Distended Bowel

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RAD 3030/4001 Diagnostic Radiology

Case from Dr. Michael Redwine and Dr. Samyuktha Balabhadra

With help from Dr. Brandon Wang, Dr. Joshua Gu, Dr. Naoki Murai and Girija Rajakumar

Clinical History

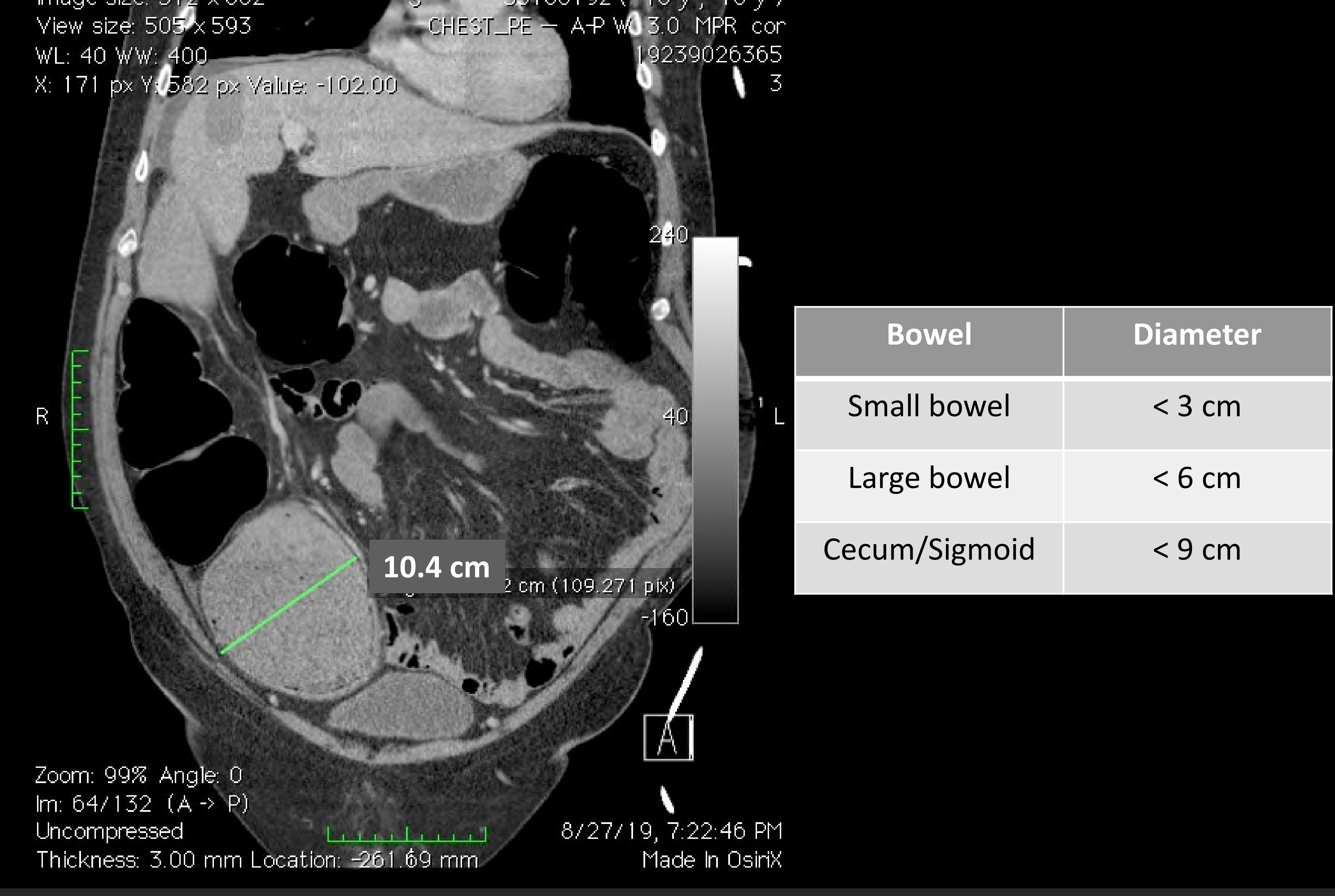
- History:
  - 78 y/o M presents to ED at MH-cypress with significant constipation on 8/27
  - Two day hx of abdominal distention and pain (8/10) with SOB
  - CT chest/abdomen/pelvis was obtained at MH-cypress, based on which he was transferred to MH-TMC for GI services

Imaging performed at MH Cypress

- Chest XR
- CTA Chest
- CT Abd/pelvis with contrast

Completed together

Image size: 512 x 602
View size: 505 x 593
WL: 5 WW: 400
S 55188192 (78 y , 78 y)
CHEST_PE — A-P W 3.0 MPR cor
19239026365
3
205
5
-195
R
L
A
Zoom: 99% Angle: 0
Im: 5/132 A (A -> P)
Uncompressed
Thickness: 3.00 mm Location: -438.19 mm
8/27/19, 7:22:46 PM
Made In OsiriX

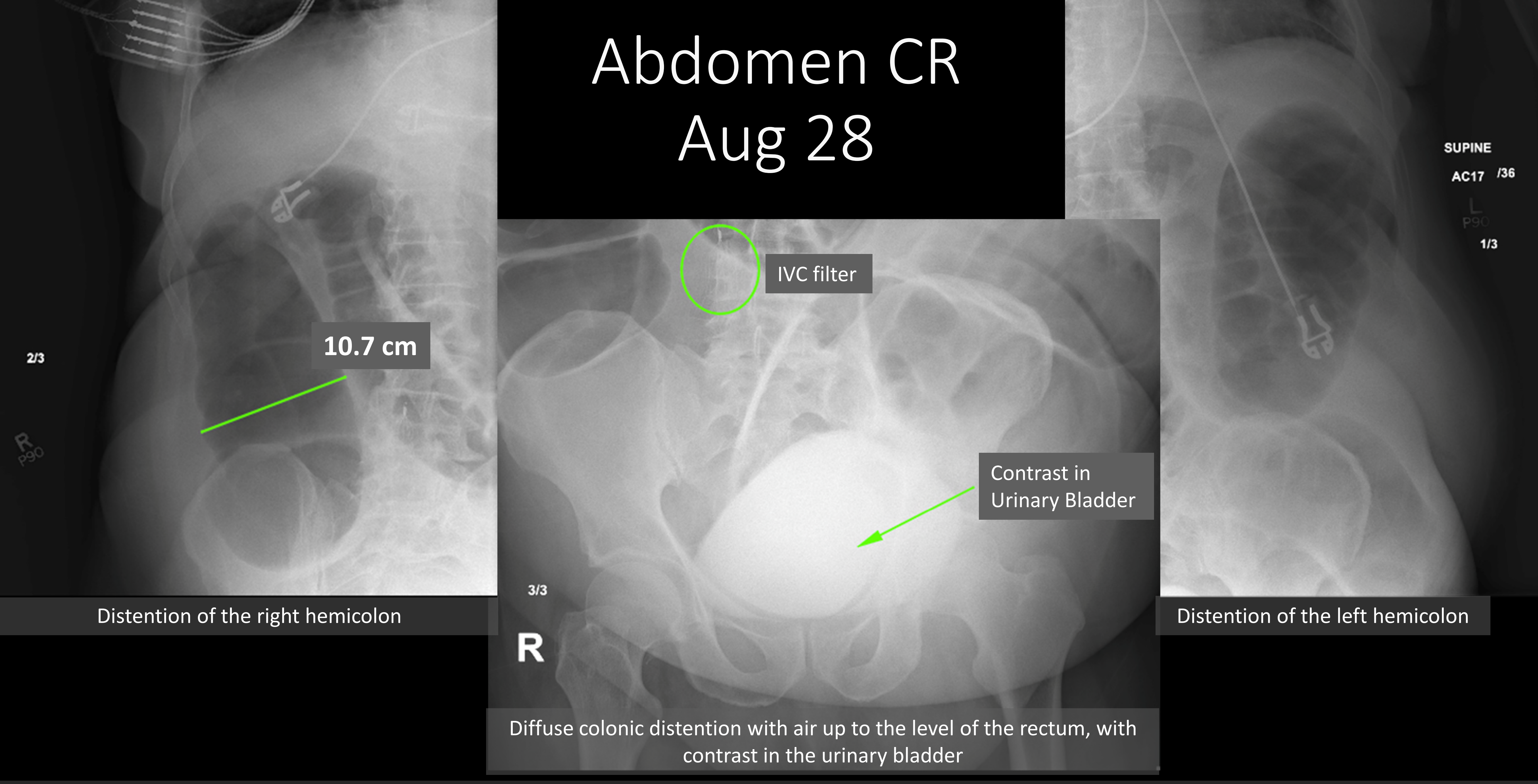


Bowel	Diameter
Small bowel	< 3 cm
Large bowel	< 6 cm
Cecum/Sigmoid	< 9 cm

Imaging performed at Memorial Hermann

- Abdominal XR (8/28)
- Abdominal XR (8/29)
- CT Abdomen/Pelvis w/ IV contrast (8/29)
- Abominal XR (8/30)
- CT Abdomen/Pelvis w/ IV contrast (9/03)

Abdomen CR
Aug 28



Distention of the right hemicolon

Diffuse colonic distention with air up to the level of the rectum, with contrast in the urinary bladder

Distention of the left hemicolon

Abdomen CR
Aug. 29

L
1 of 3
33
MIMU\4
SUPINE

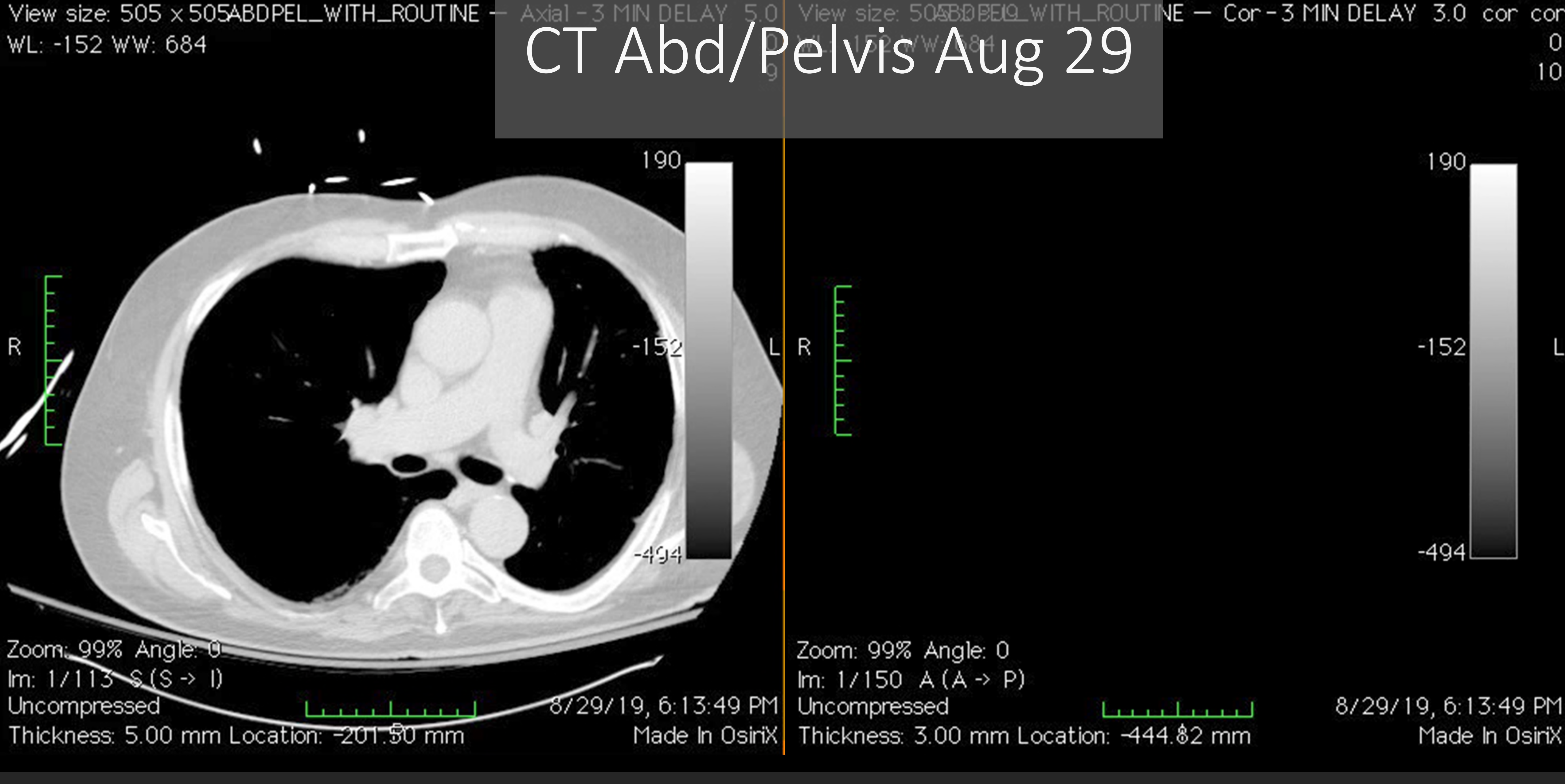
3 of 3
R

Persistent marked dilation the sigmoid to RUQ

Move (Apple + click)
2 of 3
L

Decompression of the sigmoid proximal to the dilated segment

CT Abd/Pelvis Aug 29



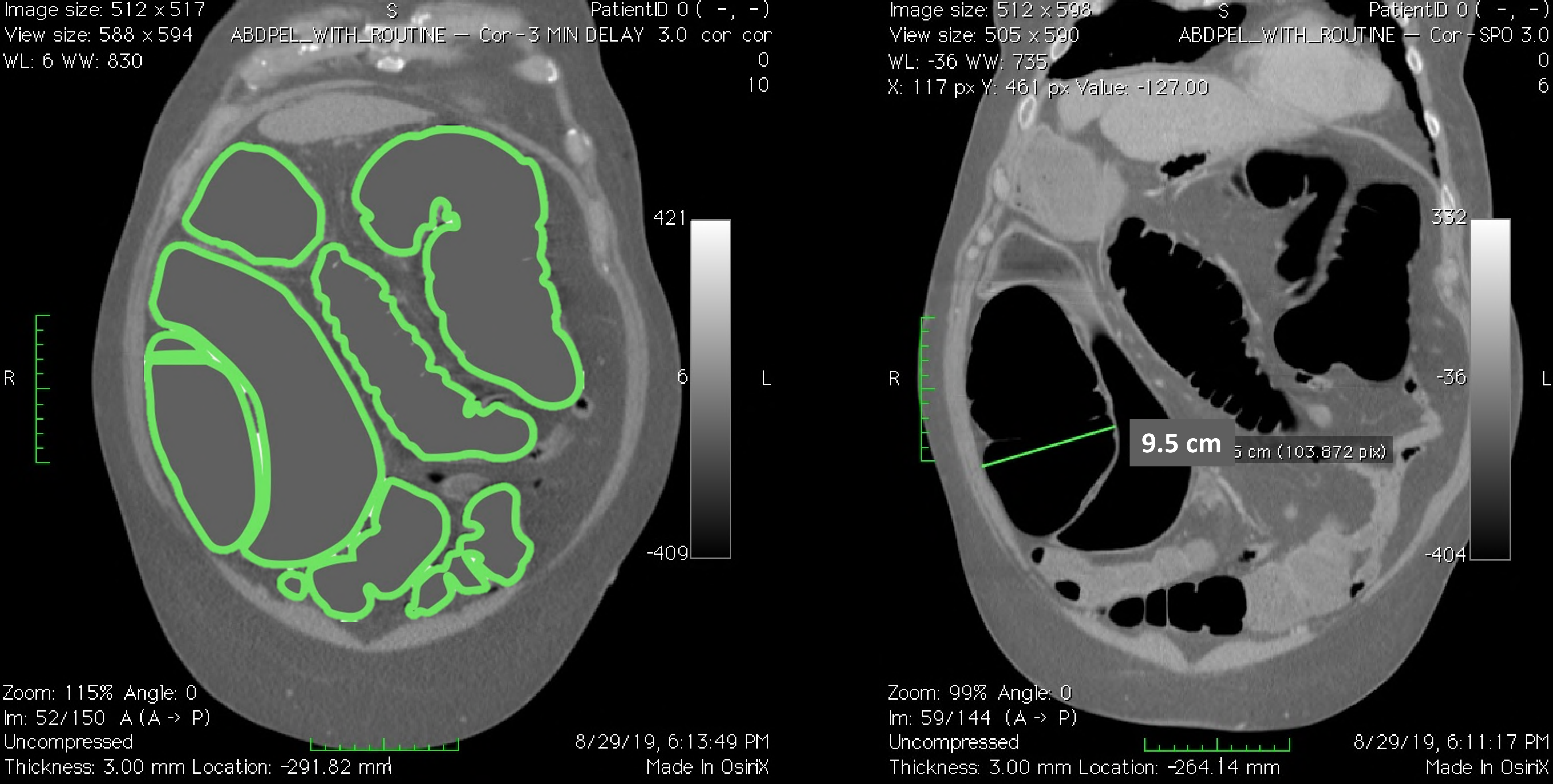


Image size: 512 x 517
View size: 588 x 594
WL: 6 WW: 830
S
PatientID 0 (-, -)
ABDPEL_WITH_ROUTINE — Cor - 3 MIN DELAY 3.0 cor cor
0
10
421
6
-409
R
L
Zoom: 115% Angle: 0
Im: 52/150 A (A -> P)
Uncompressed
Thickness: 3.00 mm Location: -291.82 mm
8/29/19, 6:13:49 PM
Made In OsiriX
Image size: 512 x 598
View size: 505 x 590
WL: -36 WW: 735
X: 117 px Y: 461 px Value: -127.00
S
PatientID 0 (-, -)
ABDPEL_WITH_ROUTINE — Cor - SPO 3.0
0
6
332
-36
-404
R
L
9.5 cm
cm (103.872 pix)
Zoom: 99% Angle: 0
Im: 59/144 (A -> P)
Uncompressed
Thickness: 3.00 mm Location: -264.14 mm
8/29/19, 6:11:17 PM
Made In OsiriX

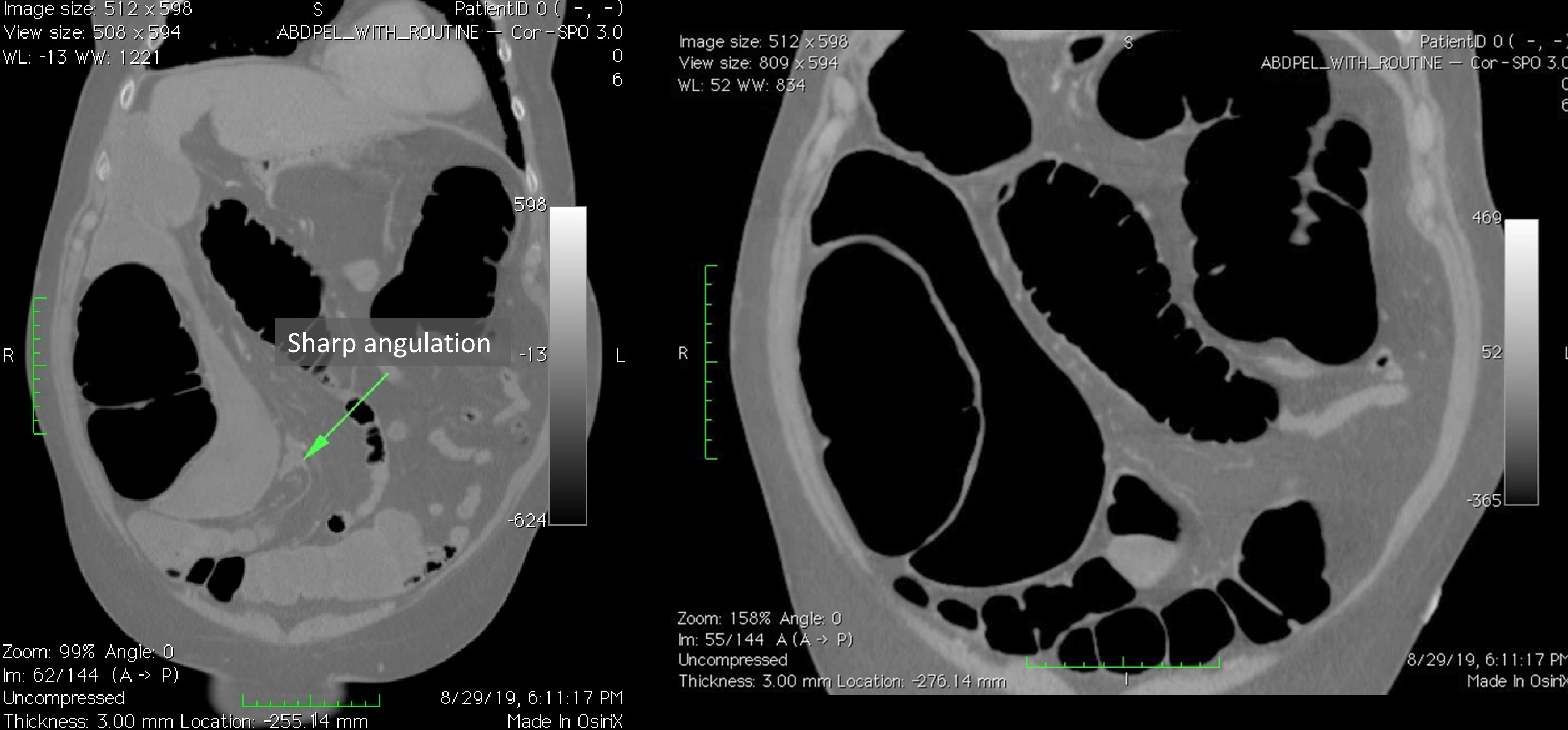


Image size: 512 x 598
View size: 508 x 594
WL: -13 WW: 1221
S
PatientID 0 (-, -)
ABDPEL_WITH_ROUTINE — Cor-SPO 3.0
0
6
598
-13
-624
R
L
Sharp angulation
Zoom: 99% Angle: 0
Im: 62/144 (A -> P)
Uncompressed
Thickness: 3.00 mm Location: -255.14 mm
8/29/19, 6:11:17 PM
Made In OsiriX
Image size: 512 x 598
View size: 809 x 594
WL: 52 WW: 834
S
PatientID 0 (-, -)
ABDPEL_WITH_ROUTINE — Cor-SPO 3.0
0
6
469
52
-365
R
L
Zoom: 158% Angle: 0
Im: 55/144 A (A -> P)
Uncompressed
Thickness: 3.00 mm Location: -276.14 mm
8/29/19, 6:11:17 PM
Made In OsiriX

Highlights of key findings

- Two day hx of constipation, lower abd. pain and distention
- Significantly redundant sigmoid, dilated to 9.5cm, from the pelvis
- Decompressed small bowel
- Possible sharp angulation of vasculature
- No other convincing signs of obstruction

Differential Diagnosis

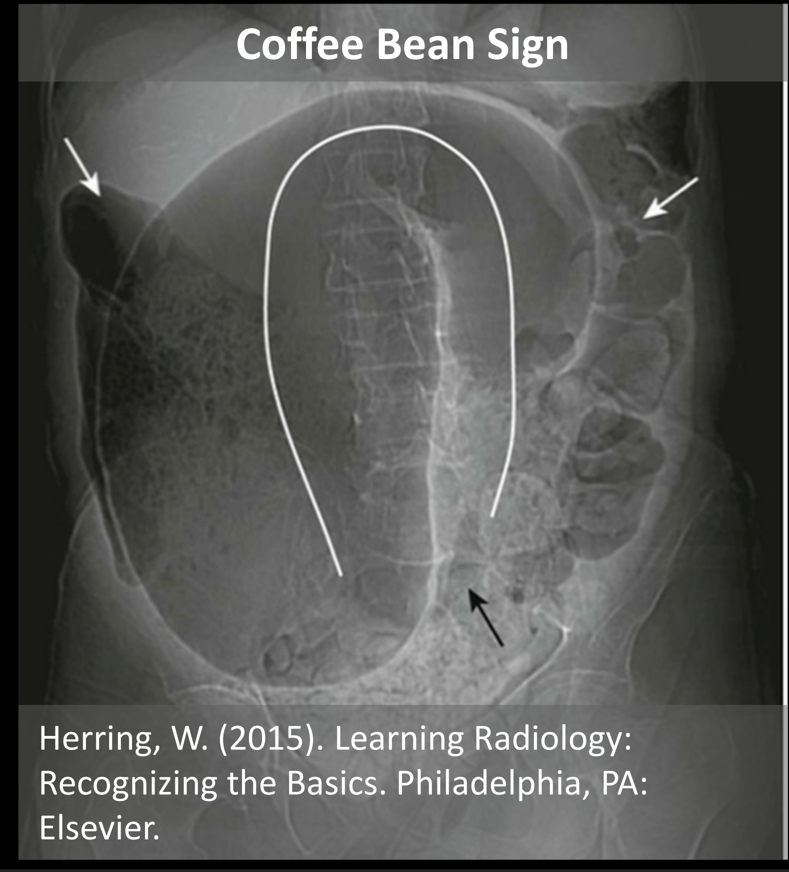
- Mechanical Obstruction
  - Volvulus
    - Sigmoid, cecum
  - Large Bowel Obstruction due to other causes
    - Tumor, hernia, intussusception
- Giant sigmoid diverticulum
- Pseudoobstruction (Ogilvie)

Discussion – Sigmoid Volvulus

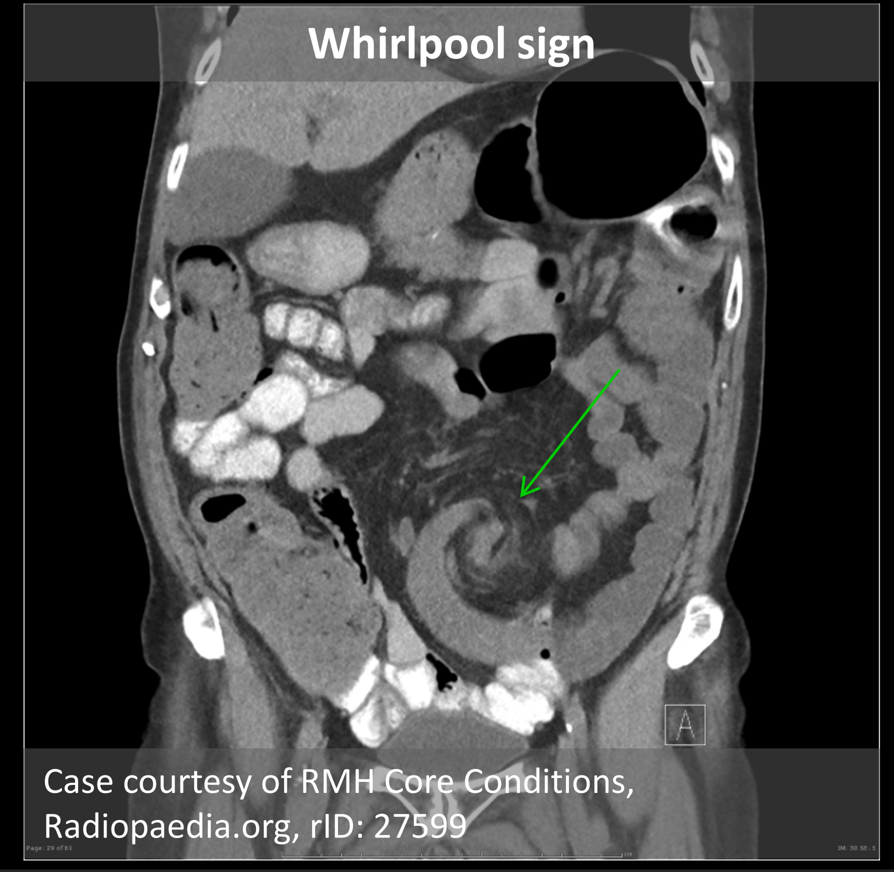
- Redundant sigmoid with narrow mesenteric attachment to posterior abdominal wall allows for twisting
- Predisposing factors:
  - Chronic constipation
  - high-roughage diet (may cause a long, redundant sigmoid colon)
  - Roundworm infestation
  - Megacolon
- Mortality rate 20-25%

Final Diagnosis

- Sigmoid Volvulus characteristic findings



Herring, W. (2015). Learning Radiology: Recognizing the Basics. Philadelphia, PA: Elsevier.



Case courtesy of RMH Core Conditions, Radiopaedia.org, rID: 27599

Final Diagnosis

- Sigmoid Volvulus characteristic findings

"split wall sign"

A

B

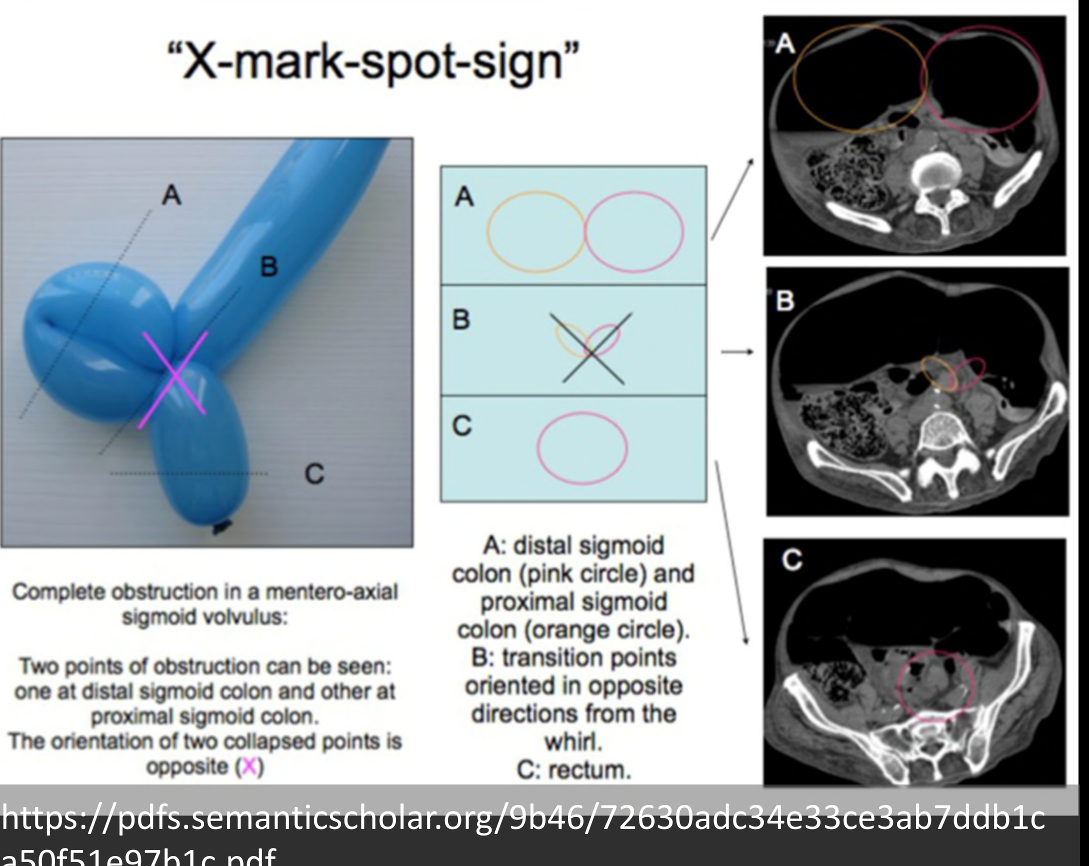
C

Partial obstruction in a mesentero-axial sigmoid volvulus:

One transition point is seen at distal sigmoid without obstruction point at proximal sigmoid.
Mesenteric fat separating the two sigmoid walls.

A: dilated sigmoid limbs: distal sigmoid (pink circle) and proximal sigmoid (orange circle)
B: one transition point at distal sigmoid (pink circle), whith mesenteric fat around it (*)
C: rectum

https://pdfs.semanticscholar.org/9b46/72630adc34e33ce3ab7ddb1ca50f51e97b1c.pdf



https://pdfs.semanticscholar.org/9b46/72630adc34e33ce3ab7ddb1ca50f51e97b1c.pdf

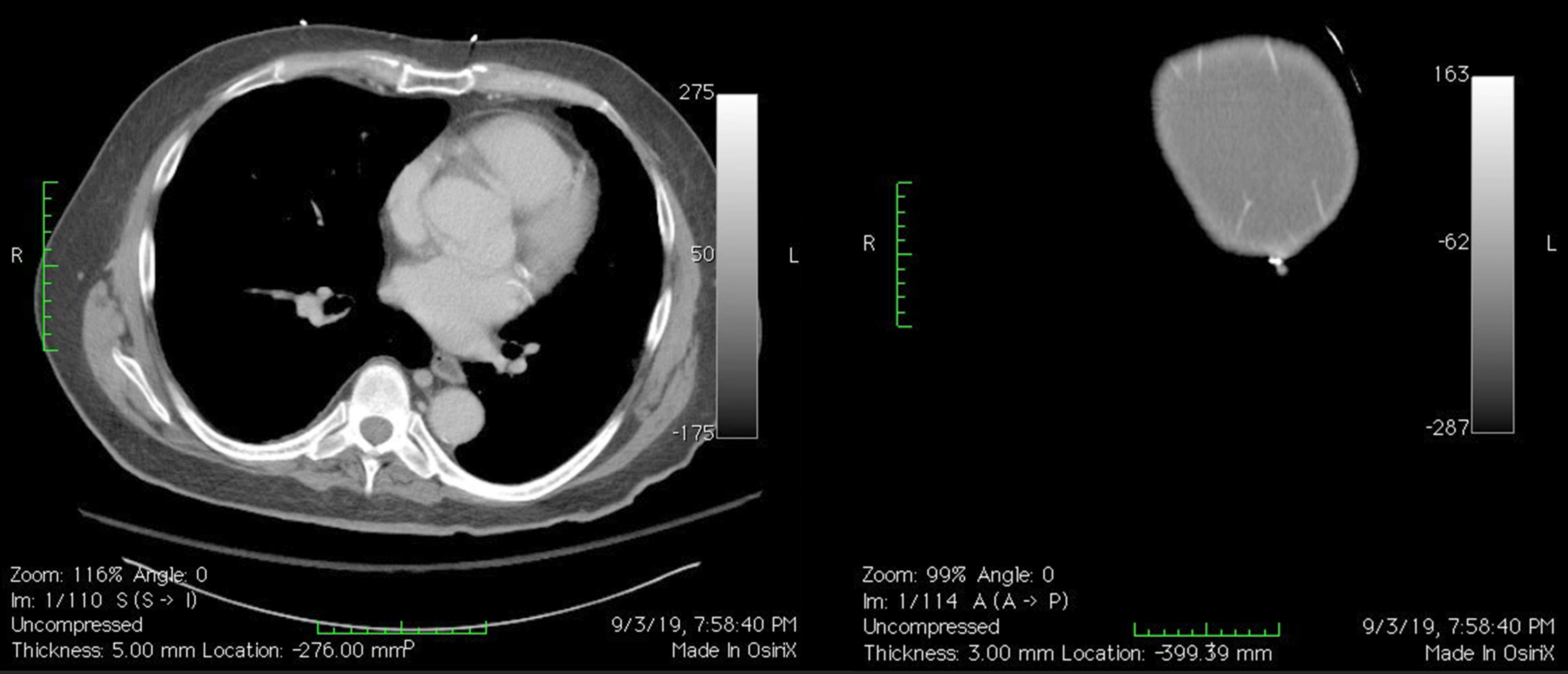
Treatment Options

- Derotation and decompression by barium enema, rectal tube, colonoscope, or sigmoidoscope if no signs of ischemia or perforation
  - Recurrent rate up to 50%
- Laparoscopic derotation or laparotomy w/ or w/o resection
- Cecopexy to parietal peritoneum

Treatment Undergone

- This patient underwent colonoscopy where volvulus was noted and later sent to surgery. An exploratory laparotomy was performed with a sigmoid colectomy with a side-to-side colocolonic anastomosis and an omental flap.
- No post-op or intervention images were available

Post Op



ACR appropriateness Criteria

Variant 1: **Palpable abdominal mass. Suspected intra-abdominal neoplasm. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
CT abdomen with IV contrast	Usually Appropriate	☢☢☢
US abdomen	Usually Appropriate	O

Variant 4: **Acute nonlocalized abdominal pain. Not otherwise specified. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
CT abdomen and pelvis with IV contrast	Usually Appropriate	☢☢☢
CT abdomen and pelvis without IV contrast	Usually Appropriate	☢☢☢
MRI abdomen and pelvis without and with IV contrast	Usually Appropriate	O
US abdomen	May Be Appropriate	O
MRI abdomen and pelvis without IV contrast	May Be Appropriate	O
CT abdomen and pelvis without and with IV contrast	May Be Appropriate	☢☢☢☢
Radiography abdomen	May Be Appropriate	☢☢

https://acsearch.acr.org/list?_ga=2.151076986.2141348136.1568572200-544311373.1568223258

Cost of Imaging

Description	Typical Charges	Average Insured Patient Responsibility
Ct Pelvis/Abdomen W/Con (Texas Medical Center) (x2)	$7,998 ($15,996)	$480 ($960)
Abdomen X-Ray 1 View (x3)	$651 ($1,953)	$122 ($366)
Ct Pelvis/Abdomen W/Con (Community Hospital)	$7,100	$406
Ct Angio Chest W/O-W Con (Community Hospital)	$3,610	$365
Chest X-ray Exam 1 View (Community Hospital)	$628	$405
TOTAL	**$29,287**	**$2,502**

https://www.memorialhermann.org/patients-caregivers/pricing-estimates-and-information/

Take Home Points

- Classic findings are not always present. Must look for other clues
- Volvulus is a common cause of constipation and abdominal distention with up to 25% mortality
  - Abdominal X-ray can often diagnose, but CT helps determine location/cause of obstruction as well as extent of ischemia or perforation
- Normal bowel diameters can be remembered by the 3-6-9 rule
  - Small bowel < 3 cm
  - Large bowel < 6 cm
  - Cecum/Sigmoid < 9 cm

References

- “Closed Loop Obstruction in Small Bowel Obstruction.” The Radiology Assistant : Closed Loop Obstruction in Small Bowel Obstruction, http://www.radiologyassistant.nl/en/p4542eeacd78cf/closed-loop-obstruction-in-small-bowel-obstruction.html.
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- Jones, Jeremy. Bowel Dilatation (Summary): Radiology Reference Article. https://radiopaedia.org/articles/bowel-dilatation-summary?lang=us.
- Jones, Jeremy. “Sigmoid Volvulus: Radiology Reference Article.” Radiopaedia Blog RSS, https://radiopaedia.org/articles/sigmoid-volvulus?lang=us.

Questions?