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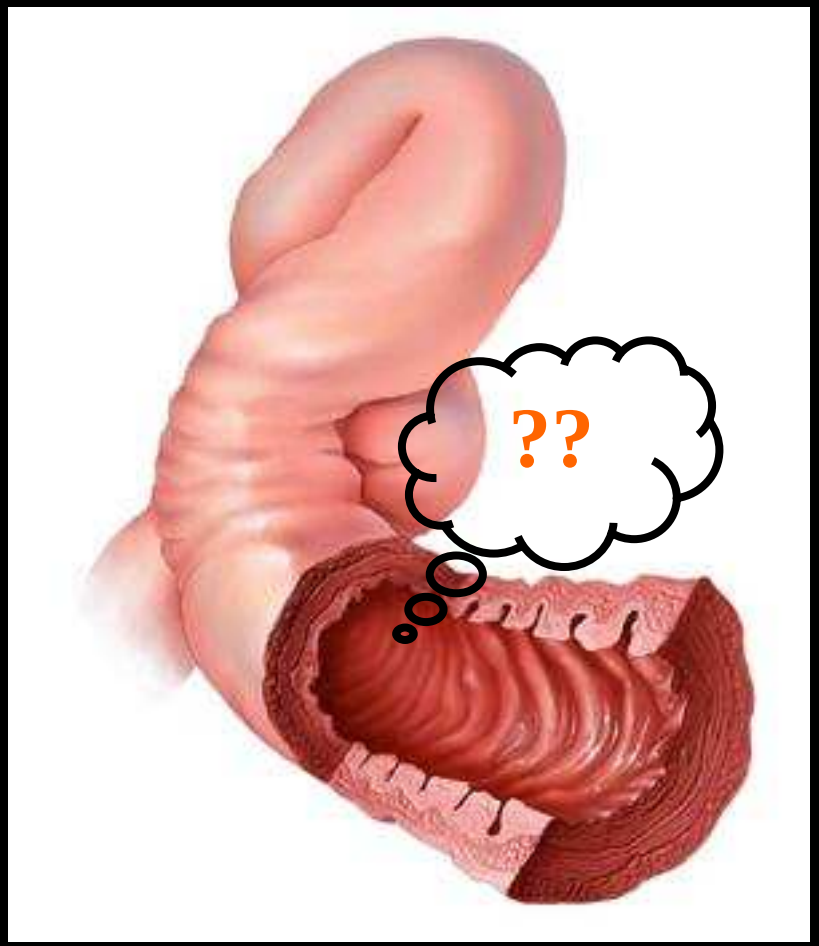
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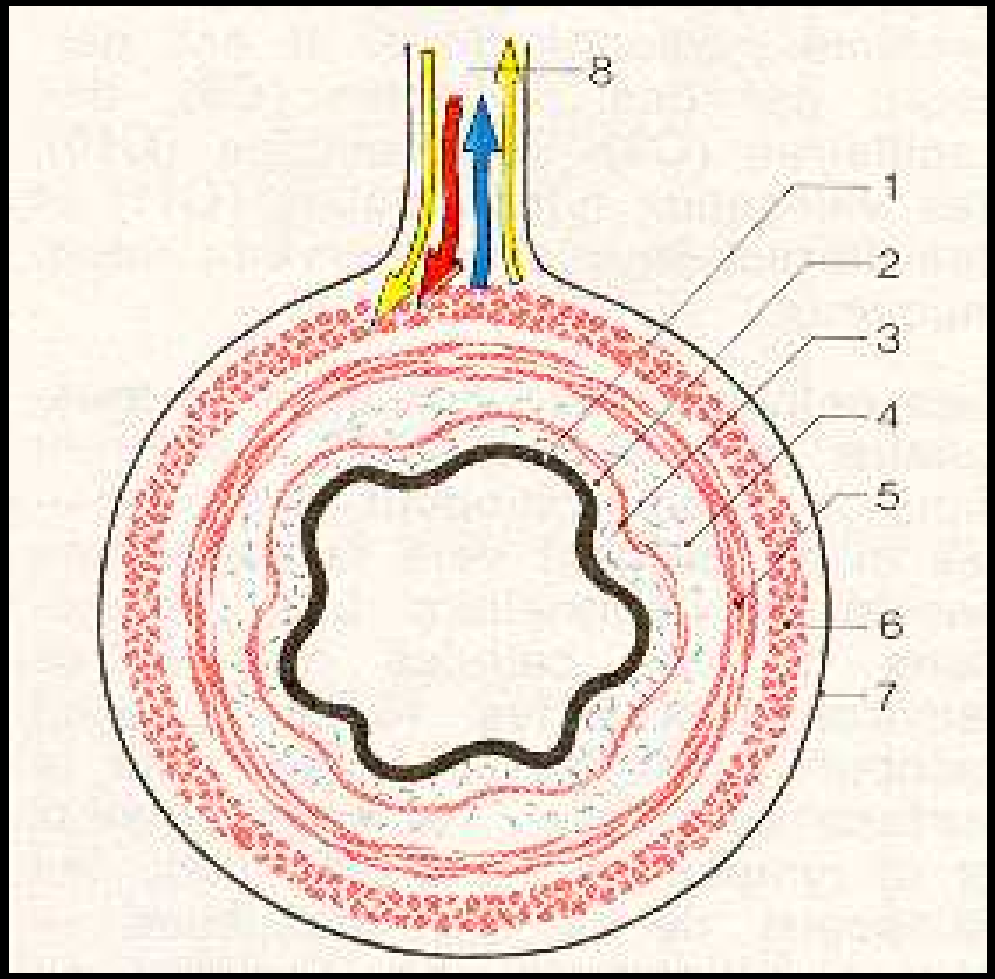
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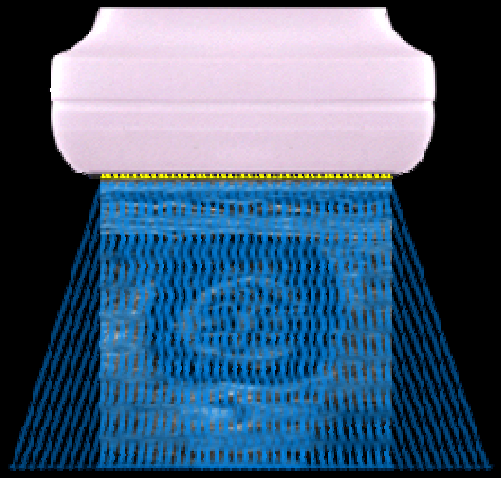
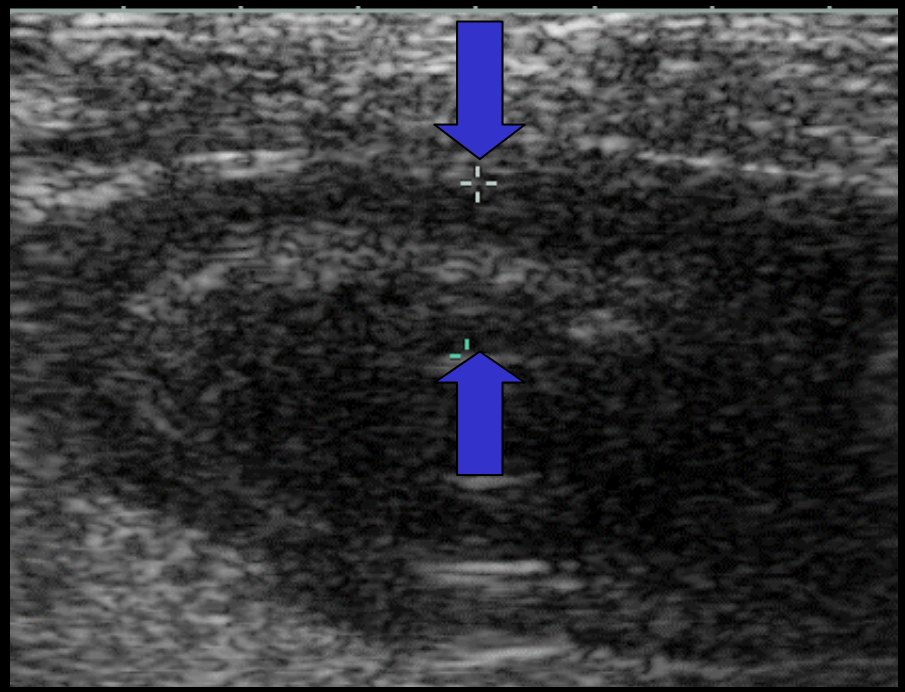
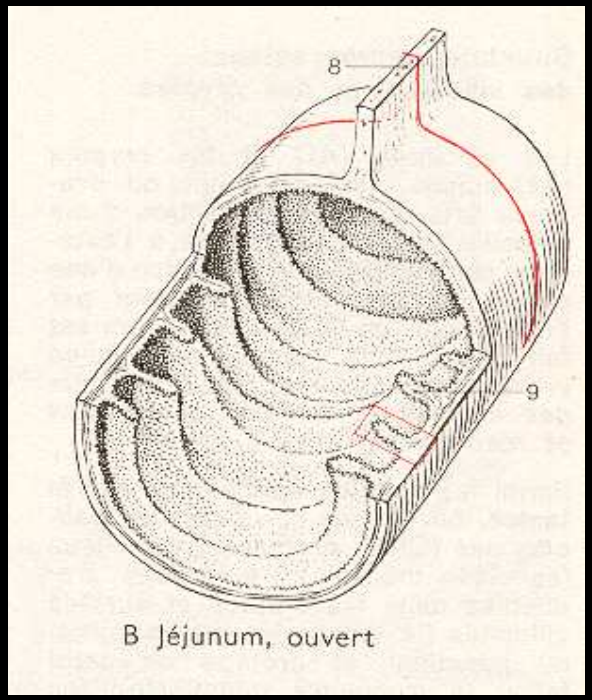
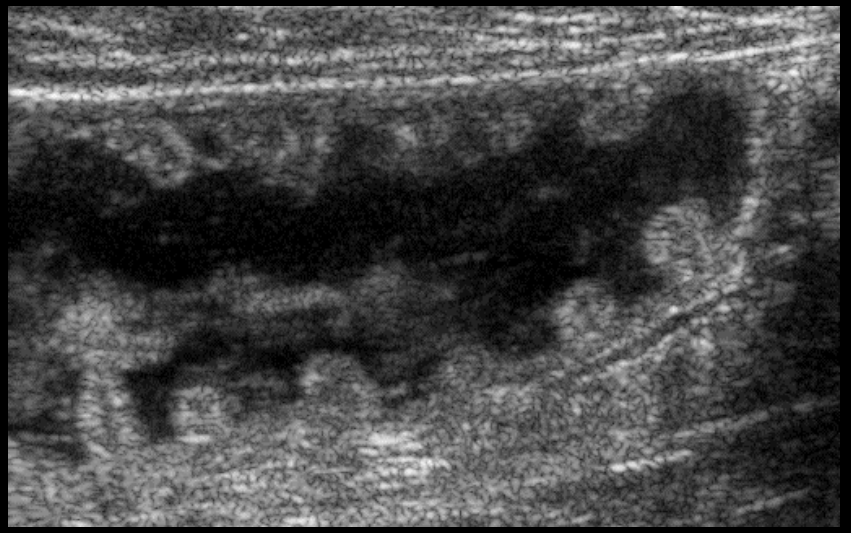
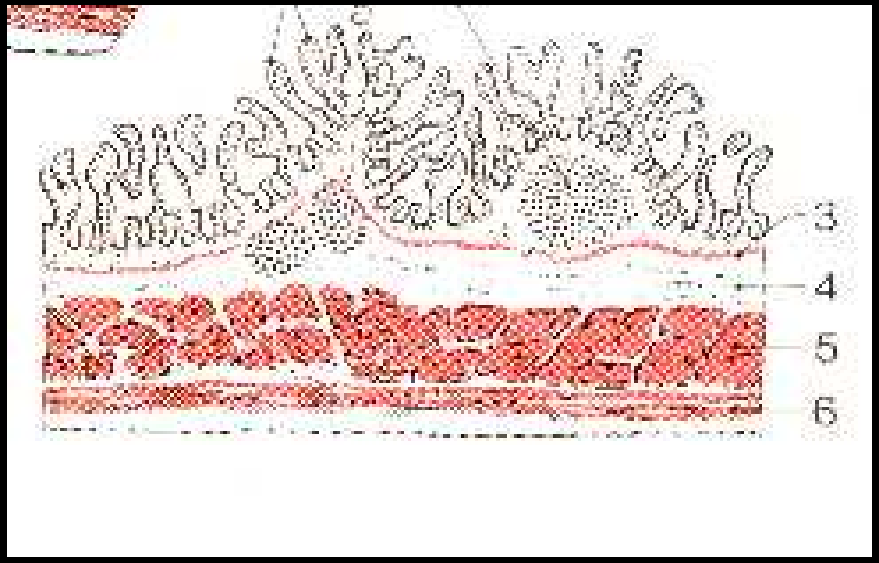




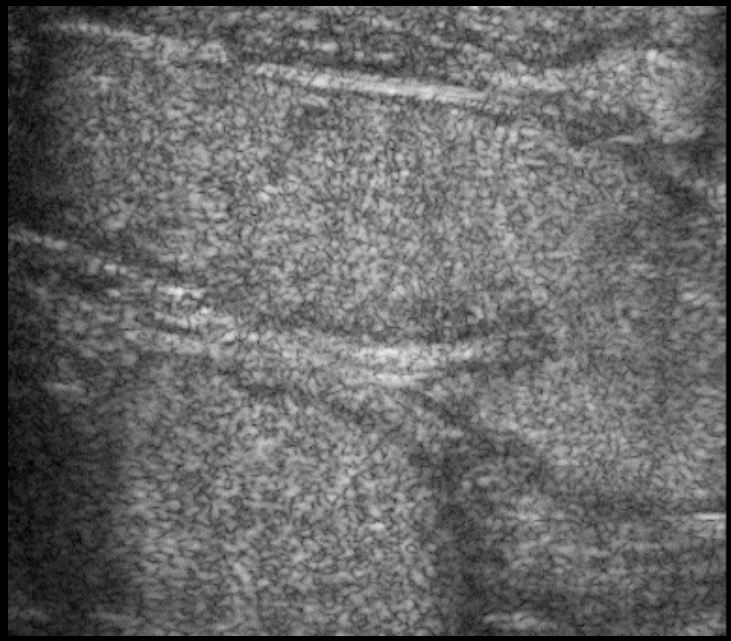


Jejunum



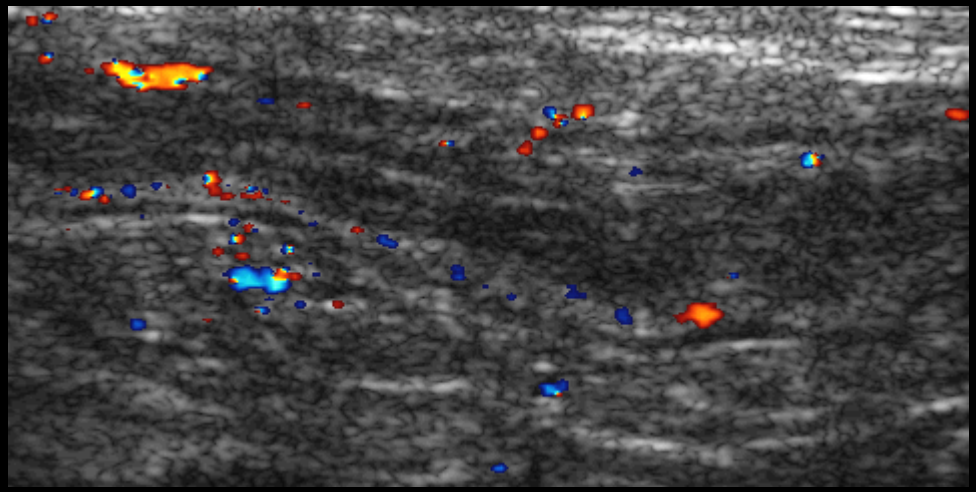


Ileon

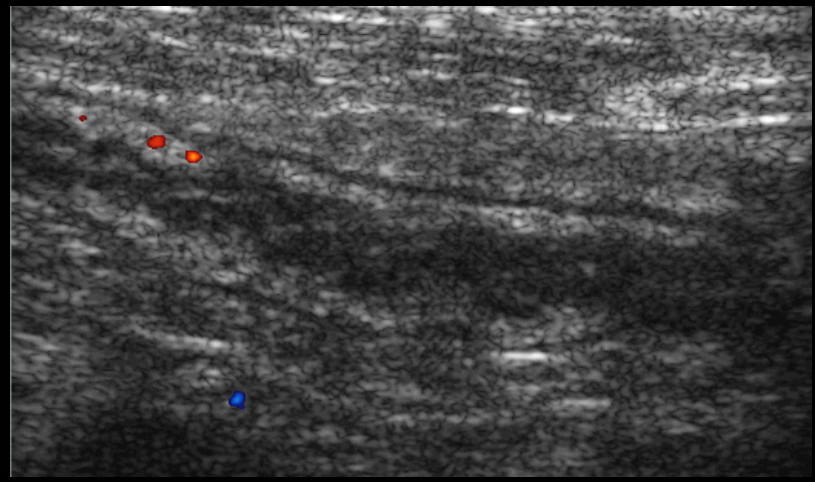


Intestin grêle

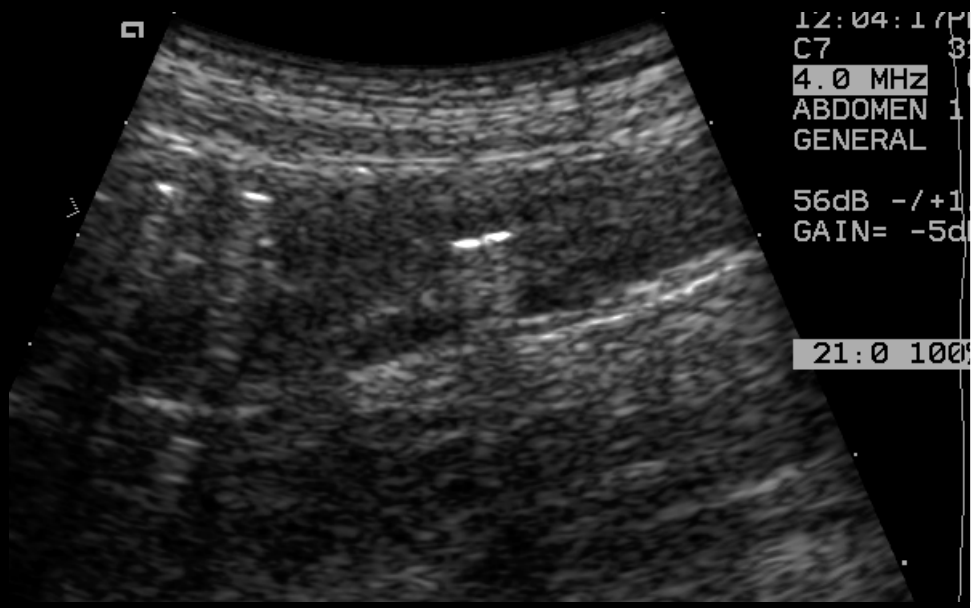
Paroi < 3 mm

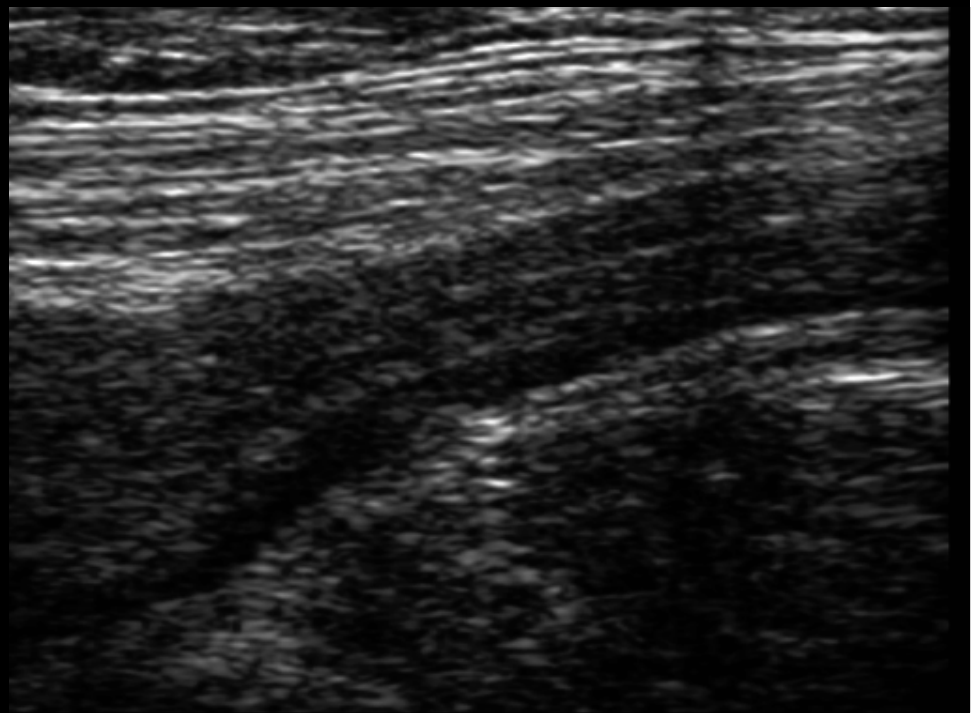


Stratification



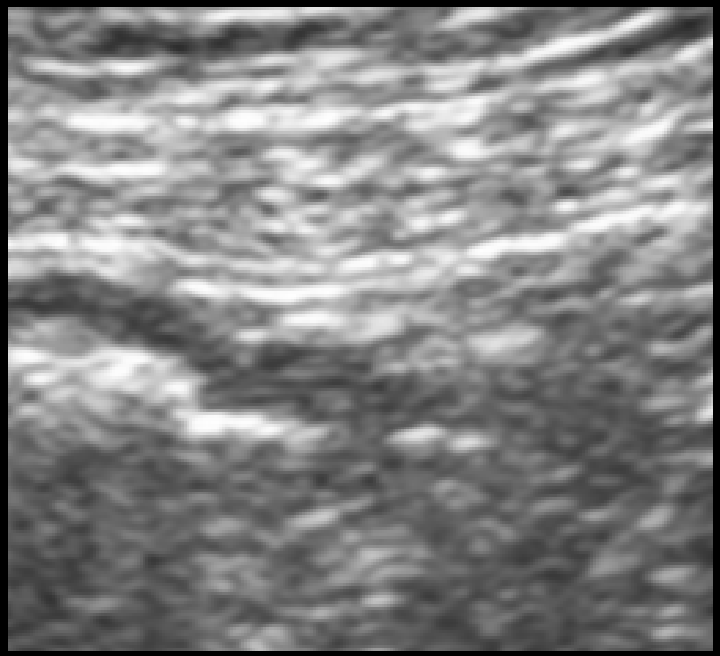
Le colon normal



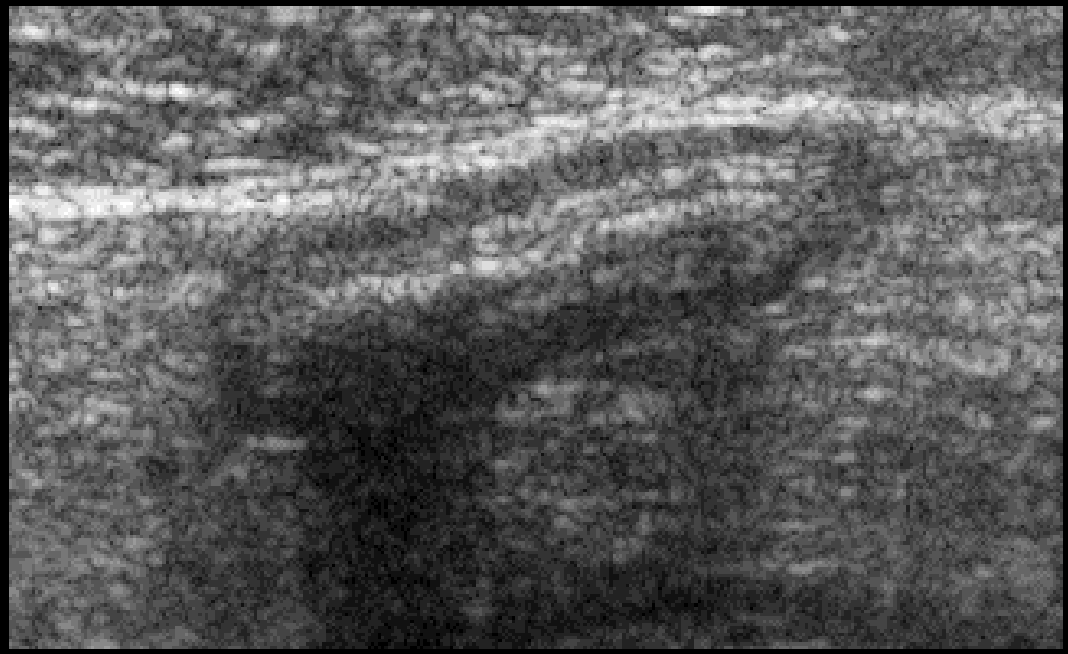


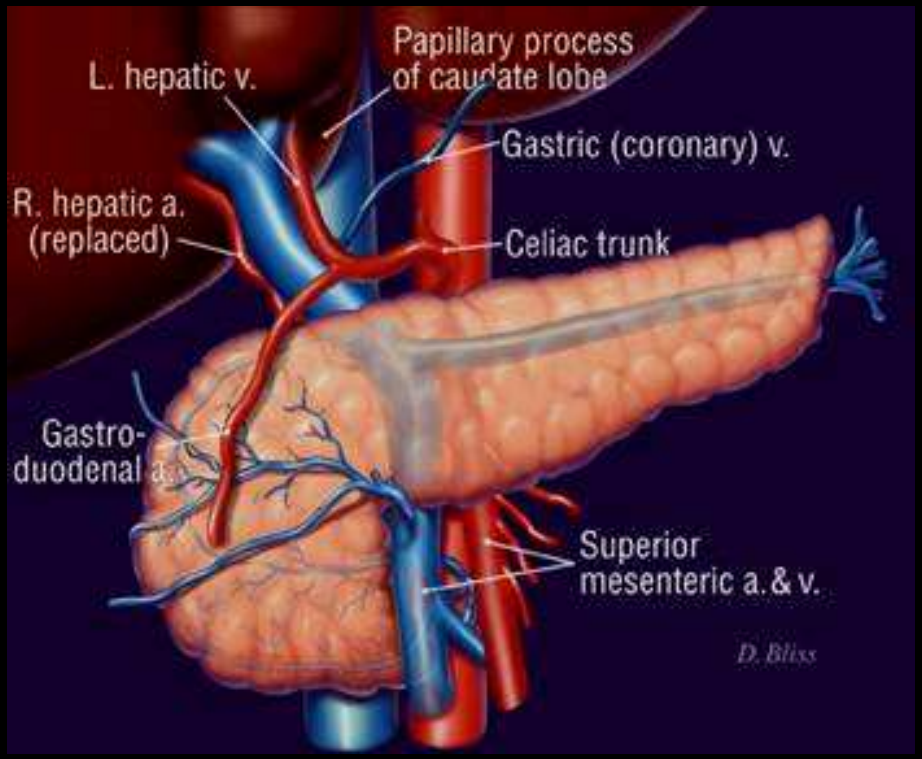
Le colon normal

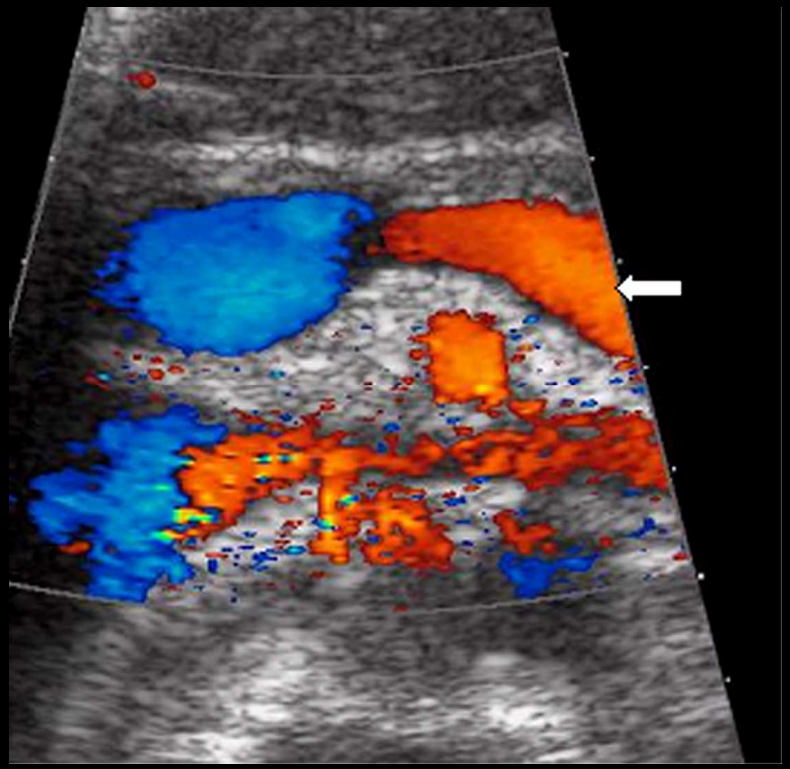
Epaisseur < 5 mm

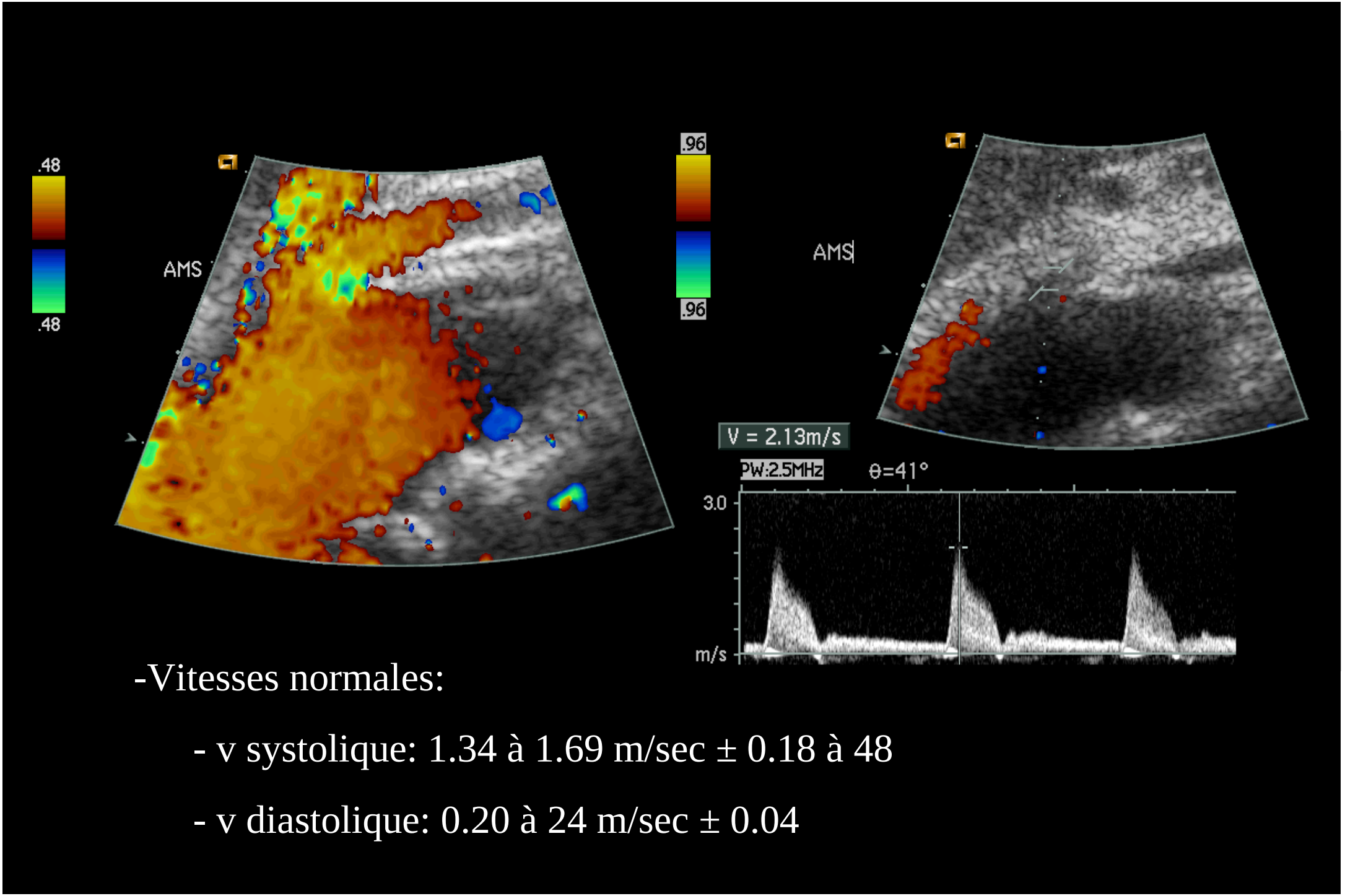


Stratification



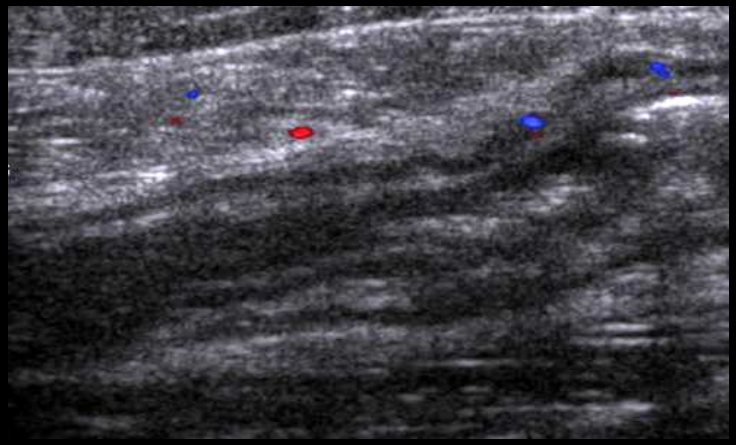

L. hepatic v.
Papillary process
of caudate lobe
Gastric (coronary) v.
R. hepatic a.
(replaced)
Celiac trunk
Gastro-
duodenal a.
Superior
mesenteric a. & v.
D. Bliss

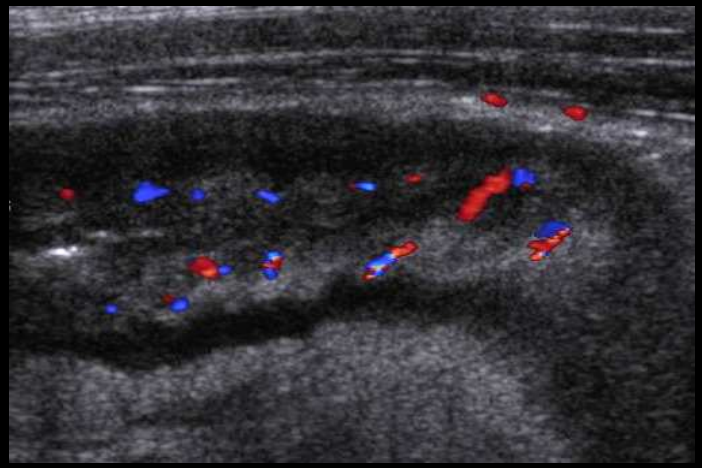


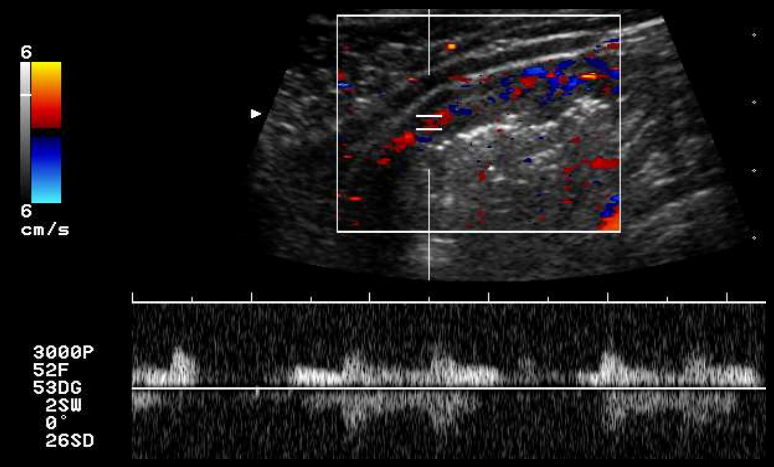


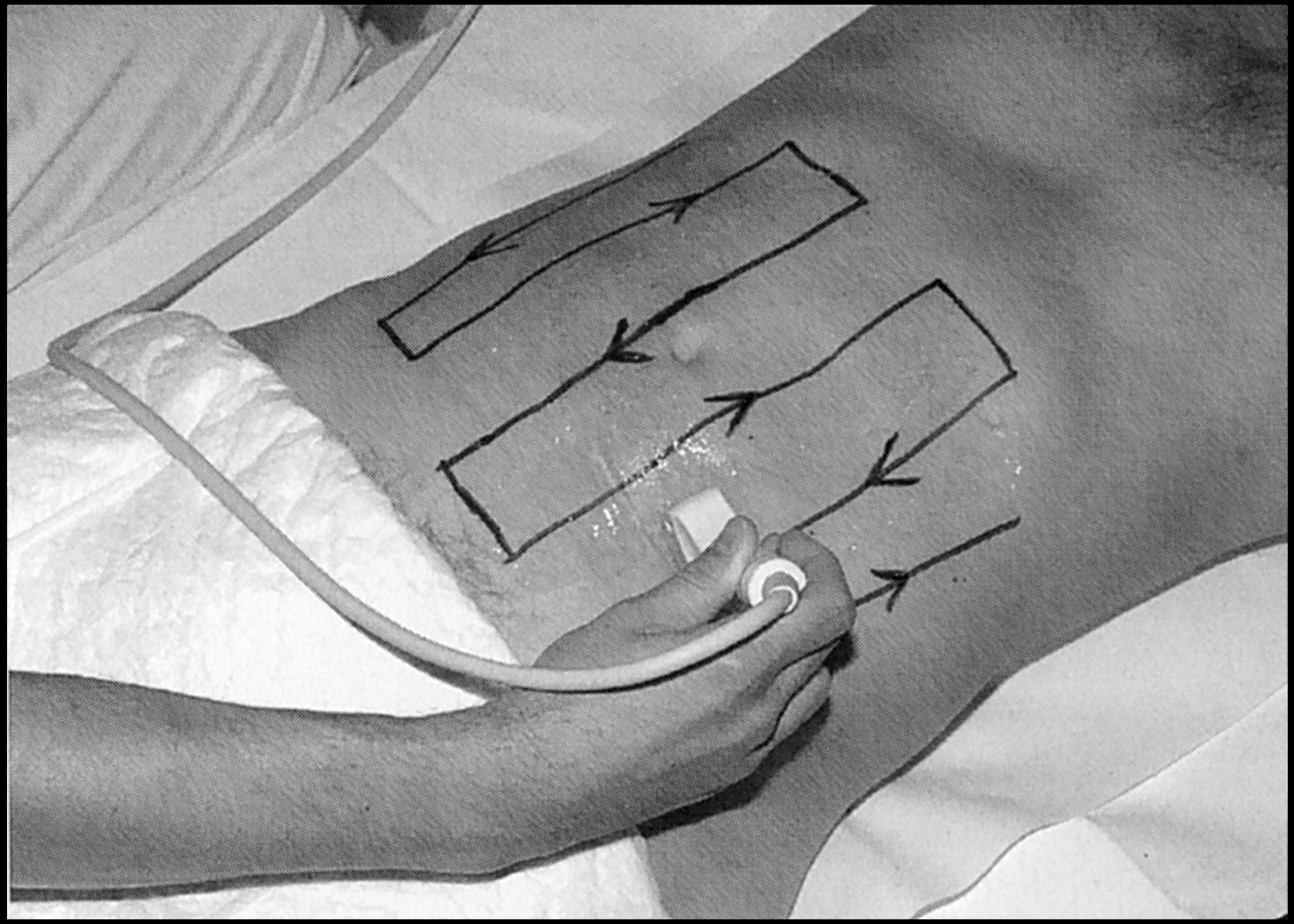
-Vitesses normales:

- v systolique: 1.34 à 1.69 m/sec ± 0.18 à 48
- v diastolique: 0.20 à 24 m/sec ± 0.04






6
6
cm/s
3000P
52F
53DG
2SW
0°
26SD



Sturm et al Eur Radiol, 2004

IBD et US

Table 3. Diagnostic value of ultrasound detection of inflammatory bowel wall thickening in 232 patients studied.

Sensitivity	90.3%
Specificity	88.4%
PV positive	95.5%
PV negative	79.2%
Overall accuracy	90.5%
Prevalence of disease	71%

PV, predictive value.

Schwerk, 1992, Eur J Gastroenterol

IBD et US

- US identifie 95.7 % des lésions de Crohn
  - Sensibilité de 88.4 à 96 %
  - Spécificité de 93 %
- US identifie 86.2 % des lésions de RCUH

Sturm et al, Eur Radiol 2004

Tarjan et al, Eur J Radiol, 2000

Table 2. Evaluation of ultrasound (US) examinations regarding the detection of inflammatory thickened bowel segments in the study population of 232 patients.

Diagnoses	(n)	US-true positive	US-true negative	US-false positive	US-false negative
Crohn's disease	128	110	11	2	5
Ulcerative colitis	33	25	4	–	4
Enterocolitis and undeterminate colitis	21	14	–	–	7
Controls	50	–	45	5	–

n, number of patients.

Schwerk, 1992, Eur J Gastroenterol

US et IBD

- Diagnostic
  - Diagnostic différentiel
  - Extension
- Complications
- Activité
- Pronostic

Table 7. Correlation of prominent histologic features and echomorphologic/dynamic ultrasound findings in different states of inflammatory bowel disease.

	Acute (mucosal) inflammation	Prolonged (transmural) inflammation	Chronic (transmural) Inflammation
Prominent histological features	Oedema of mucosa, submucosa, serosa	Increased cellular infiltration; mural spread of inflammation	Fibrosis; scarring; neovascularization; destruction of anatomic layers; transmural spread of inflammation
Echographic patterns of the wall	Slight thickening; visualization of individual ultrasonic layers; luminal narrowing ±	Prominent thickening; accentuated ultrasonic layers; decreased overall echogenicity; luminal narrowing	Prominent thickening; accentuated or poorly defined individual ultrasonic layers; decreased echogenicity; luminal narrowing; hyperechoic halo
Motility of segments involved	Normal or hypermotile peristalsis	Decreased or absent peristalsis	Immobile stiff-walled loop

Schwerk, 1992, Eur J Gastroenterol

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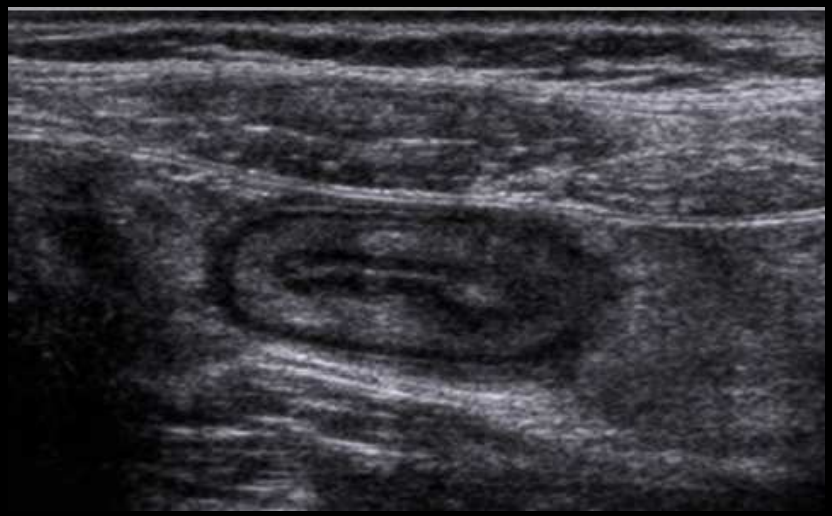

Schwerk, 1992, Eur J Gastroenterol

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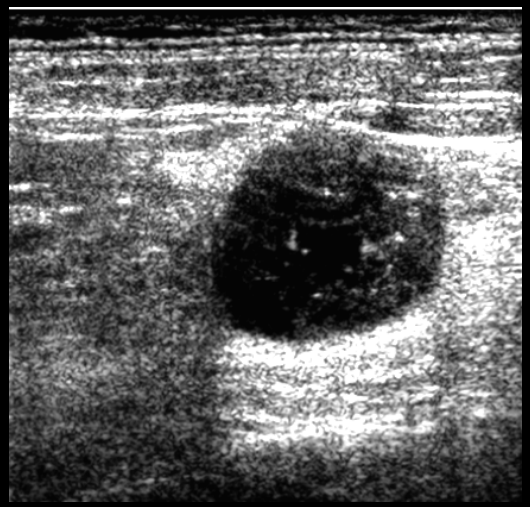

Schwerk, 1992, Eur J Gastroenterol

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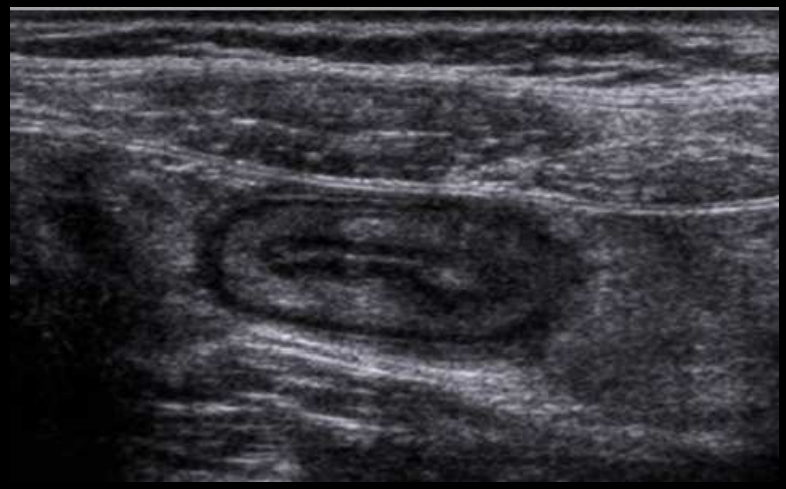
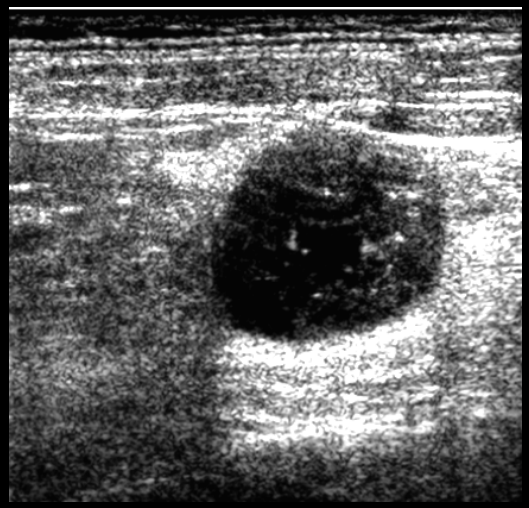
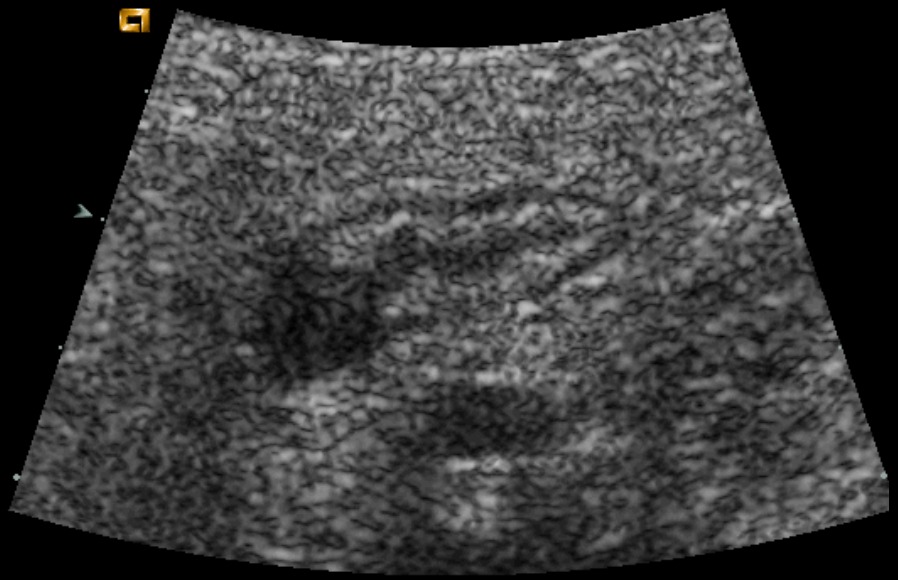
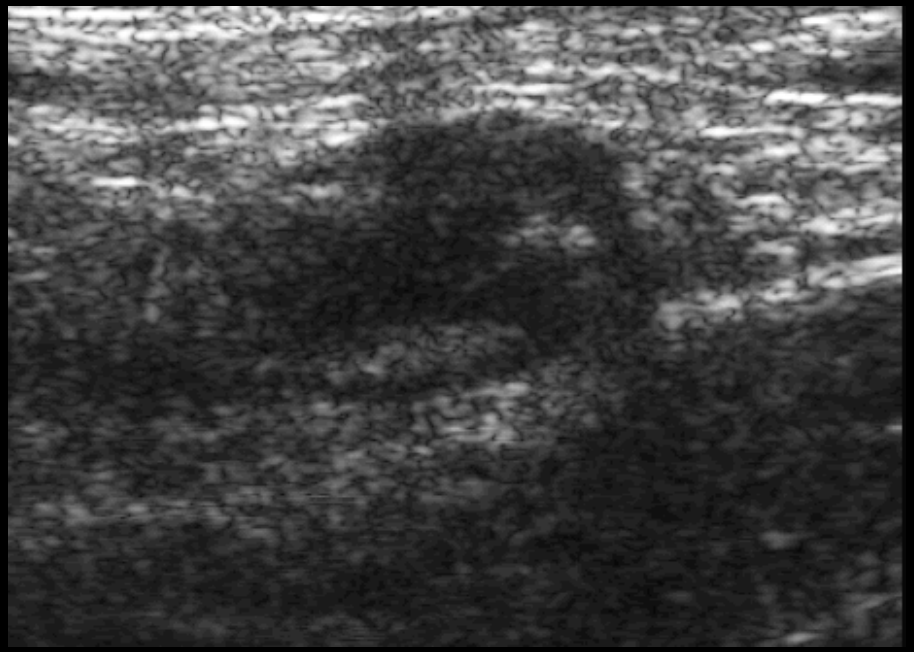
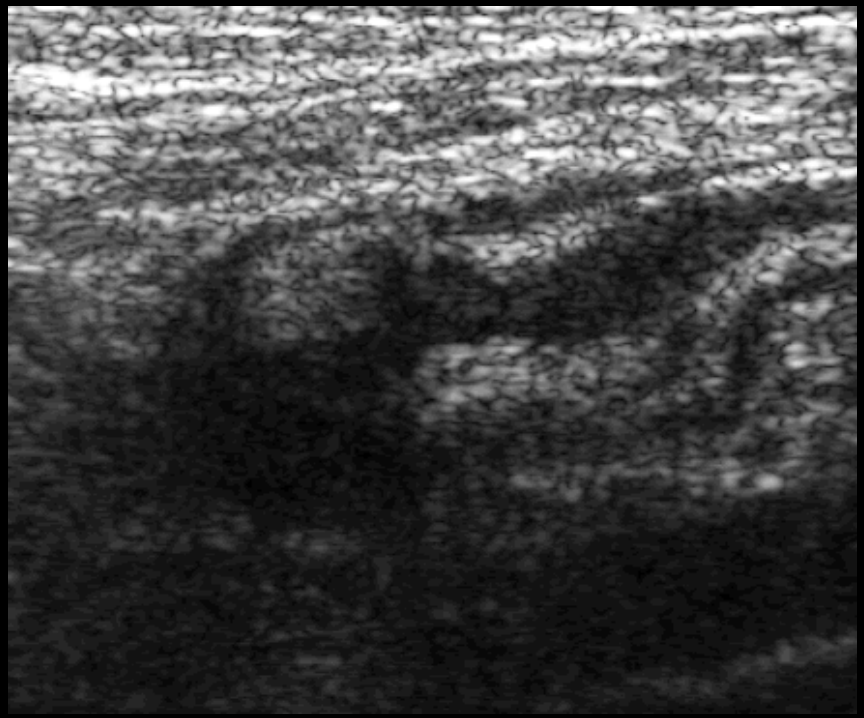




Schwerk, 1992, Eur J Gastroenterol

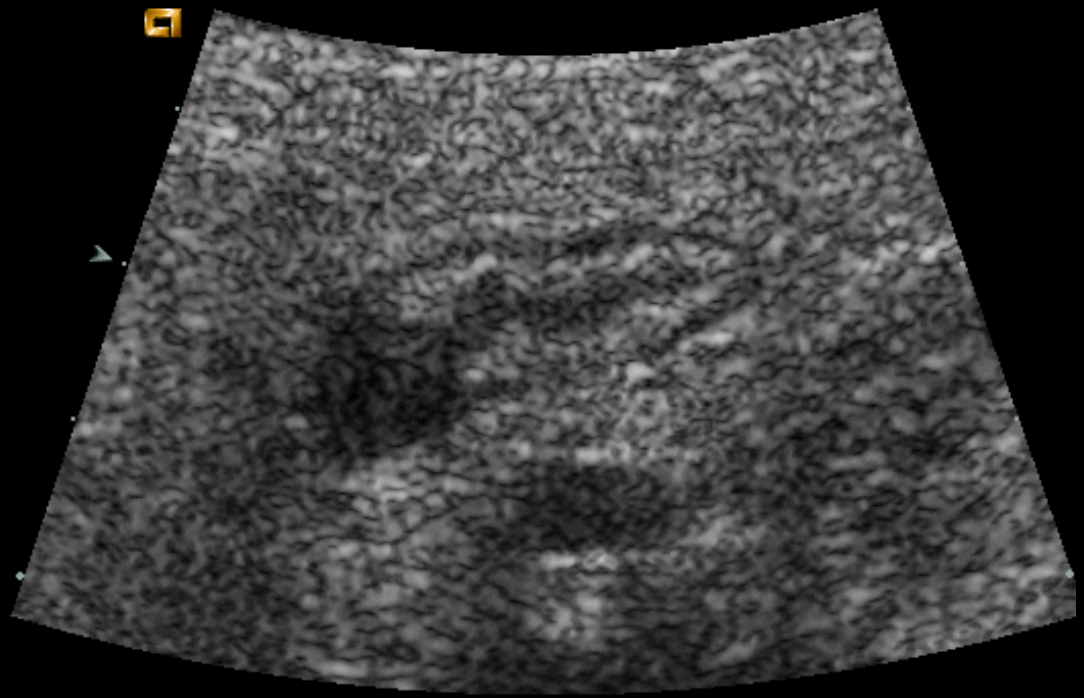


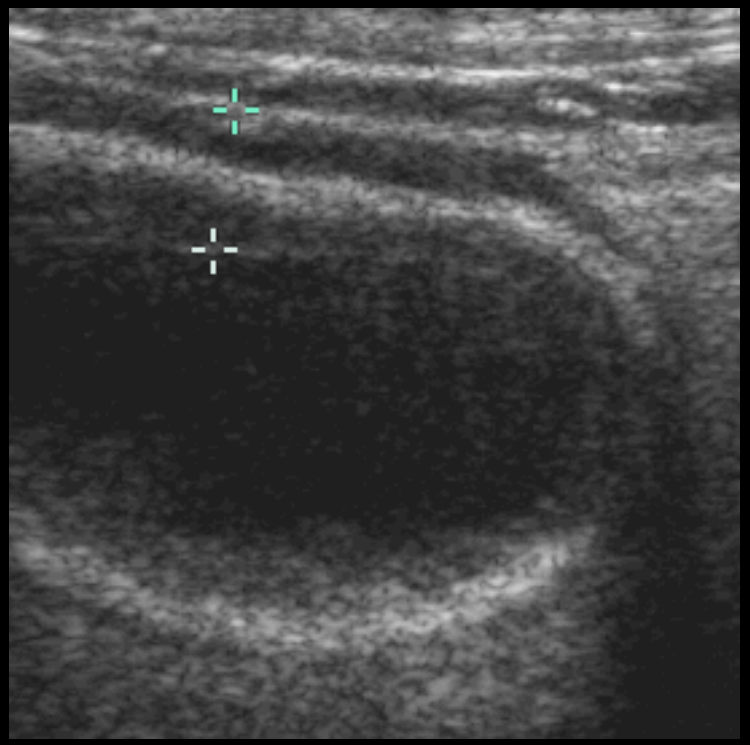




RCUH vs Crohn

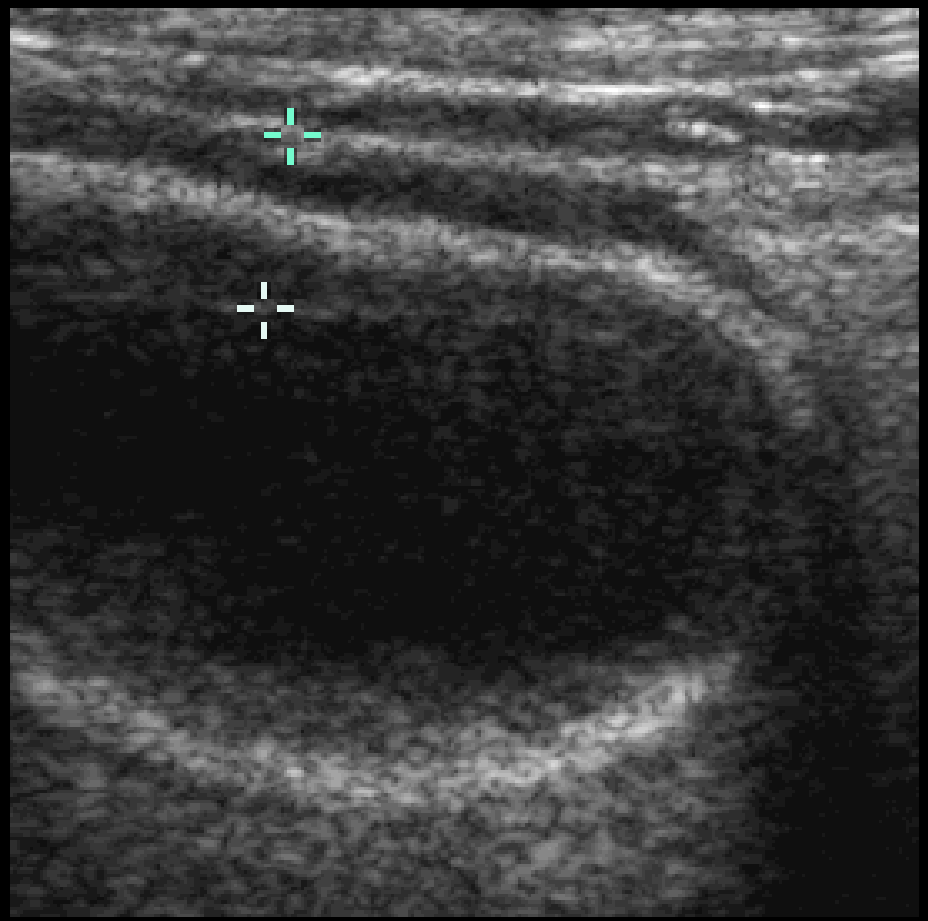
- Aspect de la paroi
- Topographie des lésions
- Anomalies péridigestives
  - Fistules
  - Abcès



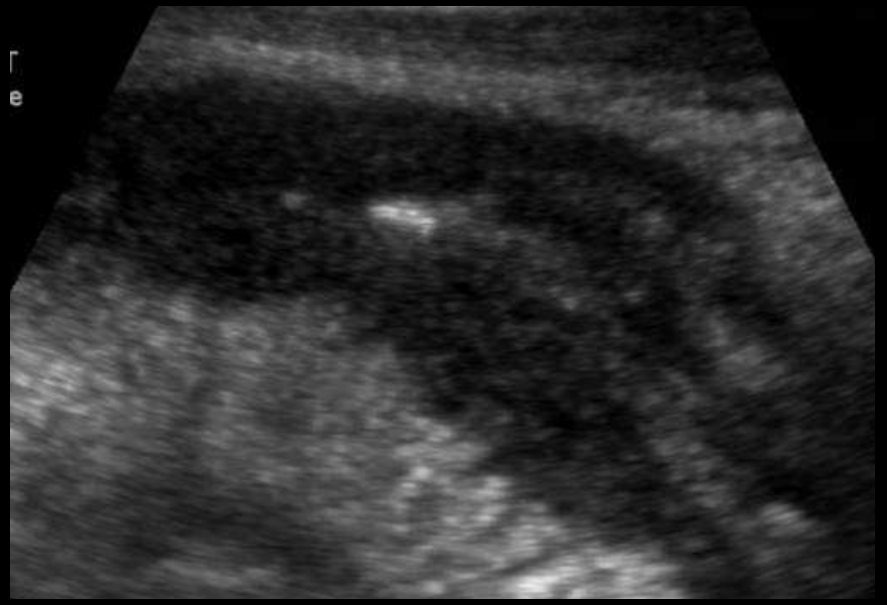


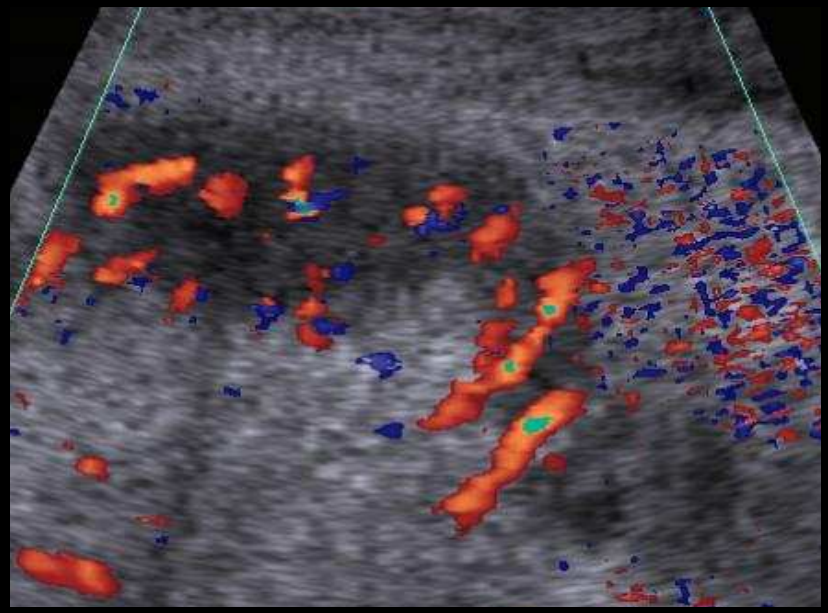
Crohn

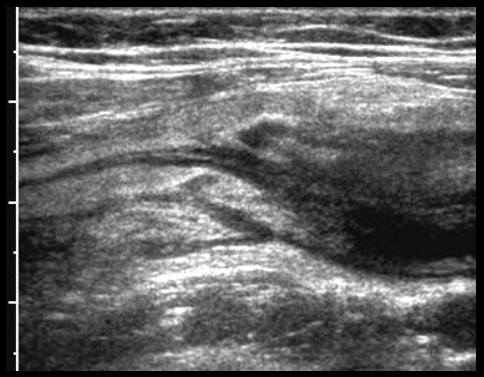
RCUH

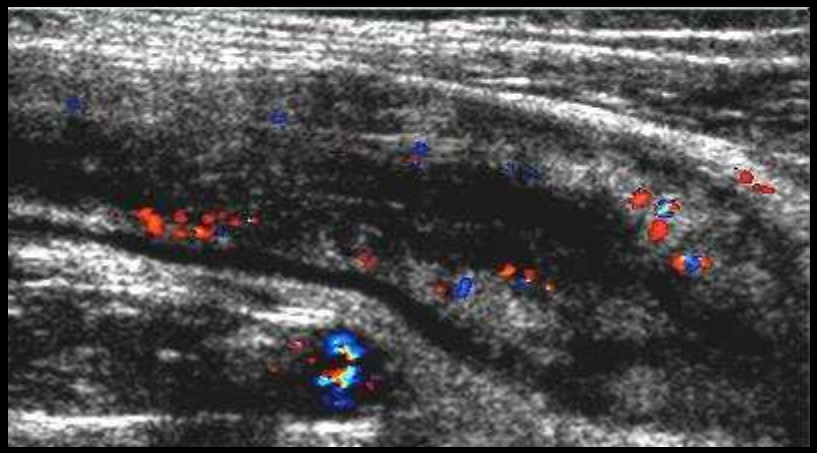


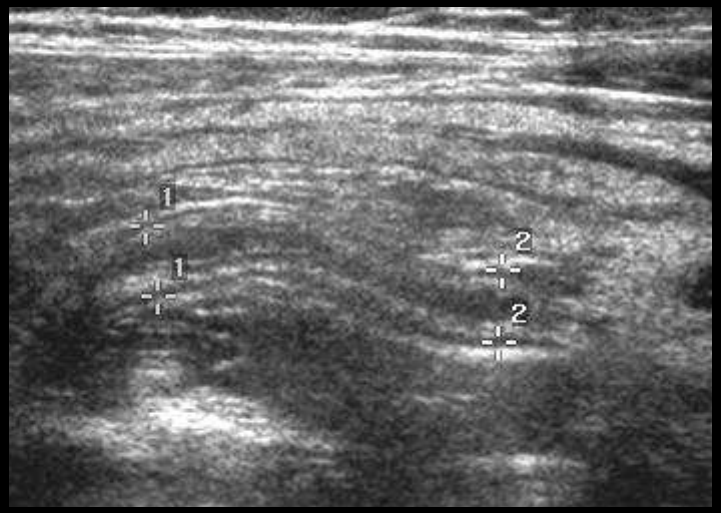
Intramural layer of fat
and thickened walls.

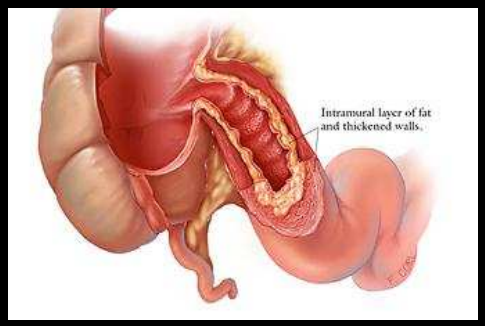


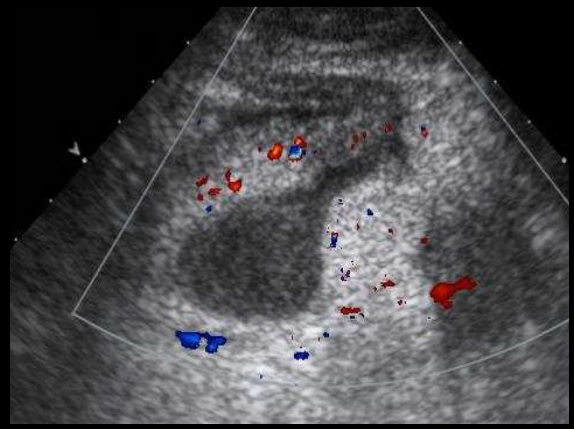








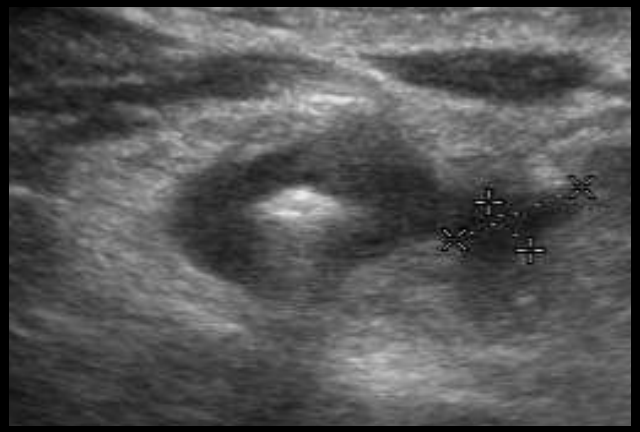


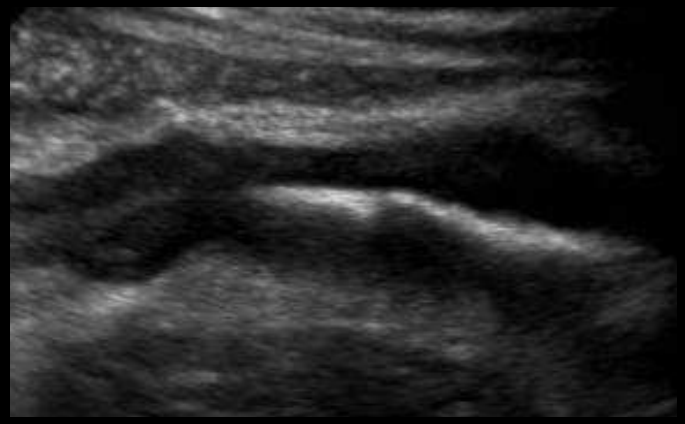


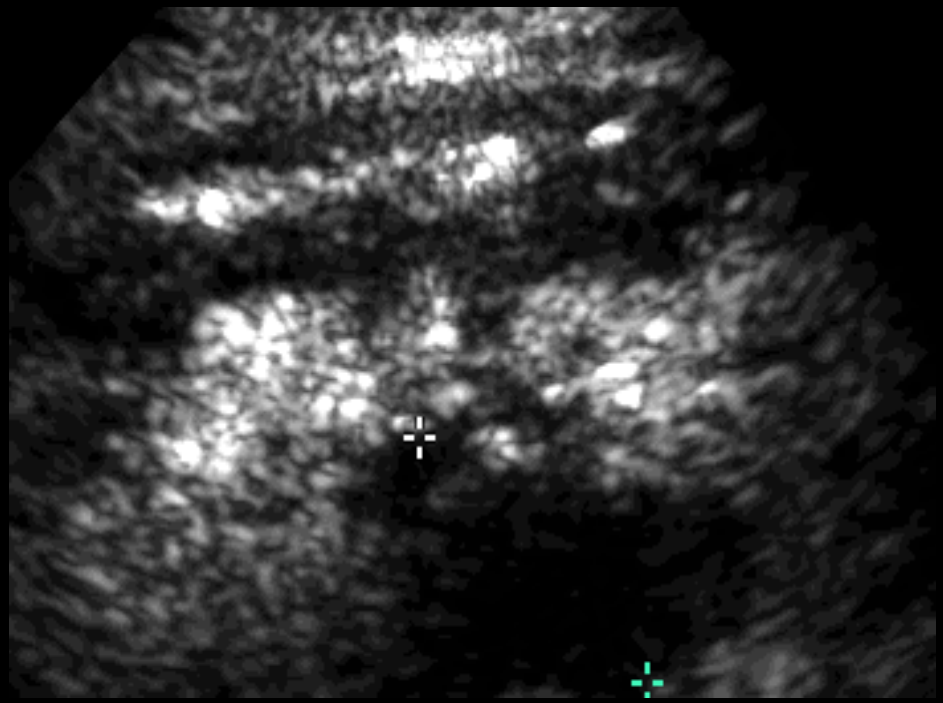
- **Épaississement iléal en cas de Crohn**
  - **Sous-muqueuse hypoE : 68 %**
  - **Prolifération graisseuse: 74 %**
  - **Atteinte appendiculaire: 8.5 %**

Sturm et al, Eur Radiol 2004

5





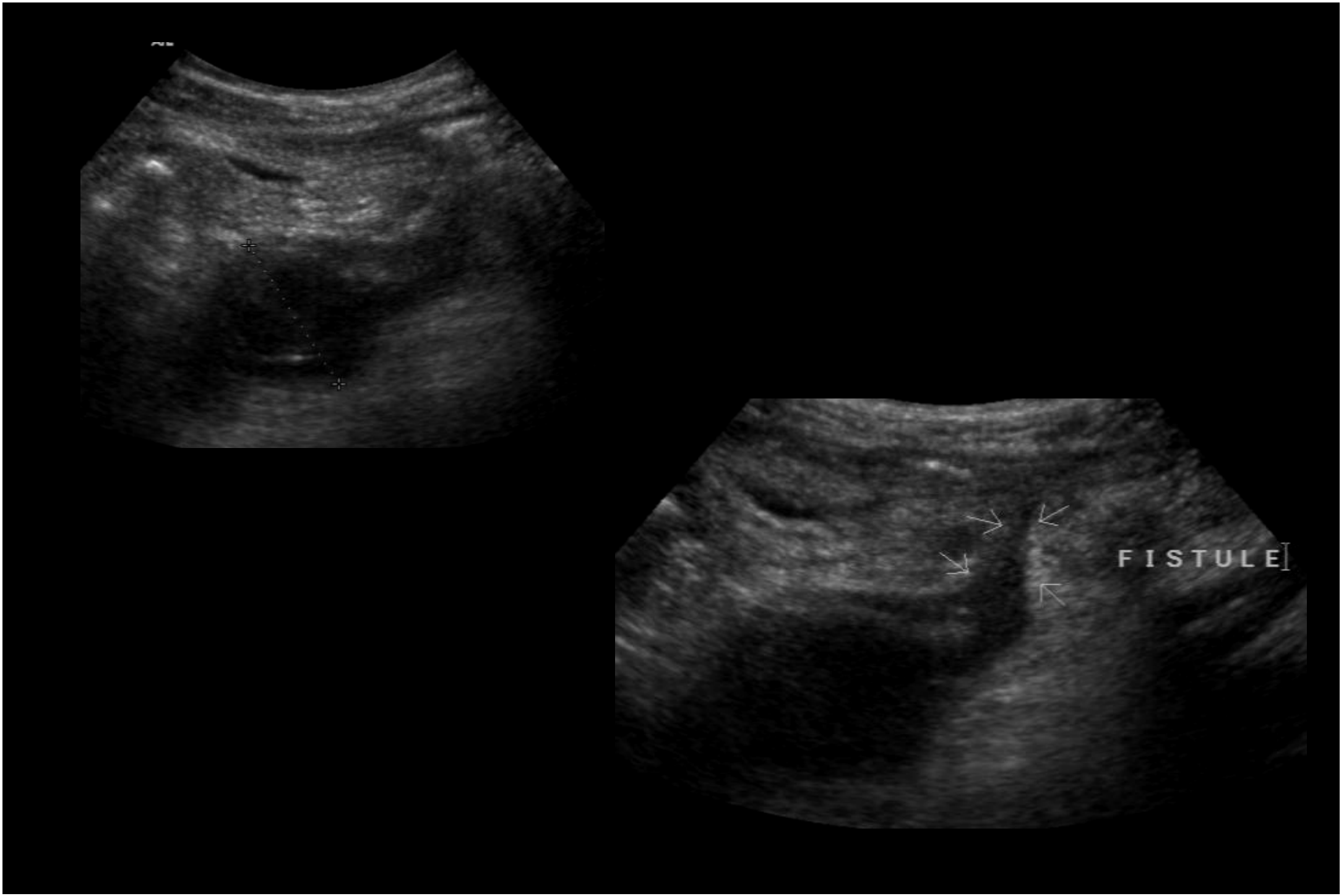


Complications :

- Fistules ou abcès (> ou < 2 cm)

- Occlusion

- Perforation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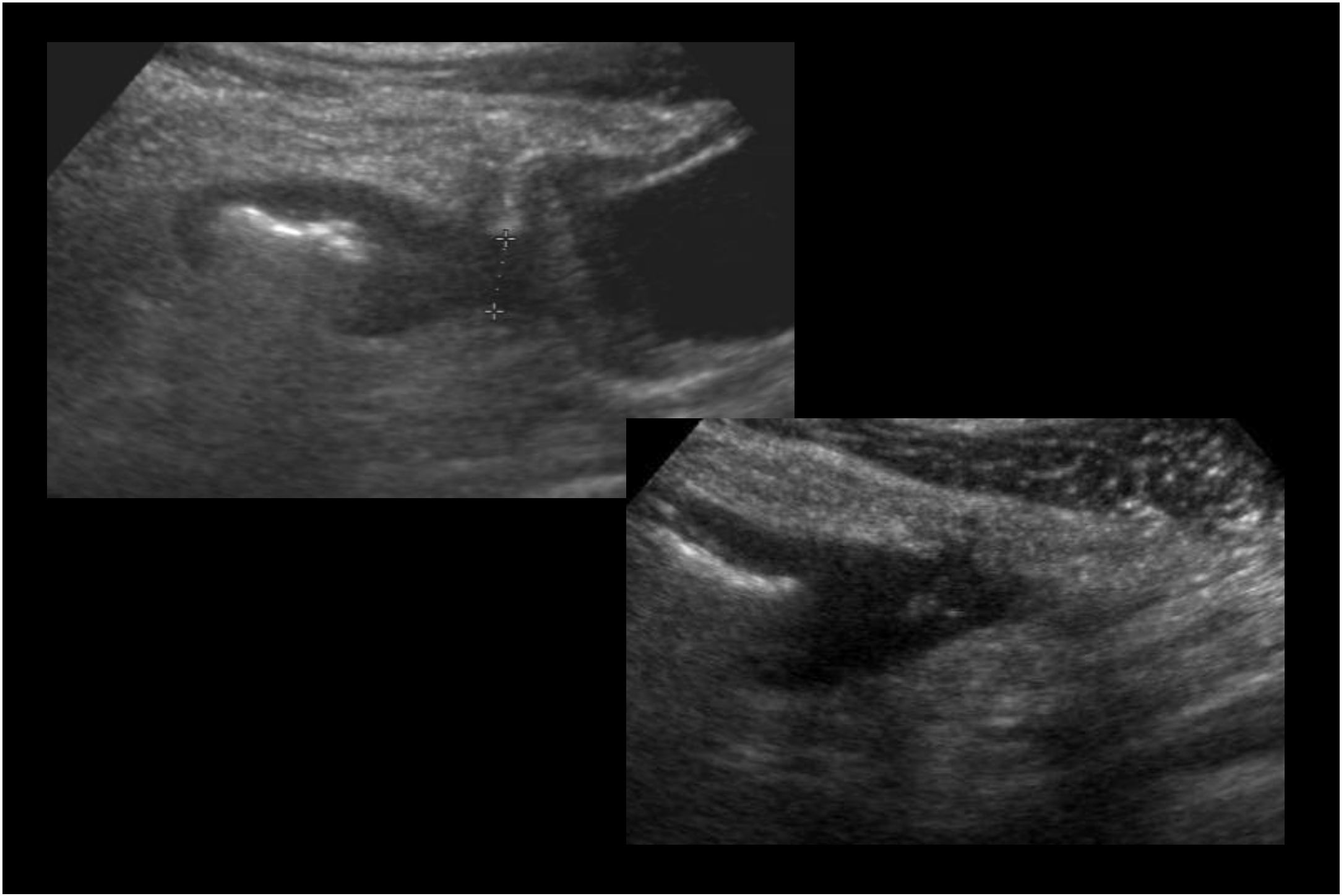

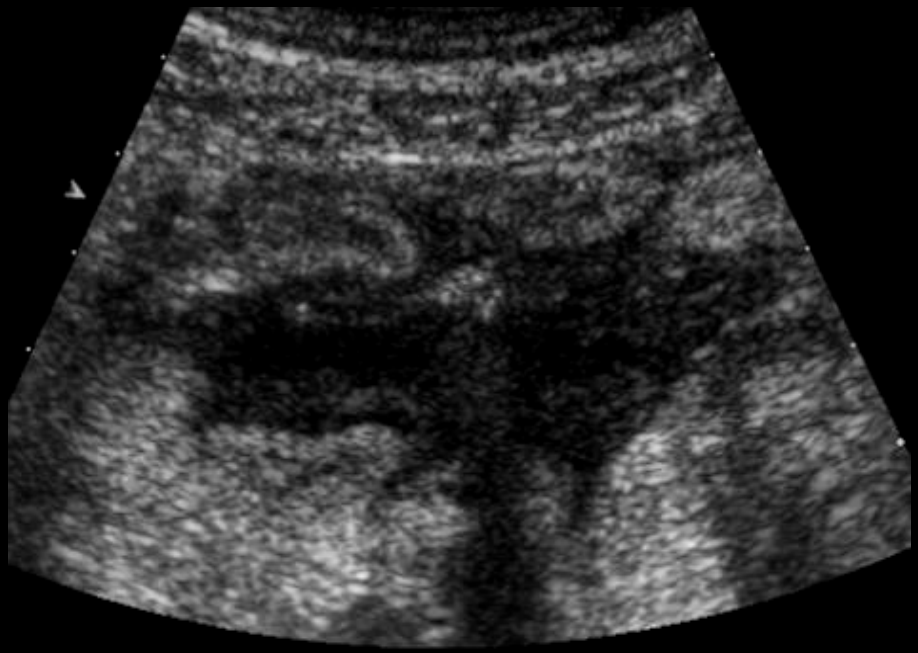

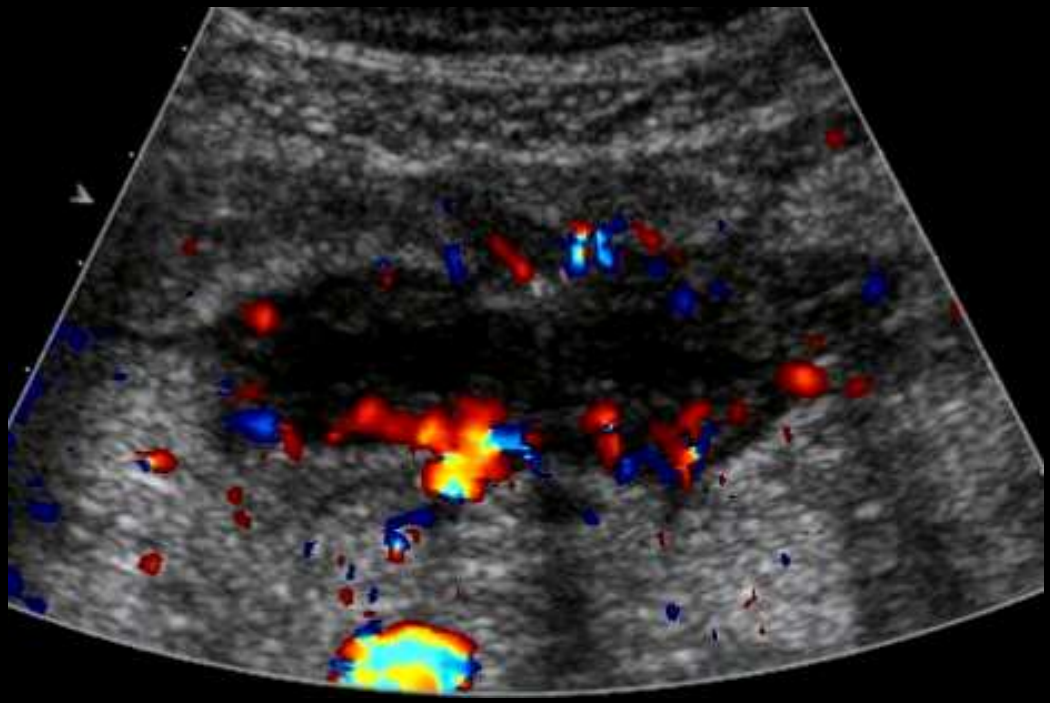

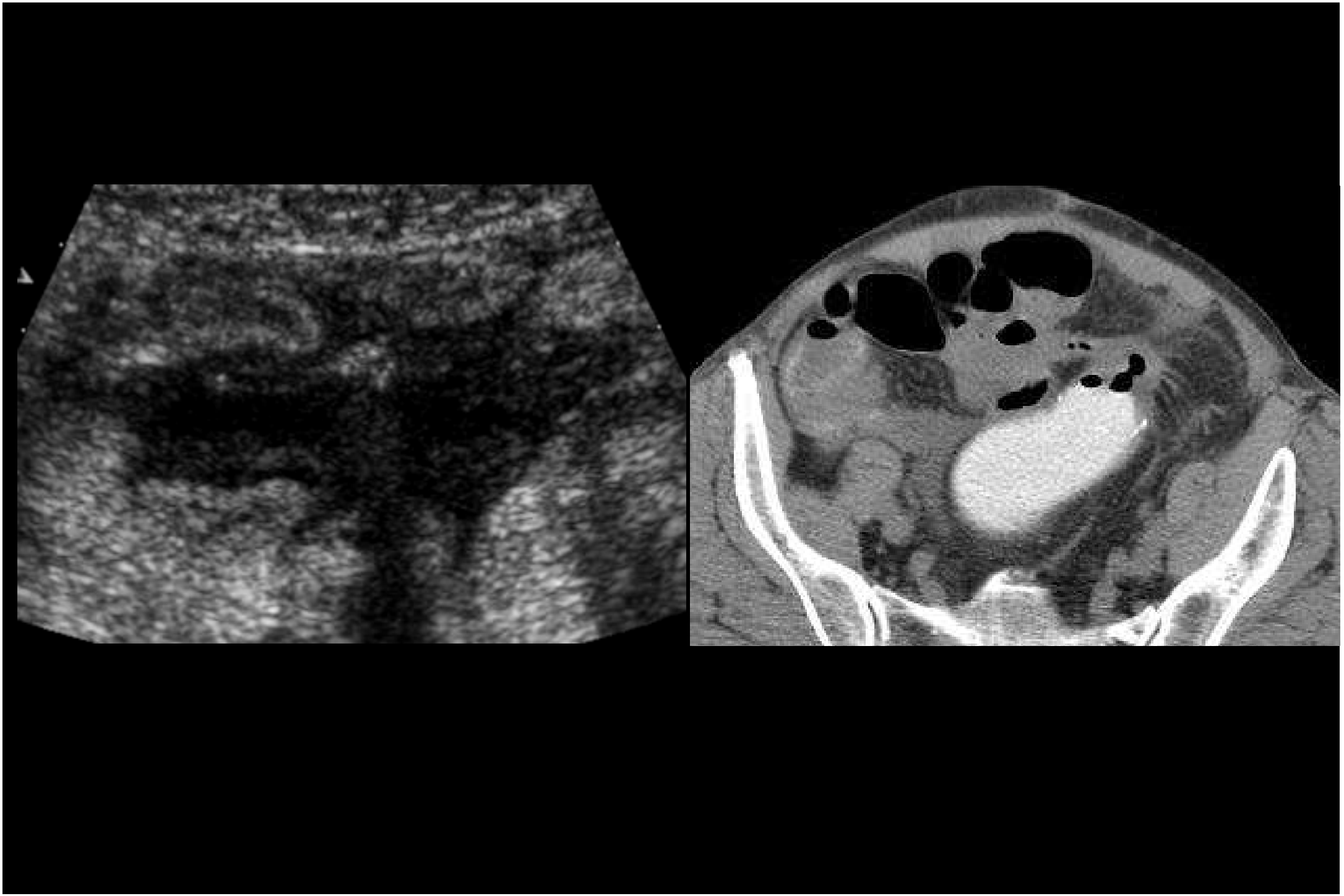

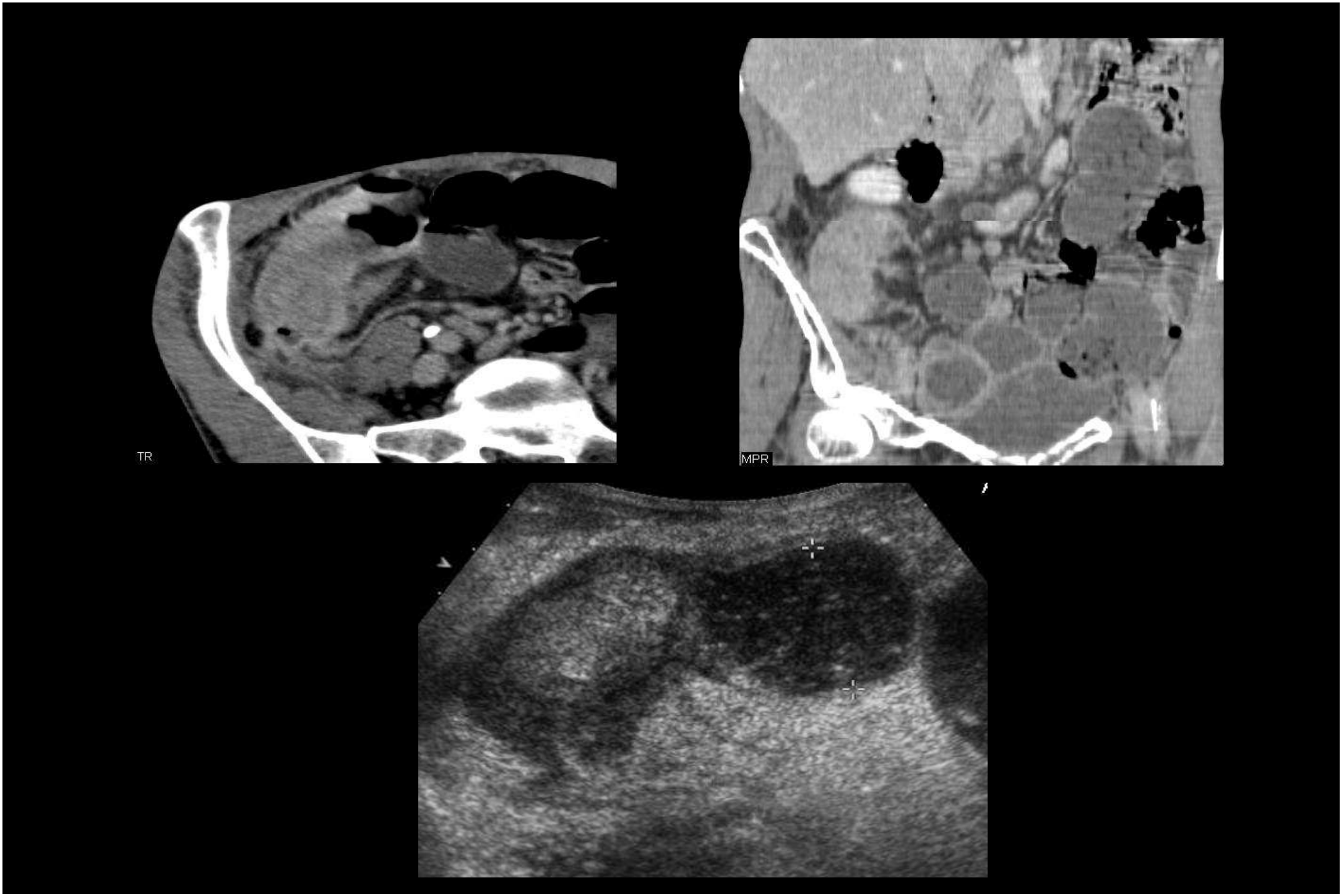
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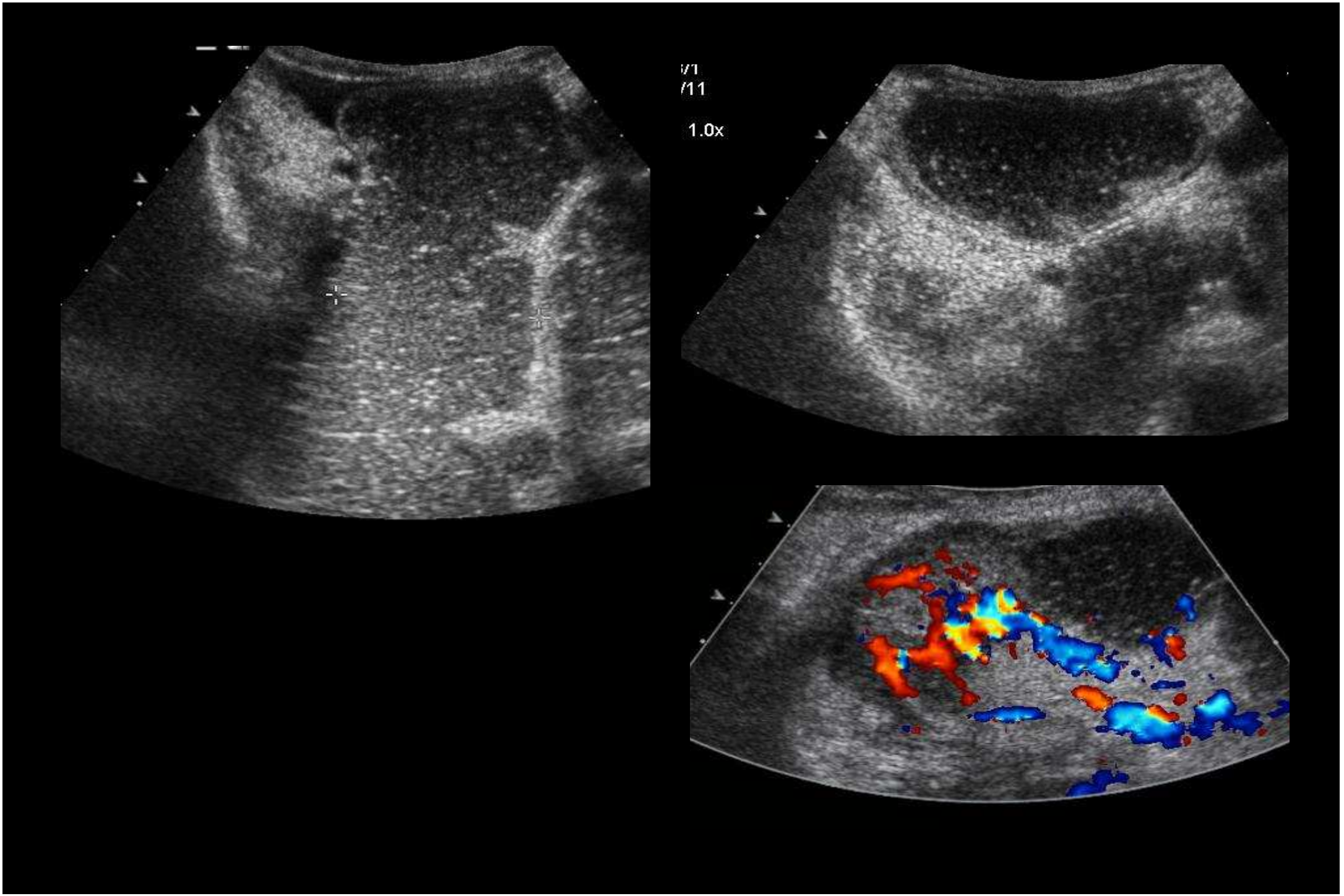
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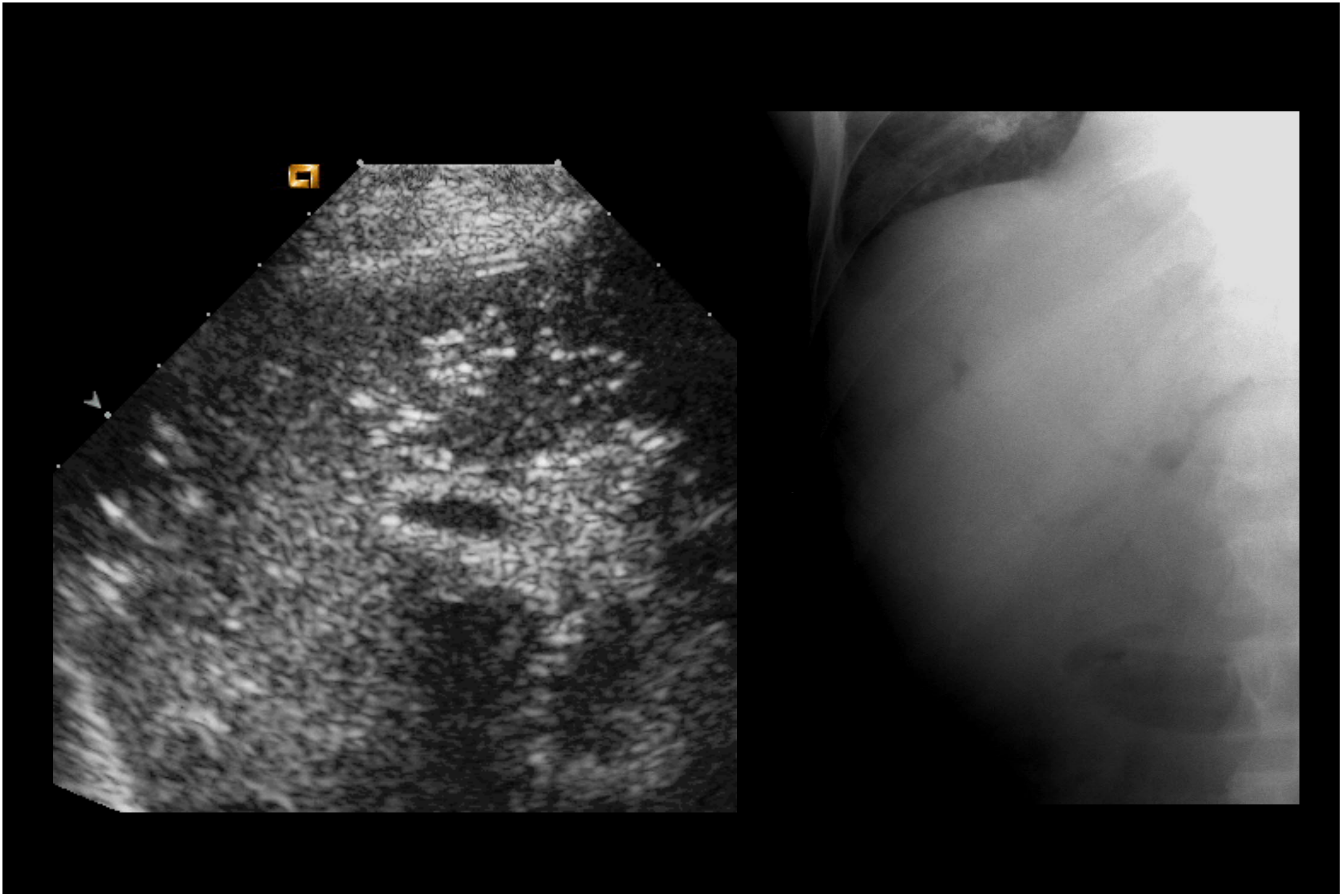
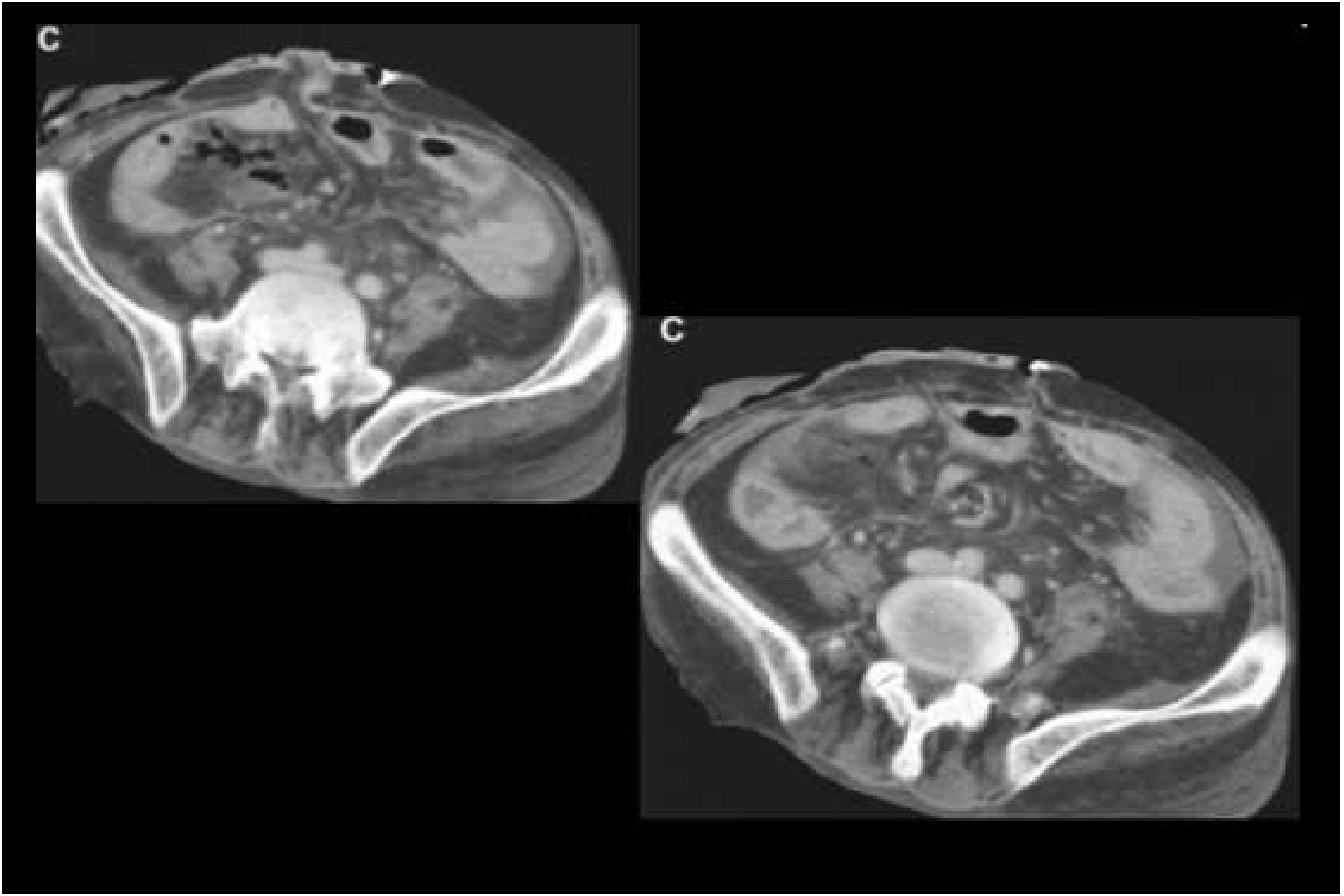
1.0x




C
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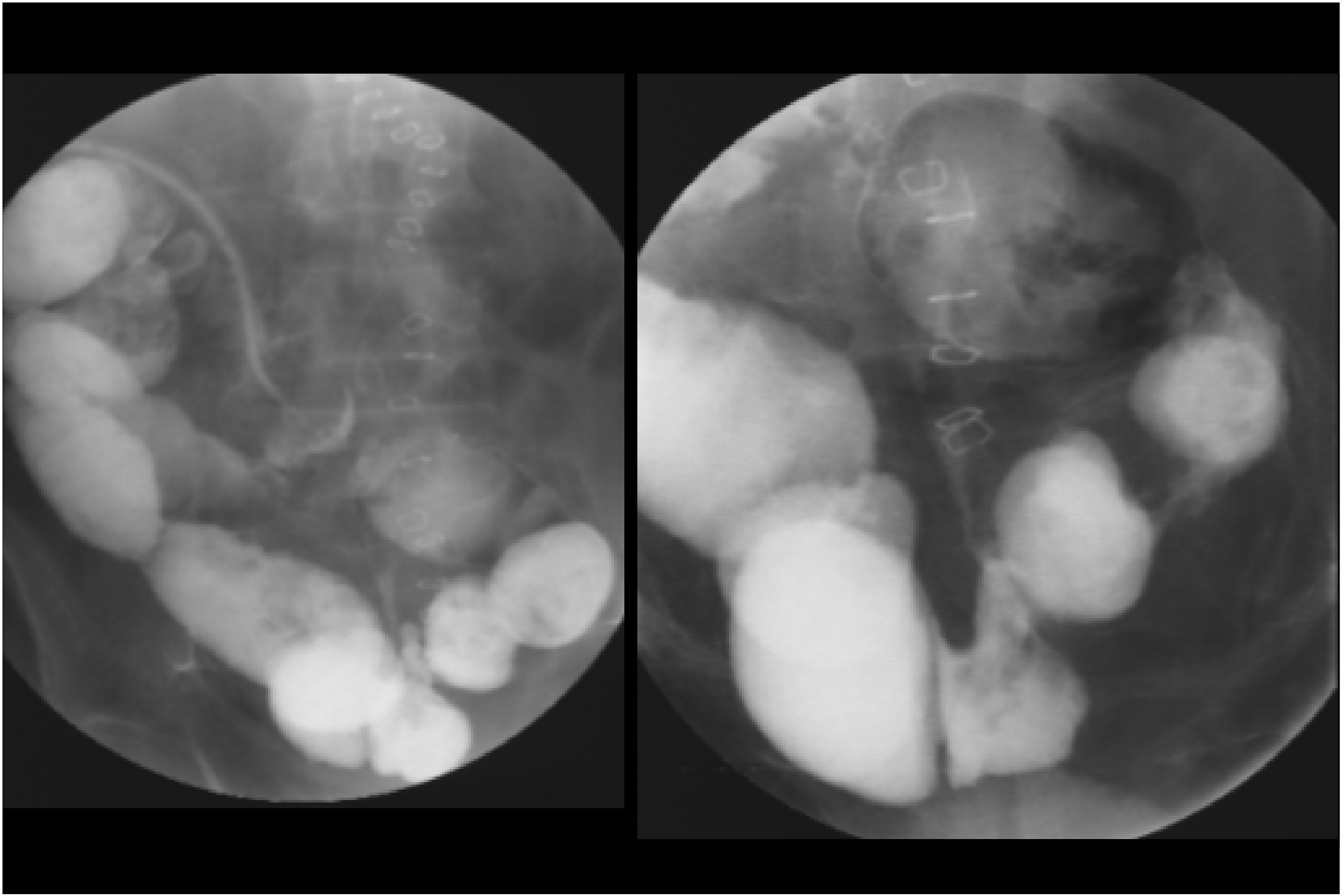
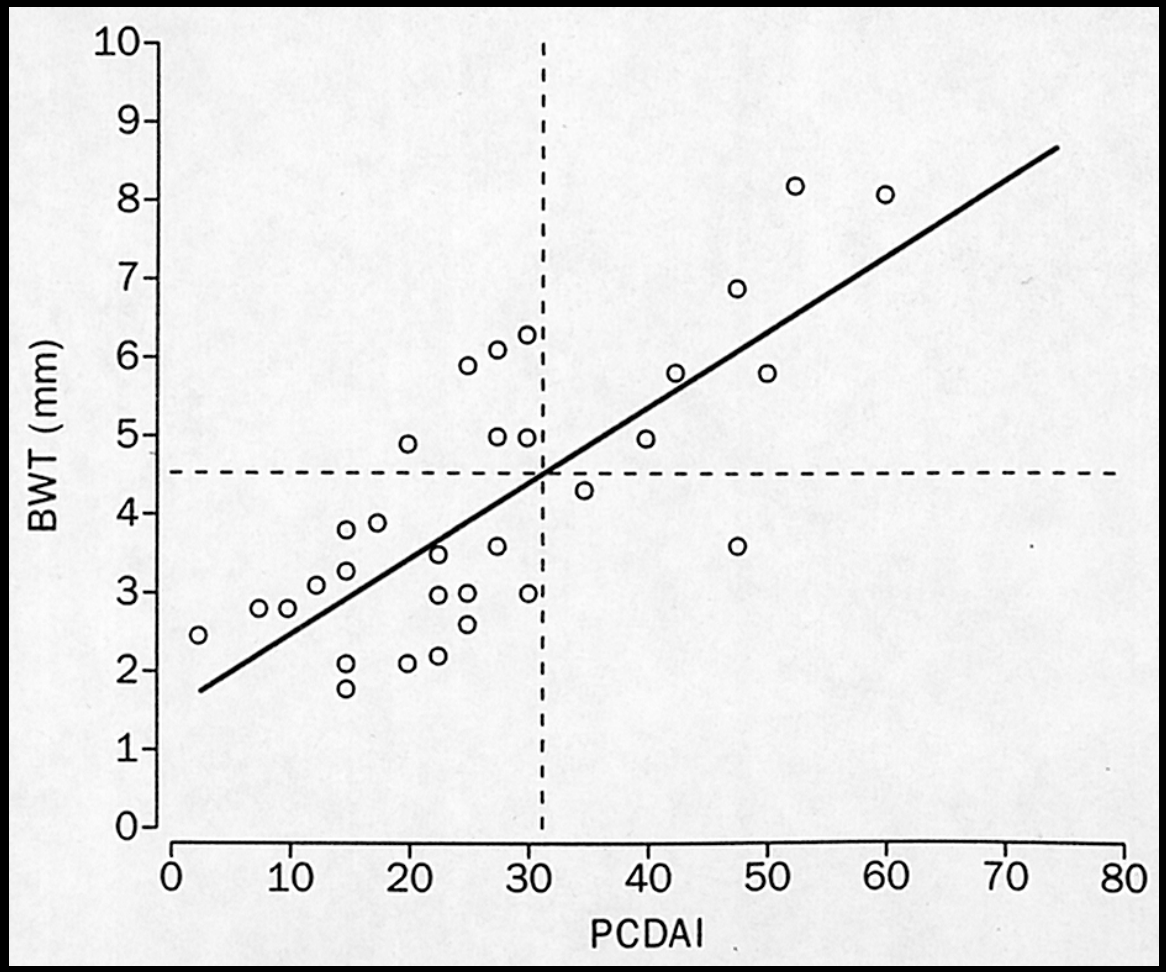
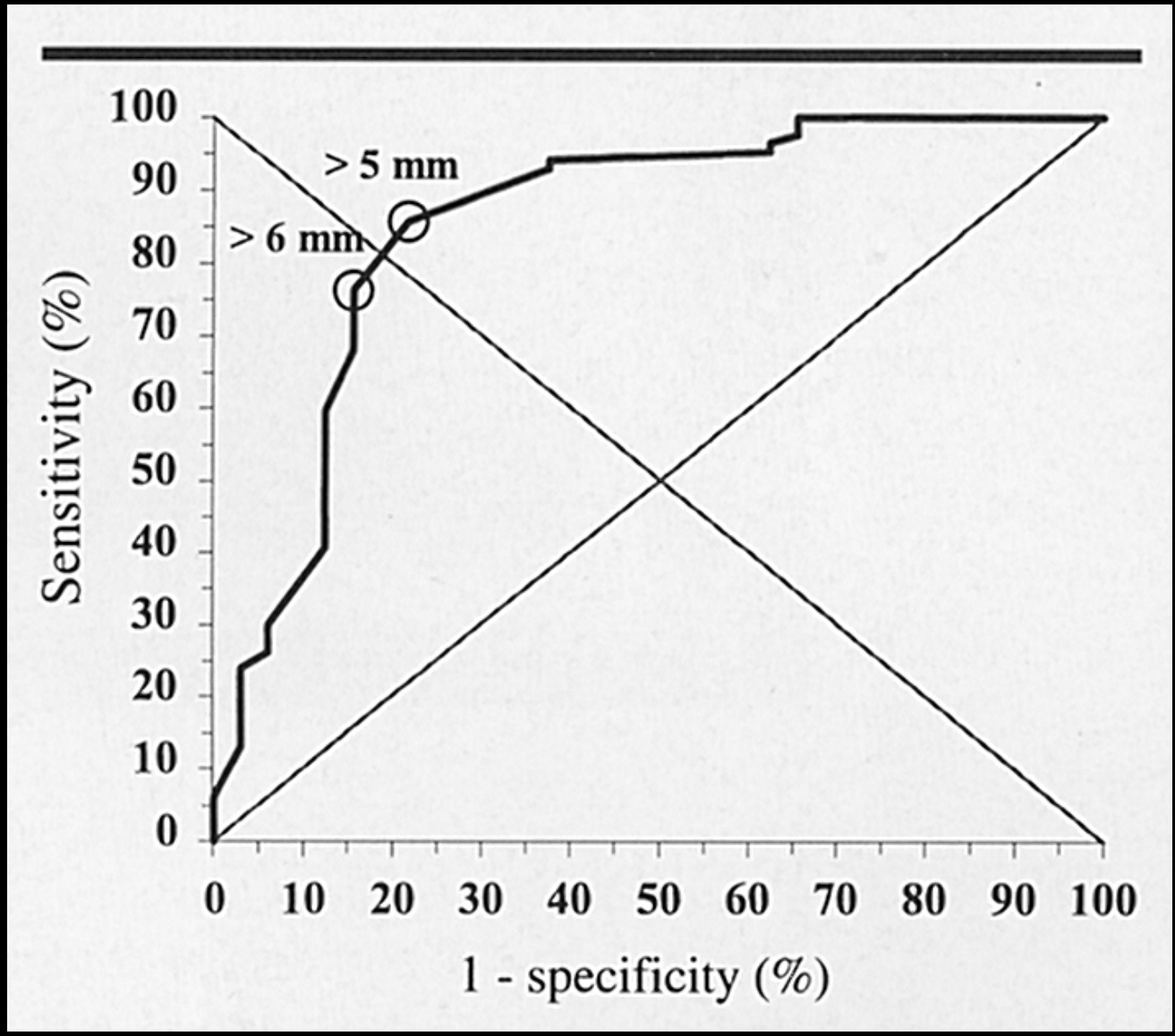




Haber et al, Lancet, 2000 : activity and bowel wall thickness



Spalinger et al, 2000, Radiology: ROC curve and activity of the disease

TABLE 3
Clinical Accuracy of Doppler US in the Detection of Active Crohn Disease

Variable	Sensitivity	Specificity	Accuracy	Positive Predictive Value	Negative Predictive Value
Thickness > 5 mm	72 of 84 (86)	25 of 32 (78)	97 of 116 (84)	72 of 79 (91)	25 of 37 (68)
Vessel density					
Moderate or high*	82 of 84 (98)	24 of 35 (69)	106 of 119 (89)	82 of 93 (88)	24 of 26 (92)
High†	68 of 84 (81)	31 of 35 (89)	99 of 119 (83)	68 of 72 (94)	31 of 47 (66)
Thickness > 5 mm					
Or moderate or high vascular density	84 of 84 (100)	18 of 32 (56)	102 of 116 (88)	84 of 98 (86)	18 of 18 (100)
And moderate or high vascular density	70 of 84 (83)	28 of 32 (88)	98 of 116 (84)	70 of 74 (95)	28 of 42 (67)

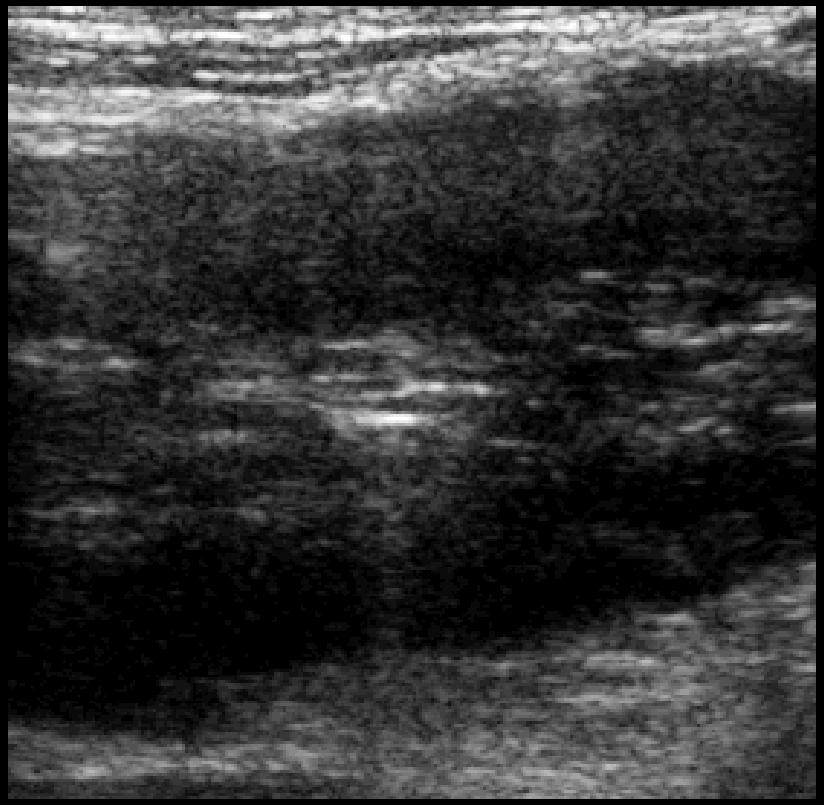
Note.—Data are the number of findings. Data in parentheses are percentages.
* More than two signals per square centimeter.
† More than five signals per square centimeter.

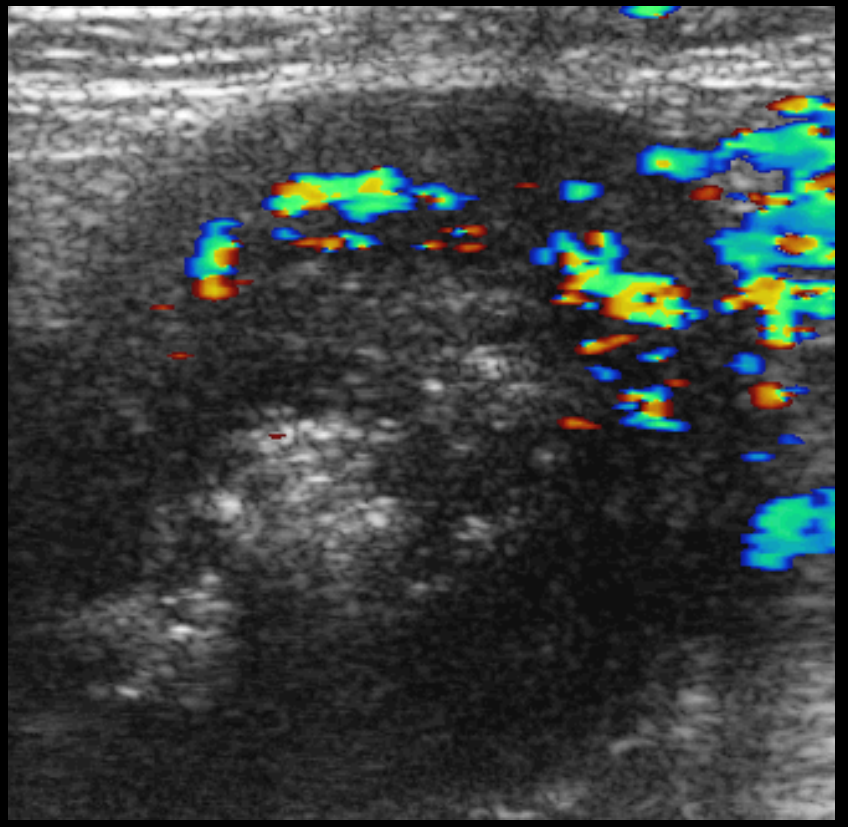
Spalinger et al, 2000, Radiology

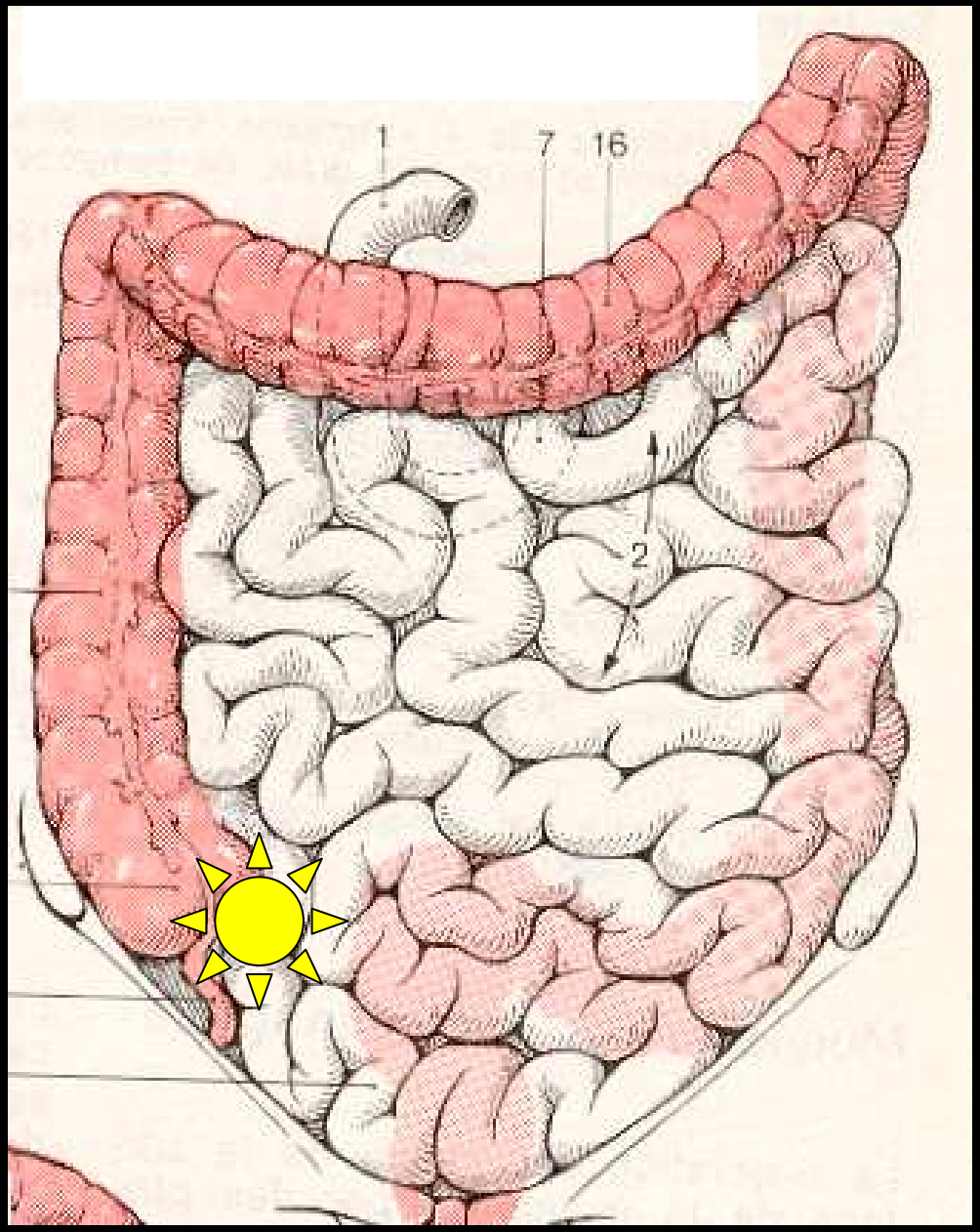
Activité :

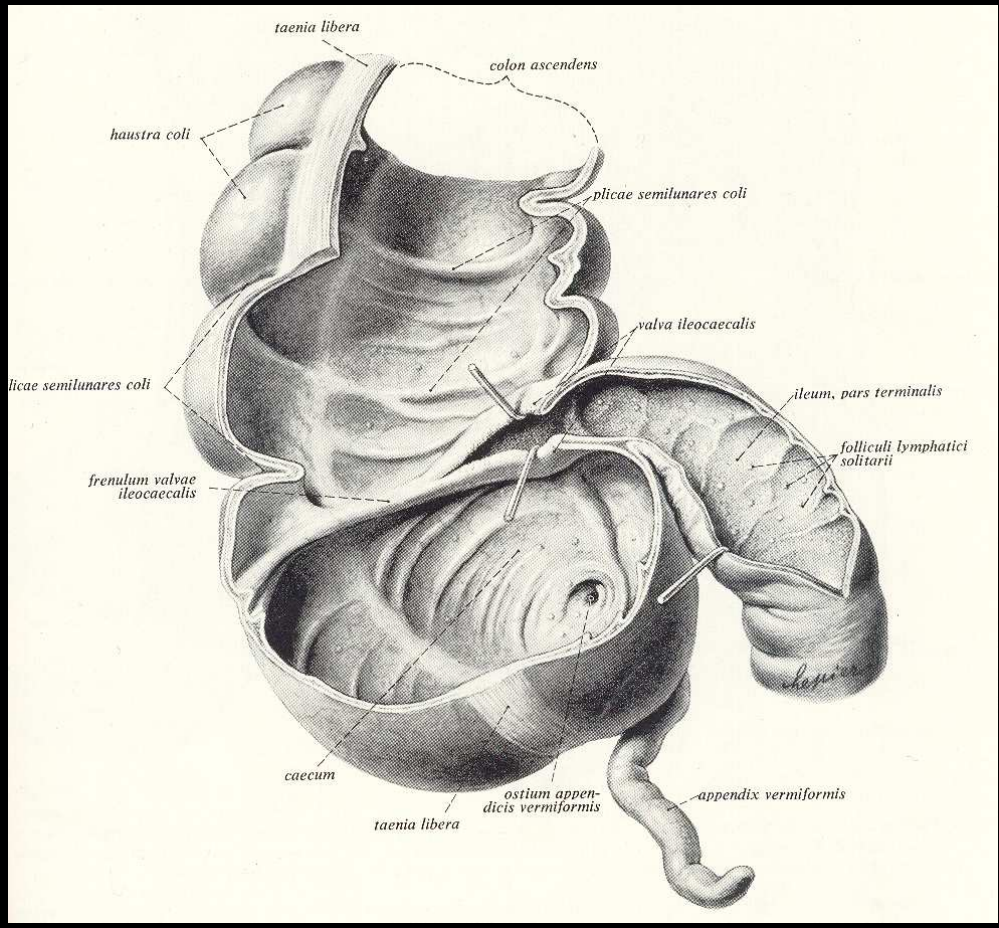
- Épaisseur de la paroi

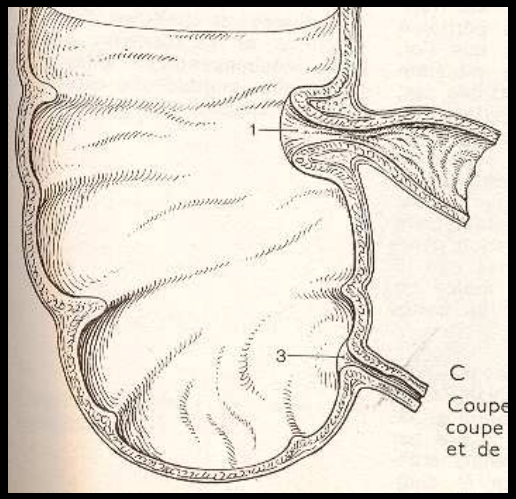
- Hyperhémie (« vessel density »)






1
7
16
2


taenia libera
colon ascendens
haustra coli
plicae semilunares coli
valva ileocaecalis
licae semilunares coli
ileum, pars terminalis
folliculi lymphatici solitarii
frenulum valvae ileocaecalis
caecum
ostium appendicis vermiformis
appendix vermiformis
taenia libera


1
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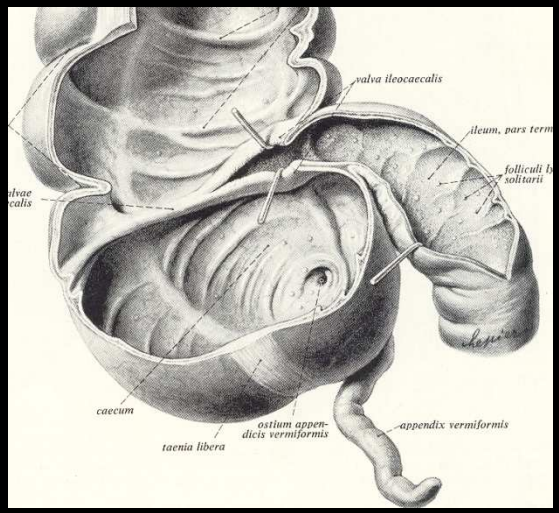
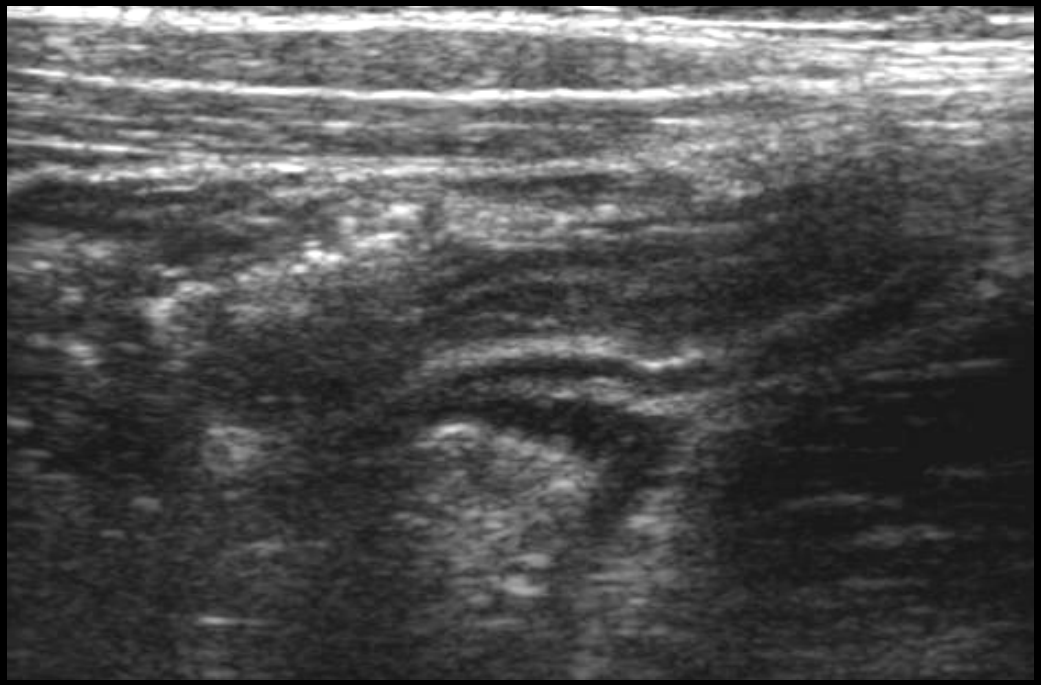
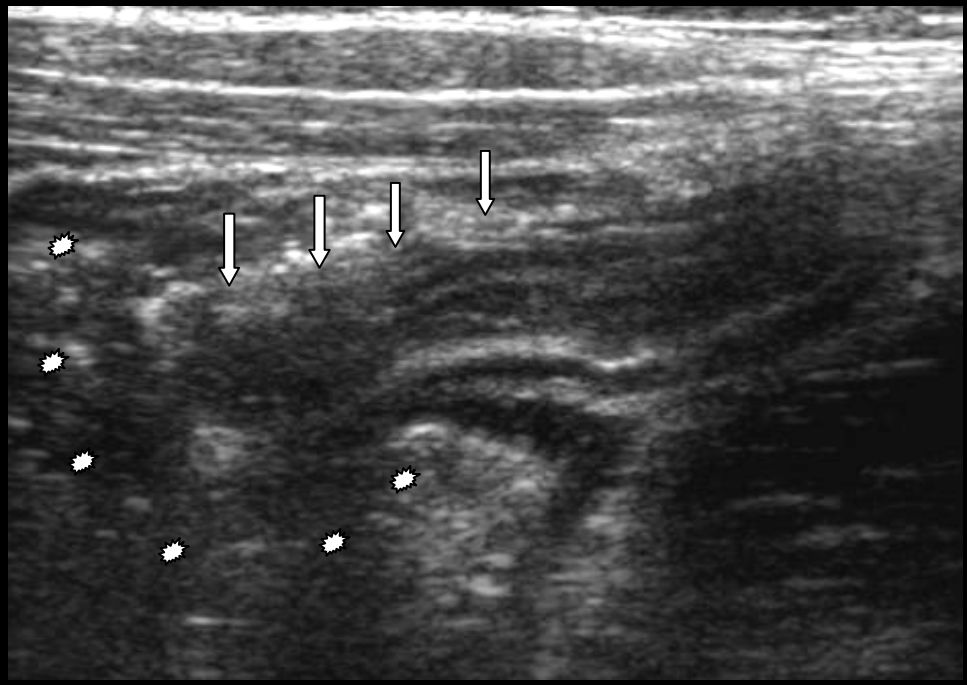
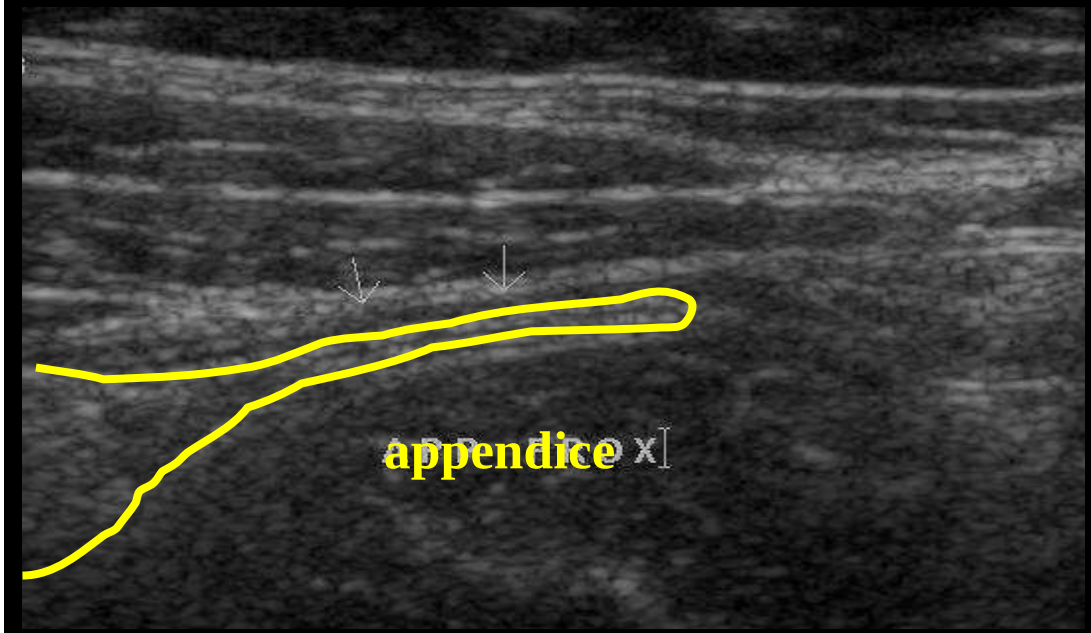
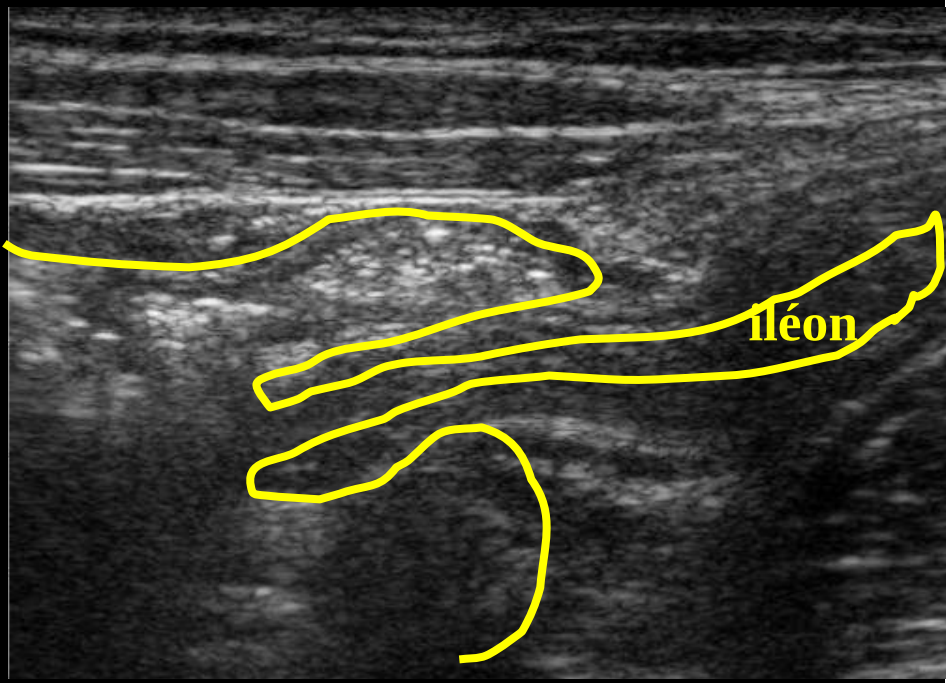
coupe
et de


valva ileocaecalis
caecum
taenia libera
ostium appendicis vermiformis
appendix vermiformis



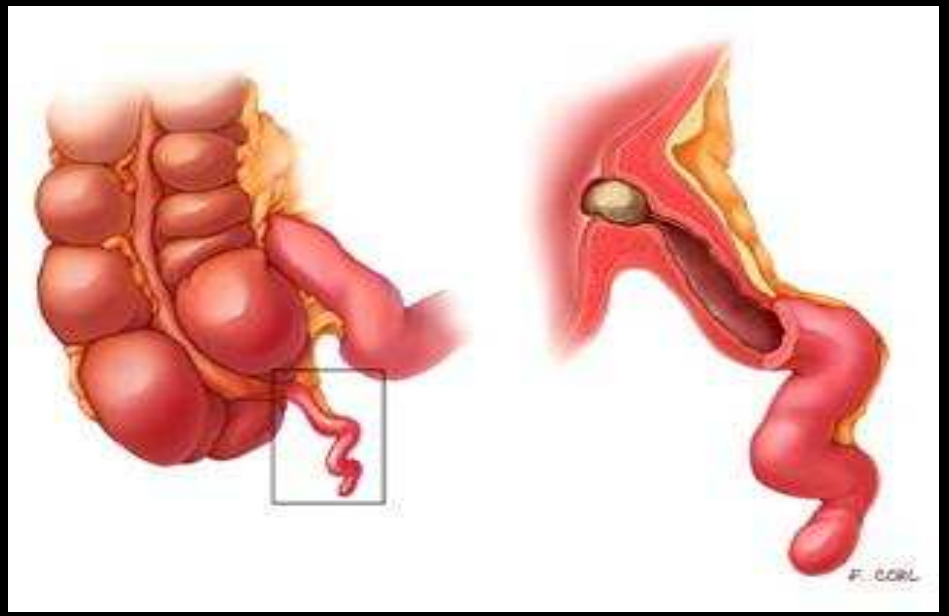


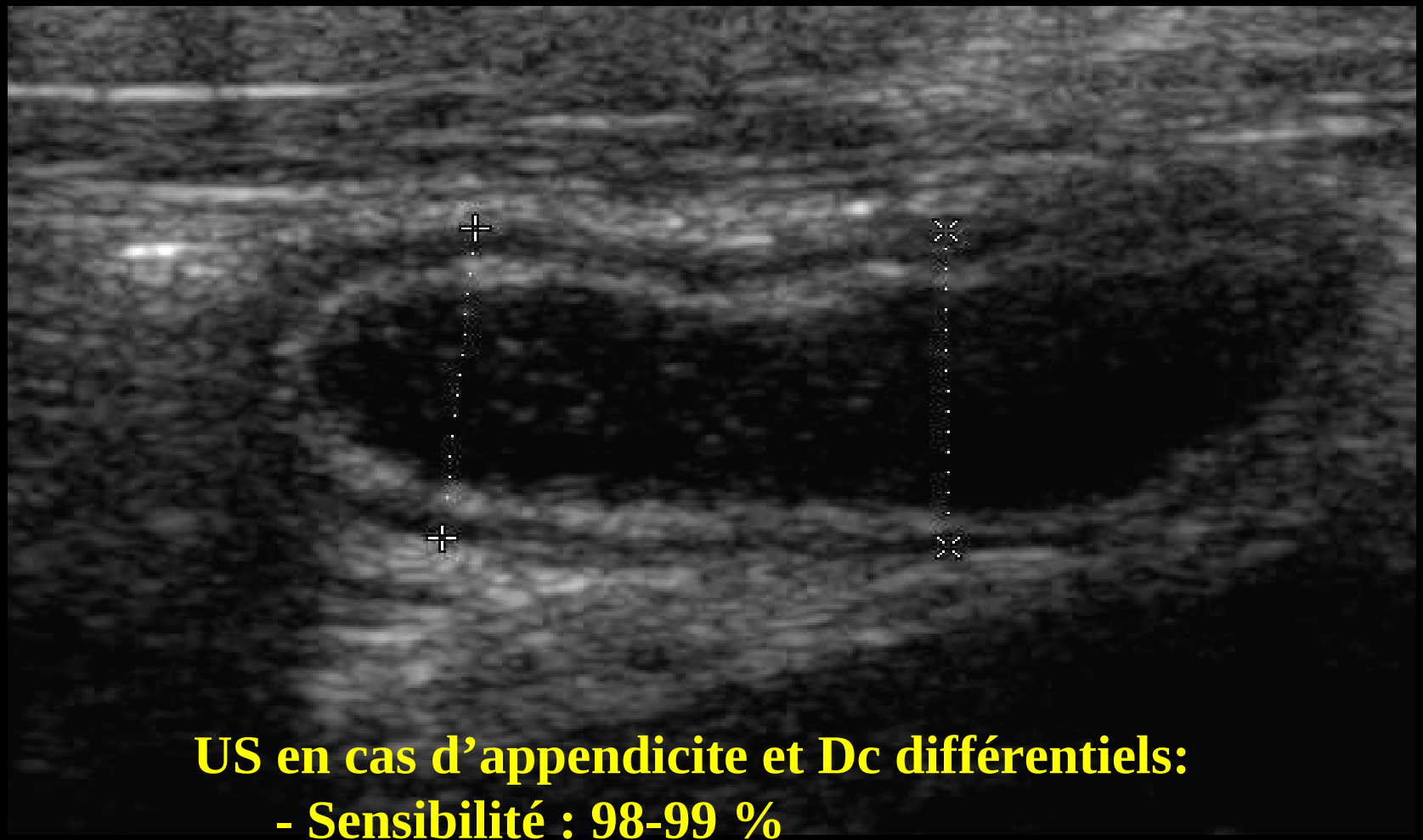

appendice


iléon

Appendicite et US

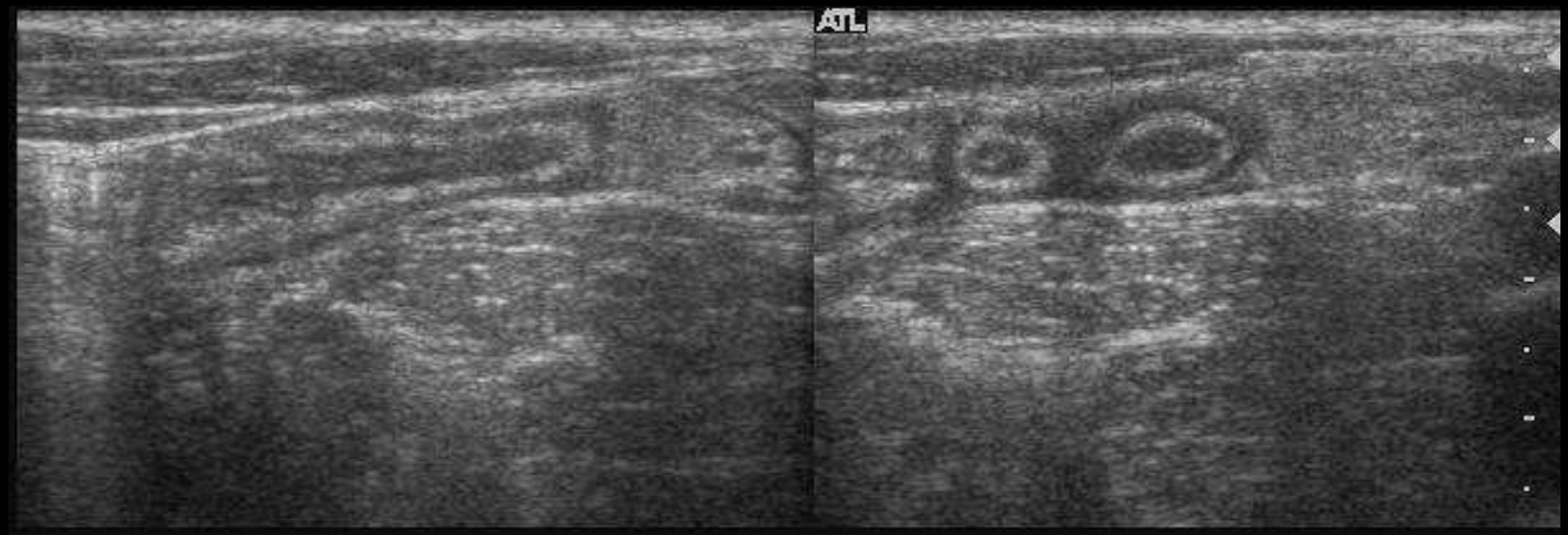
- Diamètre: = ou > 6 mm sous compression
- Paroi : > 3 mm
- Contenu:
  - Appendicolithe
  - Pas de gaz: fiabilité = 81 %
- Hyperhémie
- Environnement:
  - Graisse
  - Ganglions mésentériques
  - Collections adjacentes
- Nécrose
- Perforation





US en cas d’appendicite et Dc différentiels:

- **Sensibilité : 98-99 %**
- **Spécificité: 98-100 %**
- **Fiabilité : 96-99 %**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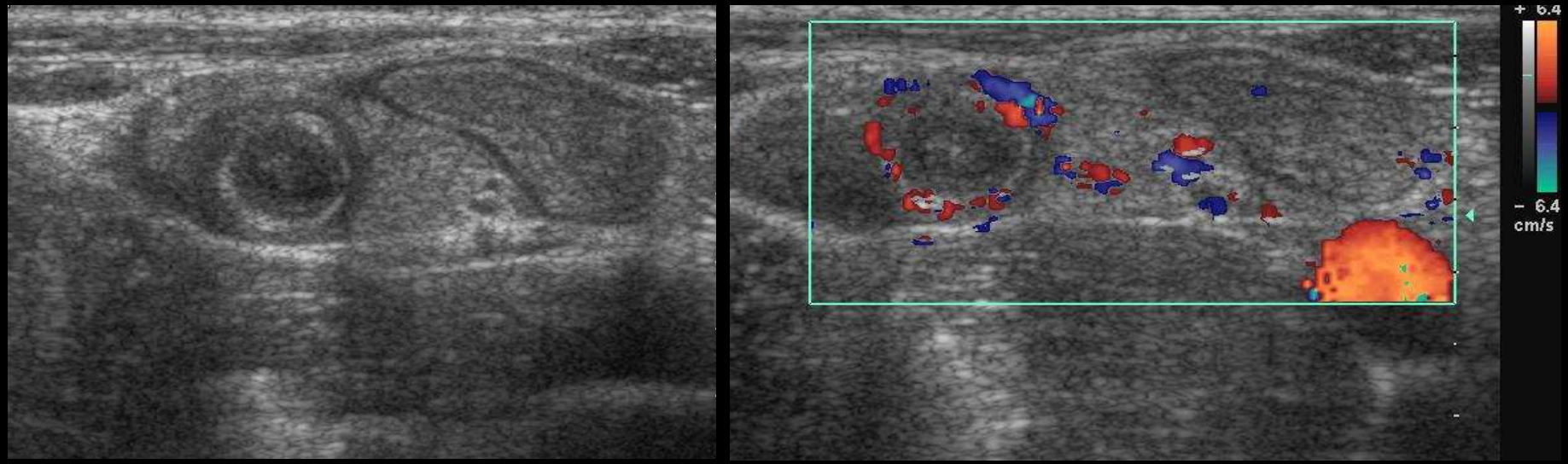
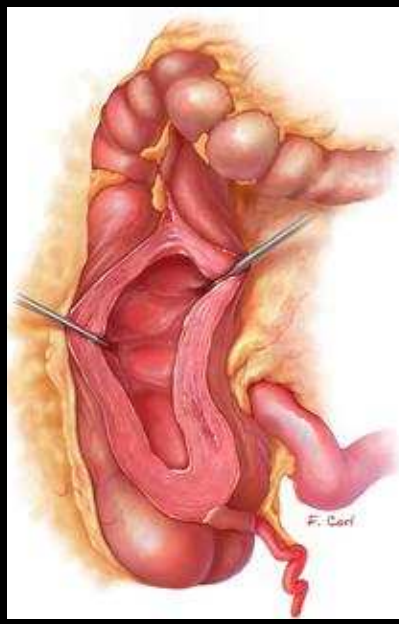
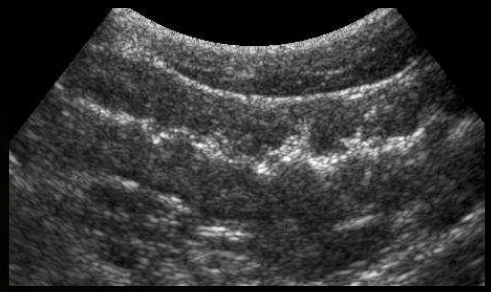
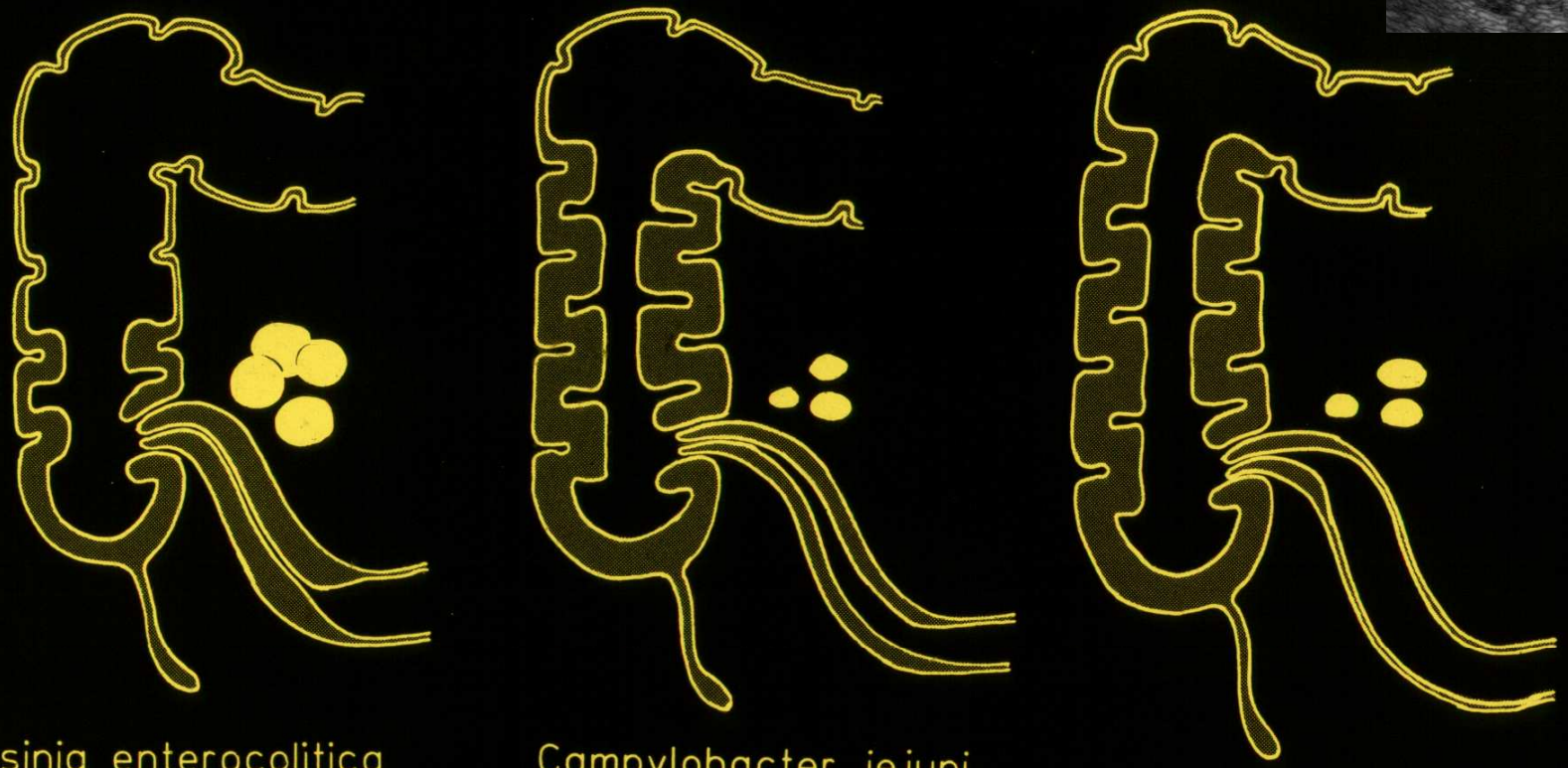

+ 6.4
– 6.4
cm/s

Table 5. Final Diagnoses in 532 Patients Admitted With Suspected Acute Appendicitis

Final diagnoses	n	%	Sonography	
			Positive findings	Negative findings
Appendicitis	130	24.4	115	15
Lymphadenitis, acute ileitis	149	28	148	1
Gastroenteritis	110	20.7	14	96
Other gastroenterologic disorders	26	4.9	15	11
Gynecologic diagnoses	47	8.8	37	10
Urinary tract disorders	10	1.9	8	2
Pain of unknown cause	60	11.3	—	60
Total	532		337	195



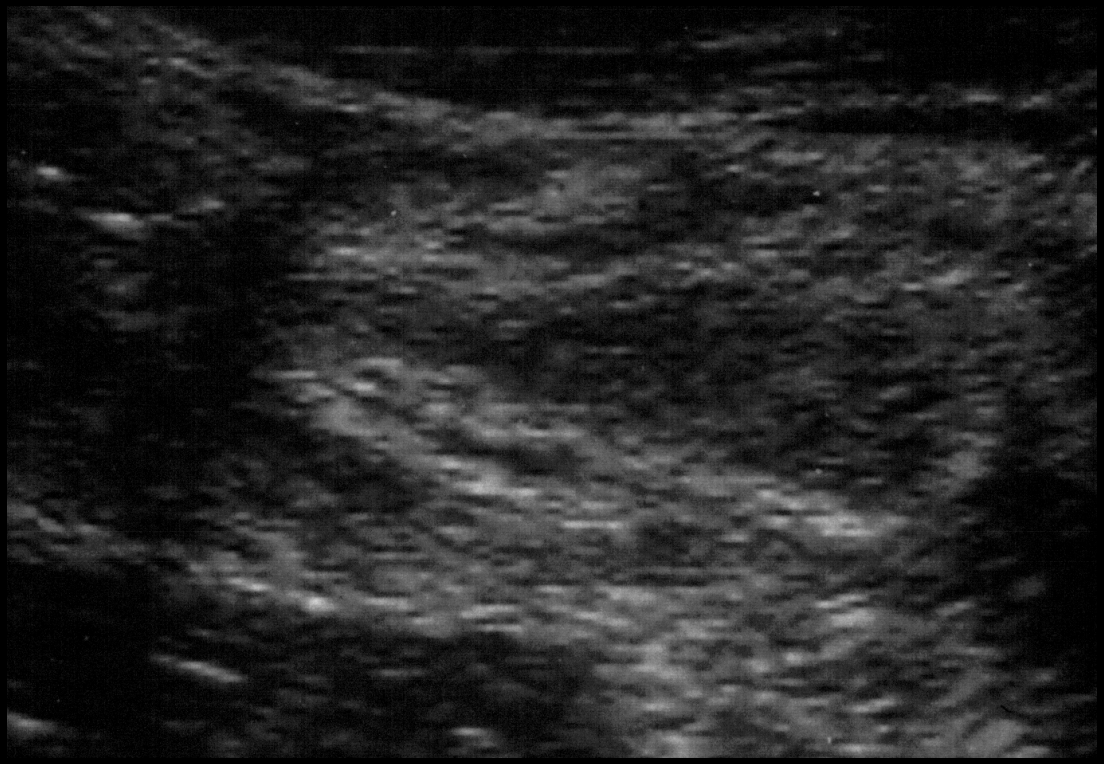


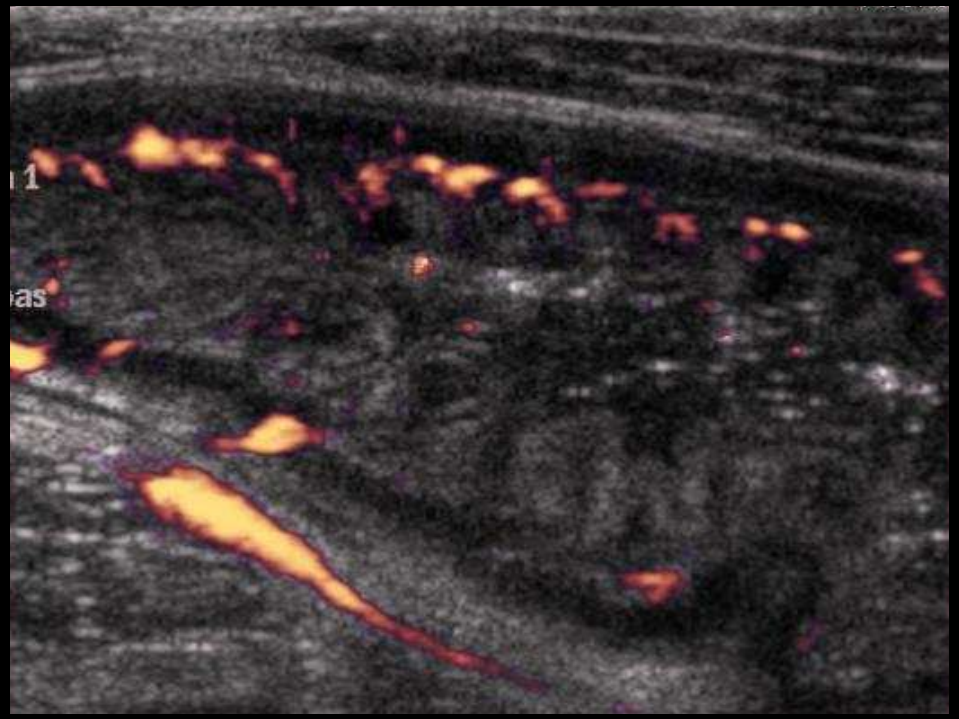


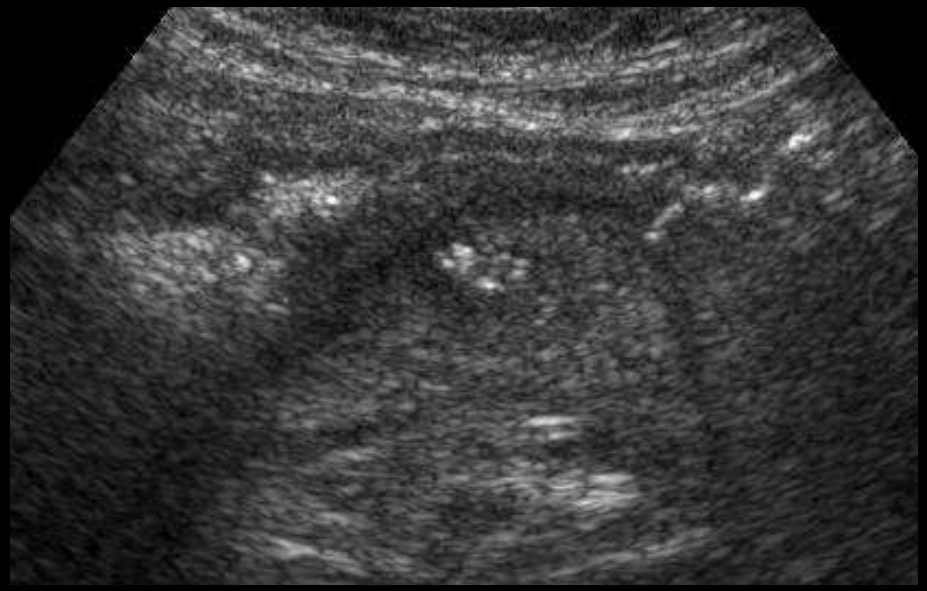
Yersinia enterocolitica
Yersinia pseudotuberculosis

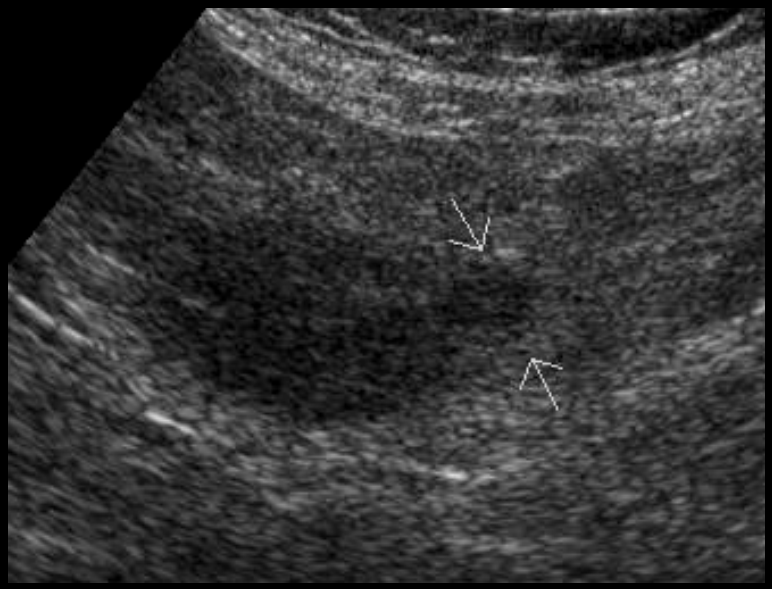
Campylobacter jejuni

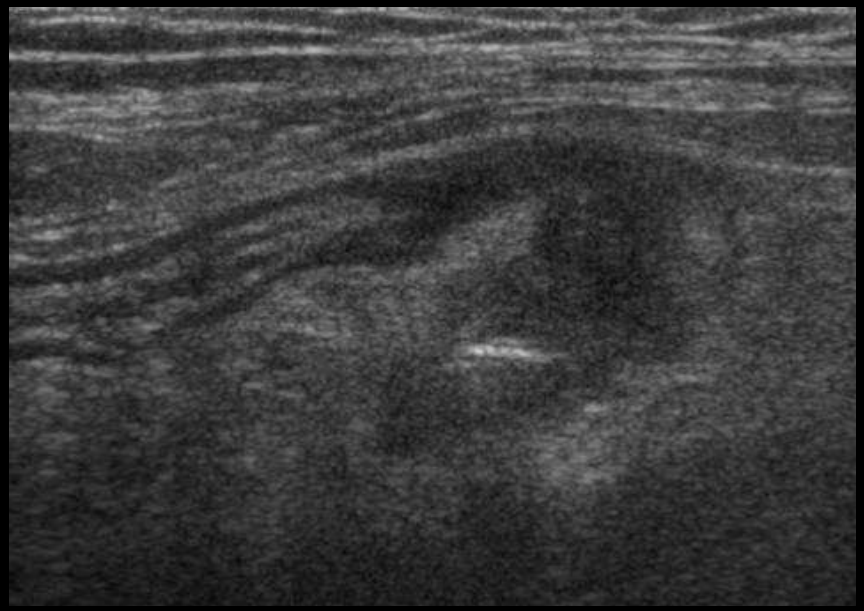
Salmonella enteritidis

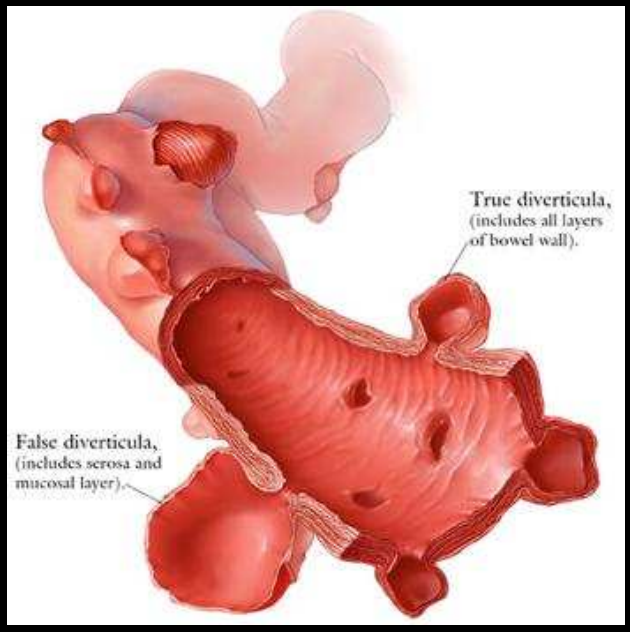


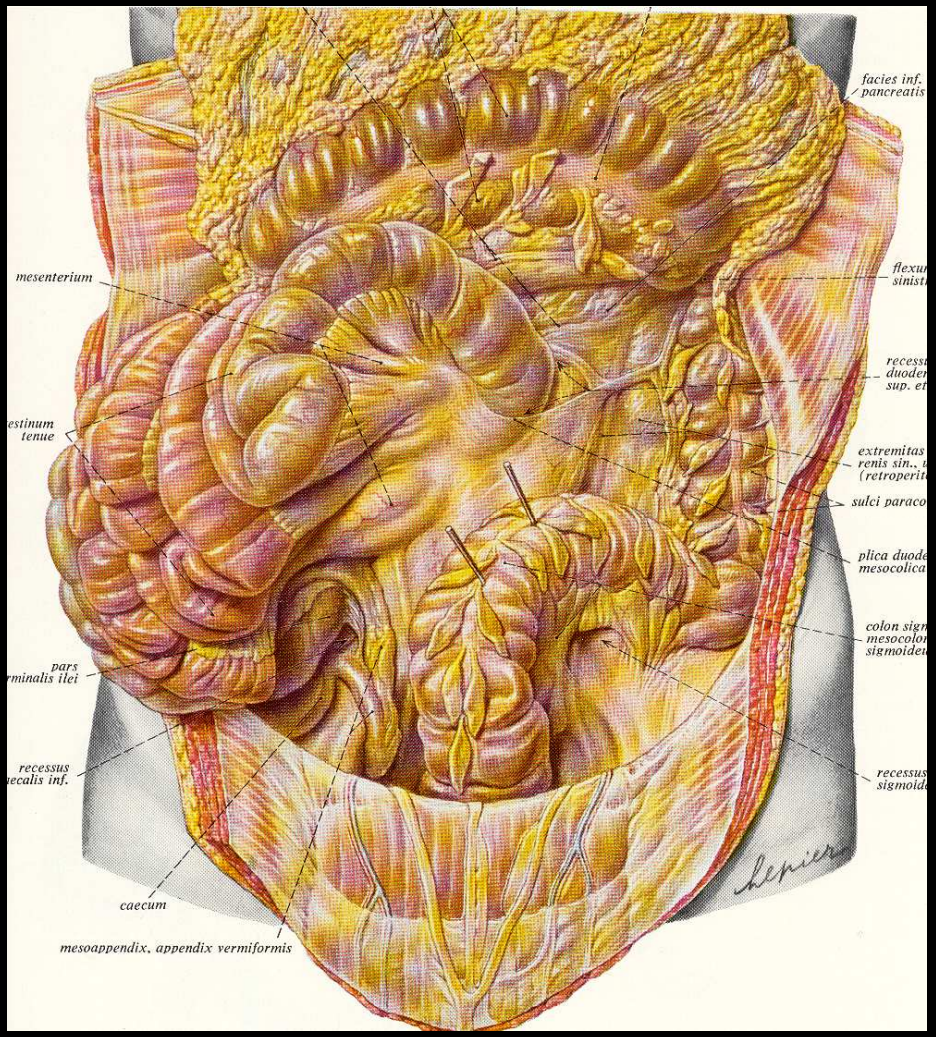


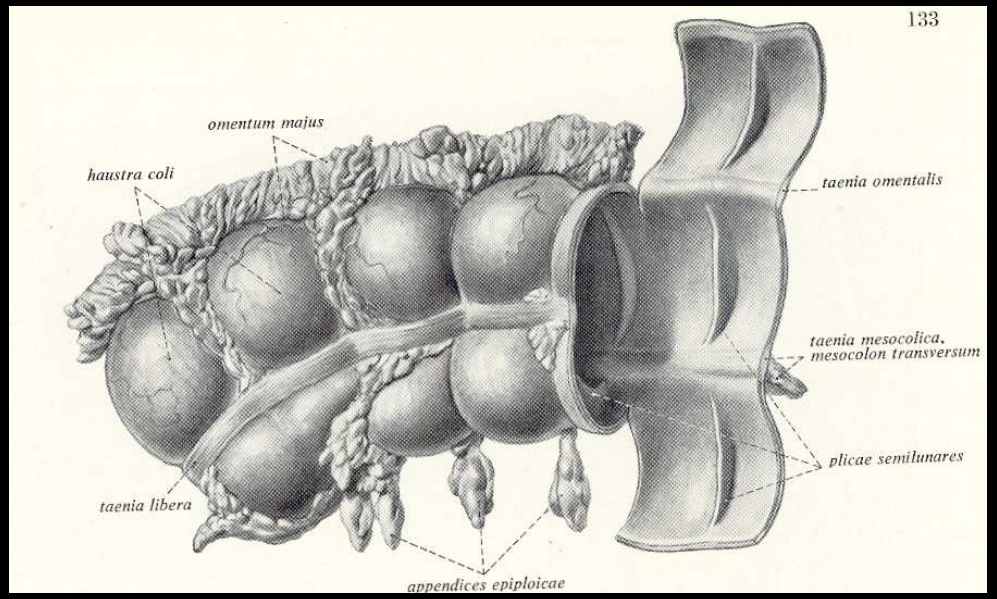


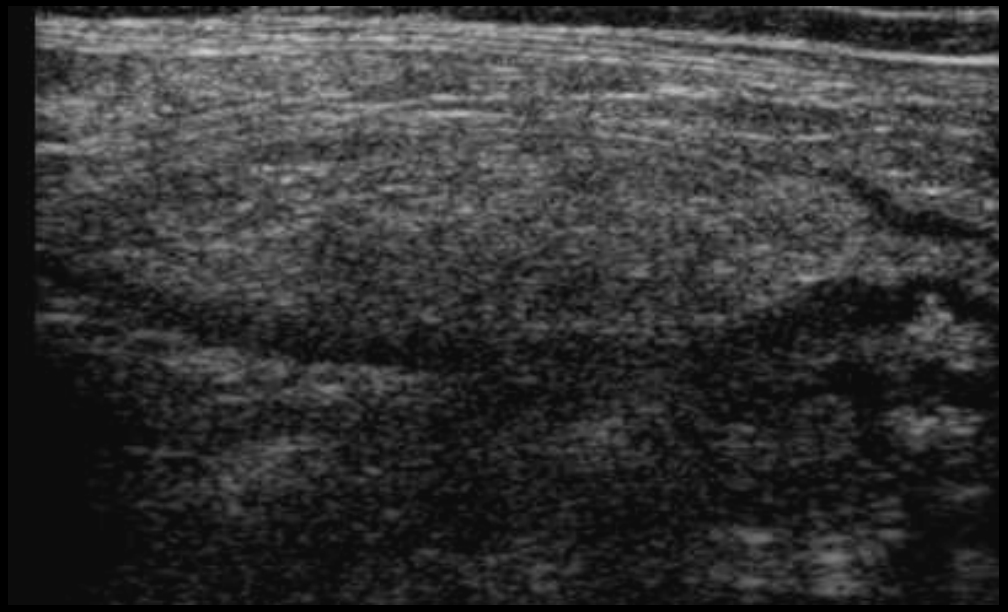


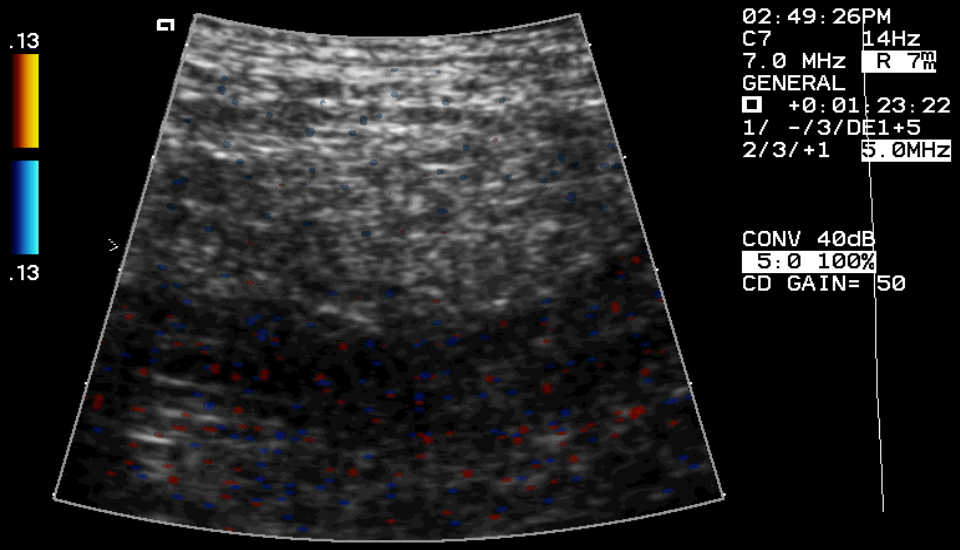


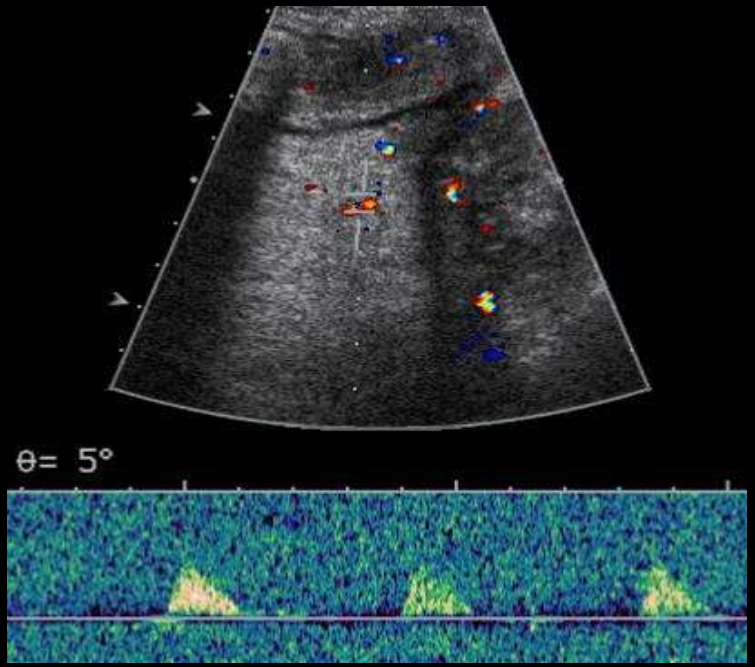

True diverticula,
(includes all layers
of bowel wall).
False diverticula,
(includes serosa and
mucosal layer).

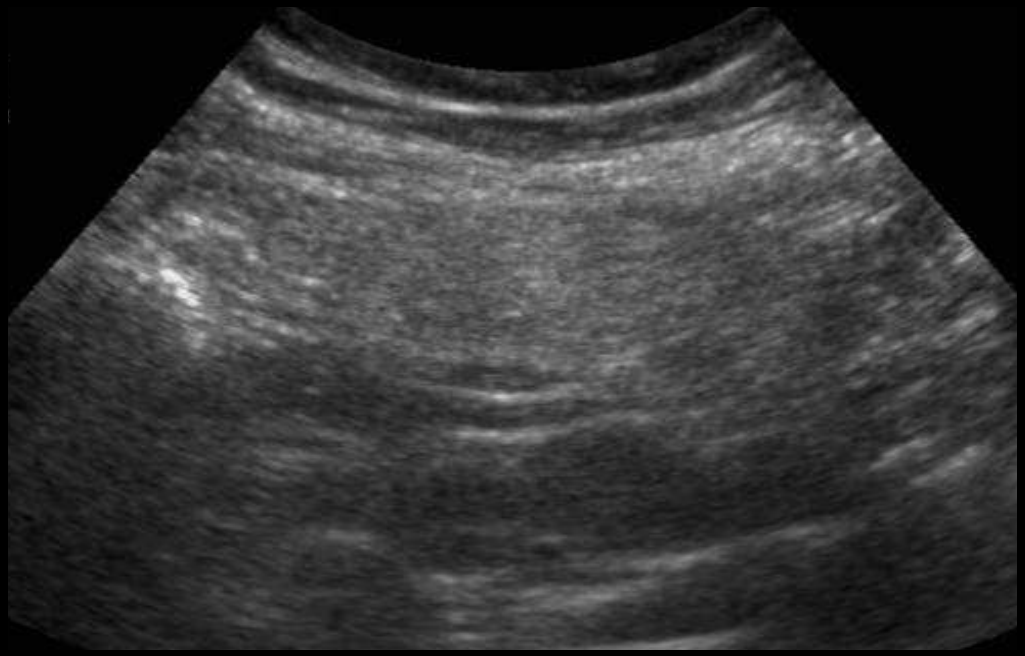

facies inf. pancreatis
mesenterium
flexur sinist
recess duoder sup. et
estinum tenue
extremitas renis sin., (retroperit
sulci paraco
plica duode mesocolica
colon sign mesocolon sigmoideu
pars rminalis ilei
recessus ecalis inf.
recessus sigmoid
caecum
mesoappendix, appendix vermiformis

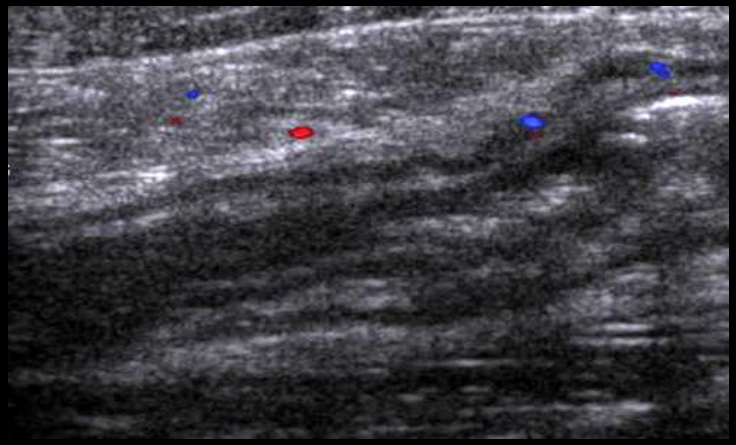

133
omentum majus
haustra coli
taenia omentalis
taenia mesocolica, mesocolon transversum
plicae semilunares
taenia libera
appendices epiploicae

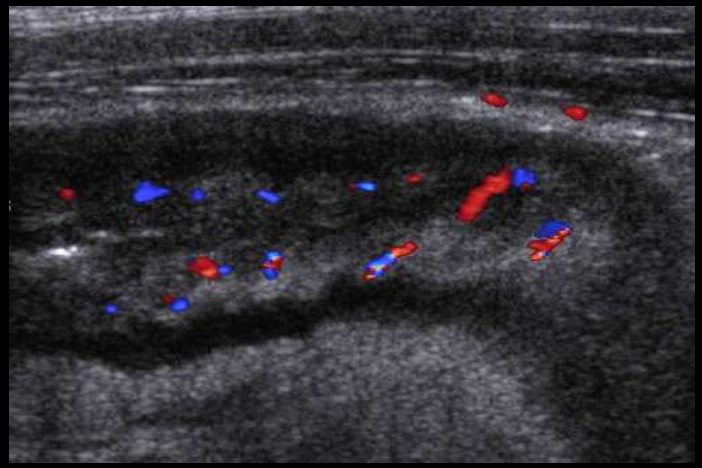


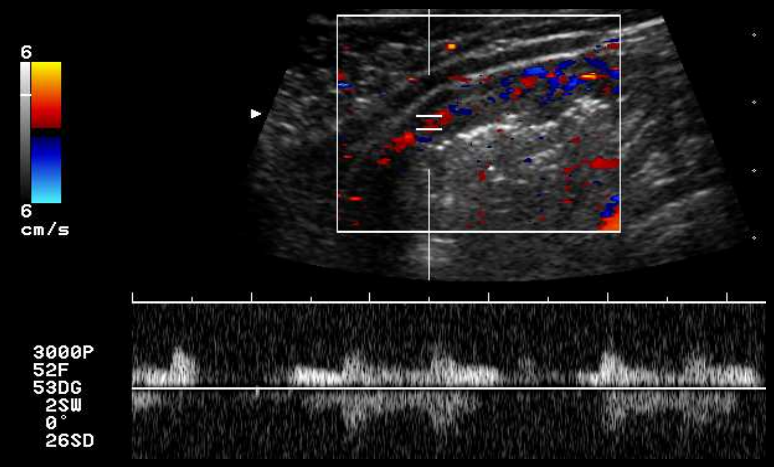

.13
.13
02:49:26PM
C7 14Hz
7.0 MHz R 7m
GENERAL
+0:01:23:22
1/ -/3/DE1+5
2/3/+1 5.0MHz
CONV 40dB
5:0 100%
CD GAIN= 50


θ= 5°








6
6
cm/s
3000P
52F
53DG
2SW
0°
26SD

	Epaisseur (mm)	Stratification nombre (%)	Flux artériel nombre (%)	IR moyenne ± SD
Inflammation (n =10)	6.6 ± 1.3 ↑	9 (90) ↑	10 (100)	0.51 ± 0.10 ↑
Infection (n=23)	8.8 ± 3.4	13 (57)	20 (87)	0.63 ± 0.15
Ischémie (n =23)	8.9 ± 2.8	11 (48)	13 (57) ↑	0.60 ± 0.10
Néoplasie (n =10)	18.2 ± 6.2 ↑	2 (20) ↑	8 (80)	0.72 ± 0.18

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Bowel Wall Thickness at Abdominal Ultrasound and the One-Year-Risk of Surgery in Patients with Crohn's Disease

Fabiana Castiglione, M.D., Ilario de Sio, M.D., Antonio Cozzolino, M.D., Antonio Rispo, M.D., Francesco Manguso, M.D., Giovanna Del Vecchio Blanco, M.D., Elena Di Girolamo, M.D., Luigi Castellano, M.D., Carolina Ciacci, M.D., and Gabriele Mazzacca, M.D.
Divisions of Gastroenterology, University of Naples "Federico II";and The Second University of Naples, Naples, Italy

OBJECTIVES: Abdominal ultrasound can assess the extent and localization of Crohn's disease, and an increased bowel wall thickness is the most common finding. Our aim was to correlate bowel wall thickness at ultrasound, with the risk of short-term surgical outcome in patients with Crohn's disease.

MATERIALS AND METHODS: From 1997 to 2000 we performed ultrasound in 174 consecutive patients with Crohn's disease. Surgical operations were recorded over a 1-yr follow-up. Logistic regression analysis was performed to identify clinical and ultrasound risk factors for surgery.

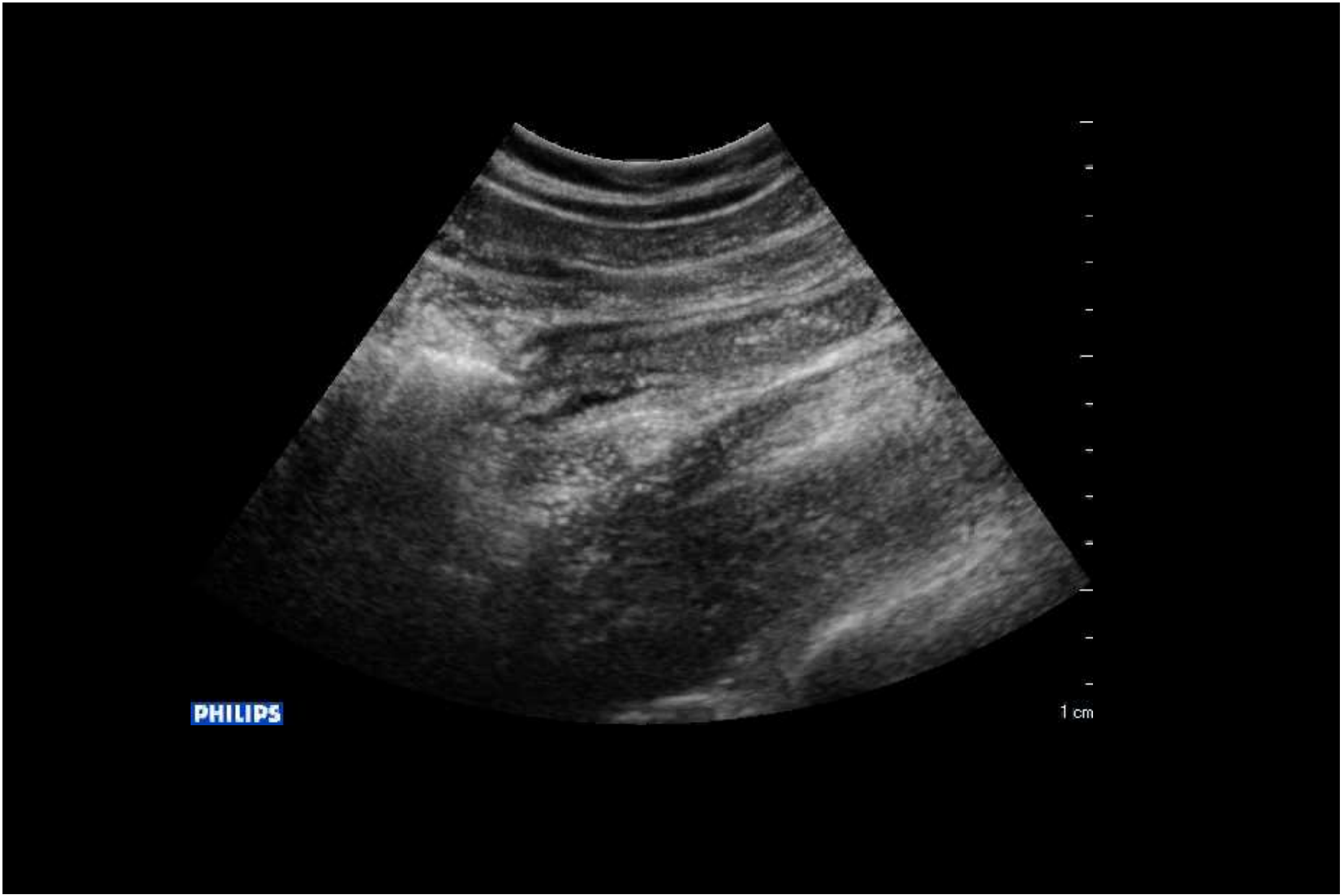
RESULTS: Fifty-two patients underwent surgery within 1 yr. Indication for surgery was strictures in most of the cases. Median bowel wall thickness was higher in patients with surgery (8 mm) than those without surgery (6 mm) ($p < 0.0001$). A receiver operating characteristic (ROC) curve was constructed taking into account bowel wall thickness for selecting patients with a high risk of surgery. The optimized cut-off for equally important sensitivity and specificity was calculated at 7.008 mm. The binary regression analysis showed that CDAI > 150, absence of previous surgery, stricturing–penetrating pattern, the presence of intestinal complications, and intestinal wall thickness >7 mm were associated with an increased risk of surgery. Patients with intestinal wall thickness >7 mm at ultrasound had the highest risk (OR: 19.521; 95% CI: 5.362–71.065).

CONCLUSIONS: Data suggest that bowel wall thickness >7 mm at ultrasound is a risk factor for intestinal resection over a short period of time. Routine use of abdominal ultrasound during evaluation of patients with Crohn's disease may identify a subgroup that is at high risk for surgery.

(Am J Gastroenterol 2004;99:1977–1983)

Figure 2. Scatter plot showing bowel wall thickness (mm) measured with abdominal ultrasound in patients with Crohn's disease stratified in those with and without surgery during 1-yr follow-up. The line represents the median. *p* by the Mann-Whitney *U* test.

PHILIPS
5 mm


PHILIPS
1 cm

US et IBD

- Diagnostic : iléite vs appendicite
- Extension
- Complications: fistules, abcès
- Activité : réponse thérapeutique
- Pronostic