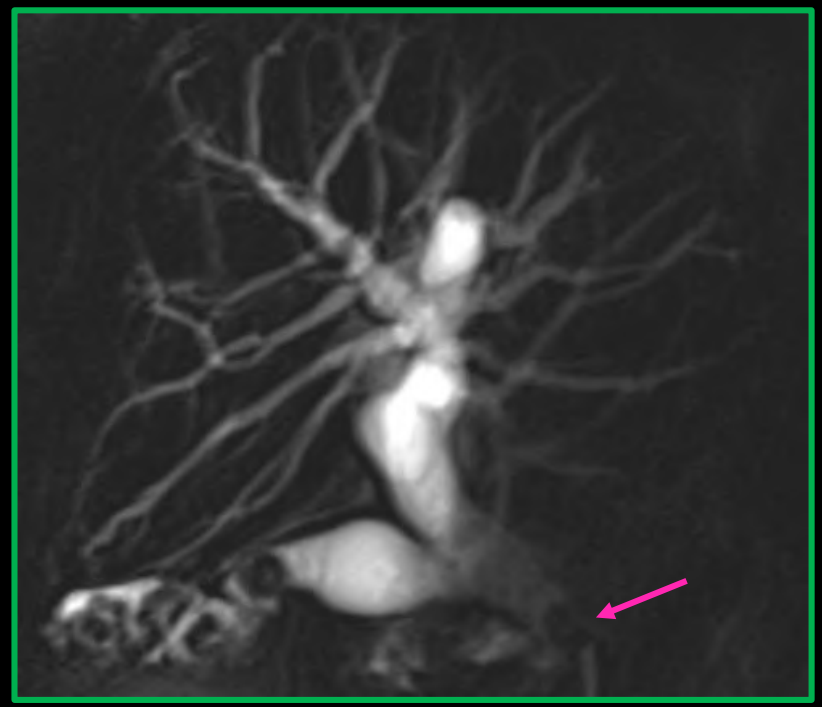
INTERNAL HERNIA DUE TO GASTRIC BYPASS SURGERY -PETERSON HERNIA-

Small bowel loops displaced into the left flank (green arrow)
Intraperitoneal free fluid (purple arrows)
Dilated mesenteric veins (blue arrows).

Hepatobiliary pathologies







CHOLEDOCHOLITHIASIS

Multiple gallbladder stones (yellow arrows) and obstructing calculus in the common bile duct (pink arrows)
Proximal biliary ductal dilatation (blue arrows)
No signs of cholecystitis: thin gallbladder wall, absence of peri-cholecystic fat stranding and fluid.

Conclusion

- The radiologist must be aware of the anatomical changes occurring in the abdomen during the 2nd and 3rd trimester of pregnancy.
- Although acute appendicitis is the most frequently suspected non-pregnancy related acute abdominal disorder, a wide range of other pathologies may occur, especially of biliary, intestinal or renal origin.
- If ultrasound is unconclusive, a standardized comprehensive multiplanar MR protocol provides an overview of the whole abdominal cavity and may, thus, allow confirmation or exclusion of the various differential diagnoses.

References

1. American College of Radiology. Manual on Contrast Media 2021
2. Association Between MRI Exposure During Pregnancy and Fetal and Childhood Outcomes. JAMA. 2016;316(9):952-961
3. Pedrosa I, Levine D, Eyvazzadeh AD, Siewert B, Ngo L, Rofsky NM. MR imaging evaluation of acute appendicitis in pregnancy. Radiology 2006; 238(3):891–899
4. Ali, A., Beckett, K. & Flink, C. Emergent MRI for acute abdominal pain in pregnancy—review of common pathology and imaging appearance. Emerg Radiol 27, 205–214 (2020).