

US confirmation of hepatopetal flow through bladder-umbilical-portal pathway in a patient affected by inferior vena cava obstruction due to retroperitoneal fibrosis and pelvic lipomatosis

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Section: Abdominal imaging

Area of Interest: Abdomen Anatomy Vascular Veins / Vena cava

Procedure: Computer Applications-Detection, diagnosis

Procedure: Diagnostic procedure

Procedure: Computer Applications-3D

Procedure: Imaging sequences

Procedure: Contrast agent-intravenous

Procedure: Education

Imaging Technique: CT

Imaging Technique: MR

Imaging Technique: Ultrasound-Colour Doppler

Imaging Technique: Ultrasound-Power Doppler

Special Focus: Tissue characterisation Haemodynamics

/ Flow dynamics Case Type: Clinical Cases

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Patient: 56 years, male

Clinical History:

A 56-year-old African man with a history of Ulcerative Colitis (endoscopically diagnosed and treated) and haemorrhoidectomy presented to our emergency department for a swelling of the right lower limb. Physical examination revealed pitting oedema and typical signs of inflammation suspicious for peripheral venous thrombophlebitis.

Imaging Findings:

After a negative Colour Doppler investigation of peripheral veins, CT after contrast demonstrated narrowed and obstructed Inferior Vena Cava caused by a solid tissue around vessels extended till the bisiliac-aortic carrefour; ureters were not involved. There was a complete thrombosis of the common iliac veins (Fig. 1).

An uncommon collateral pathway was detected: a vein from ectasic perivescical venous plexus directed to the umbilicus following the way of urachus (Fig. 2) was connected to a patent umbilical vein. The bladder was displaced superiorly and anteriorly and compressed by exuberant pelvic fatty tissue (Fig. 3).

In addition, an area of decreased portal perfusion mimicking a hepatic mass in the medial segment of the left lobe

(S4), was observed (Fig. 4).

In order to characterize these findings a Colour Doppler examination of the abdominal vessels was performed and it demonstrated a hepatopetal flow direction (Fig. 4) into the patent umbilical vessel.

Discussion:

Obstruction of VC is often an acquired condition. In the event of a chronic occlusion, collateral pathways must develop to maintain venous drainage. Retroperitoneal fibrosis (RFP) can be a rare cause of obstruction of IVC. RFP encompasses a wide range of disease characterized by proliferation of aberrant fibroinflammatory tissue, which usually surrounds the infrarenal portion of the abdominal aorta, IVC and iliac vessels.

The radiologist can confide in several features to differentiate benign and malignant RF forms; this is important because the first ones have a good outcome while malignant secondary forms have a poor prognosis. But to distinguish features lacks sensitivity and specificity and generalization is not always correct [1], (Fig. 1). The major collateral pathways which develop in IVC obstruction are superficial, intermediate, portal and deep ones [2]. Furthermore, uncommon pathways exist: blood may recanalize the paraumbilical veins in the anterior abdominal wall, which drain through the reconstituted patent venous duct into the hepatic vein. Our patient showed another unusual one: "bladder-umbilical-portal pathway" (Fig. 2). Possible reasons of this condition may consist in the fact that prevesical plexus originates from apical veins that surround urachal and in this case the apex of the patient's bladder is really close to the umbilical due to "inverted pear" morphology. Paraumbilical venous system leads blood from the navel to the liver. This flow dilutes the portal perfusion causing pseudolesions interpreted as due to "third inflow" [3] as confirmed by US examination (Fig. 4).

Judicious search for reasons of bladder dislocation and of unusual collateral pathways leads to the diagnosis of pelvic lipomatosis (PL). It is a rare non-malignant overgrowth of adipose tissue with minimal fibrotic and inflammatory components compressing soft tissue structures within the pelvis.

The association of RF and PL is a really rare condition [4].

Long et al [5] visualized eosinophil cells and other typical cells of inflammation and for this reasons he did not exclude an allergic component in the aetiology of PL.

PL and RF could be two different manifestations of a systemic condition due to a Th2- cell dominant immune reaction. In fact, our case showed a particular association of these two rare diseases, ulcerative colitis and allergic conditions which are suggestive of a strong Th2 immune polarization [6].

Radiologists should keep in mind specific and diagnostic signs and get curious about strange finding because they could be the key to achieve the correct diagnosis.

Differential Diagnosis List: Inferior vena cava obstruction due to RF and PL., Retroperitoneal liposarcoma, Retroperitoneal lymphoma

Final Diagnosis: Inferior vena cava obstruction due to RF and PL.

References:

- Caiafa RO1, Vinuesa AS, Izquierdo RS, (2013) Retroperitoneal Fibrosis: role of imaging in diagnosis and follow-up. *Radiographics* 33:535-552 (PMID: [23479712](#))
- Sonin AH1, Mazer MJ, Powers TA (1992) Obstruction of the inferior vena cava: A multiple-modality demonstration of causes, manifestations, and collateral pathways. *Radiographics* 12:309-322 (PMID: [1561419](#))
- Yoshimitsu K1, Honda H, Kuroiwa T (2001) Hemodynamics and Pseudolesions of the Noncirrhotic Liver at CT. *RadioGraphics* 21:S81-S96 (PMID: [11598250](#))
- Craig WD, Fanburg-Smith JC, Henry LR, Guerrero R (2009) Fat-containing Lesions of the Retroperitoneum: Radiologic-Pathologic Correlation. *RadioGraphics* 29:261-290 (PMID: [19168848](#))

Long WW Jr, Kellett JW, Gardner WA, (1973) Perivescical lipomatosis. J Urol 109:238-241 (PMID: [4685735](#))
Danese S, Fiocchi C. (2011) Ulcerative Colitis. N Engl J Med 365:1713-25. (PMID: [22047562](#))

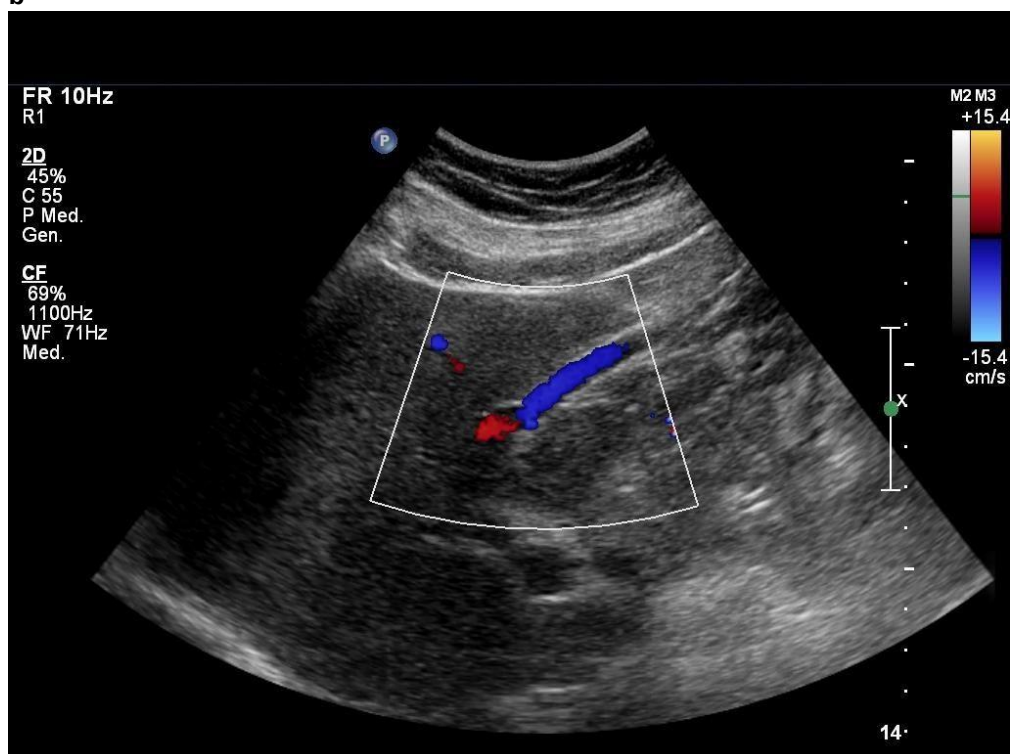
Figure 1

a



Description: MDCT shows hypodense area during portal phase due to hepatopetal flow ("third inflow") through superior Sappey vein. **Origin:** IRCCS IST SAN MARTINO HOSPITAL, GENOVA

b



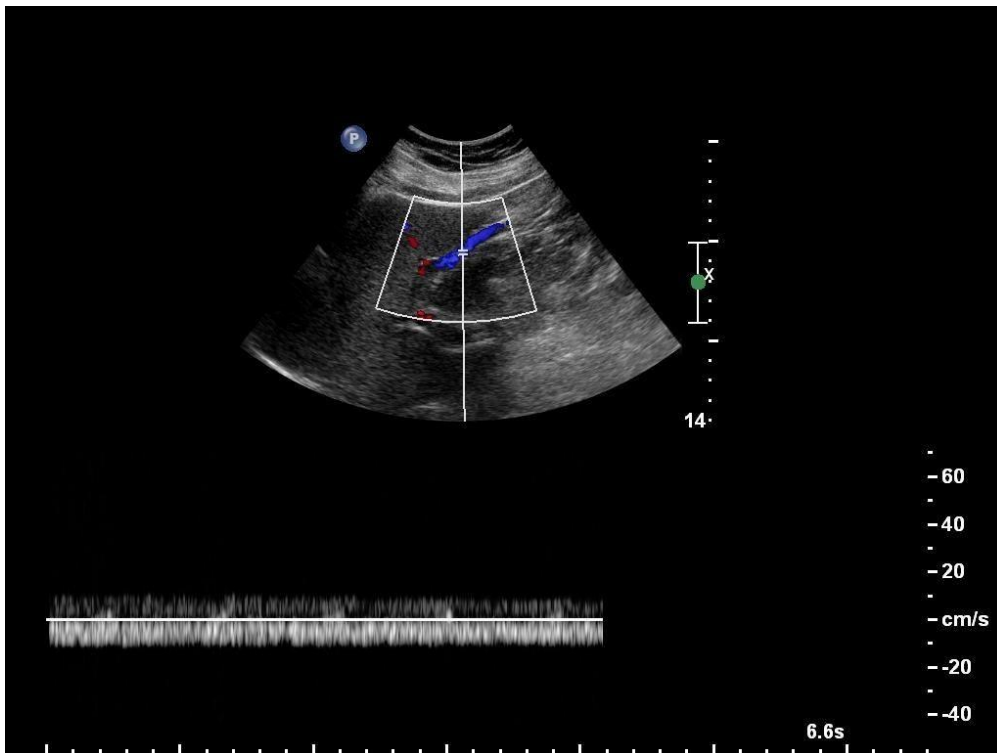
Description: Colour Doppler confirms our suspicion: two venous flows, one portal and one through patent venous duct, have different directions. **Origin:** IRCCS IST San Martino, Genova

c



Description: Further, C- D, pulsed Doppler confirms that the two flows analysed are venous. **Origin:** IRCCS IST San Martino, Genova

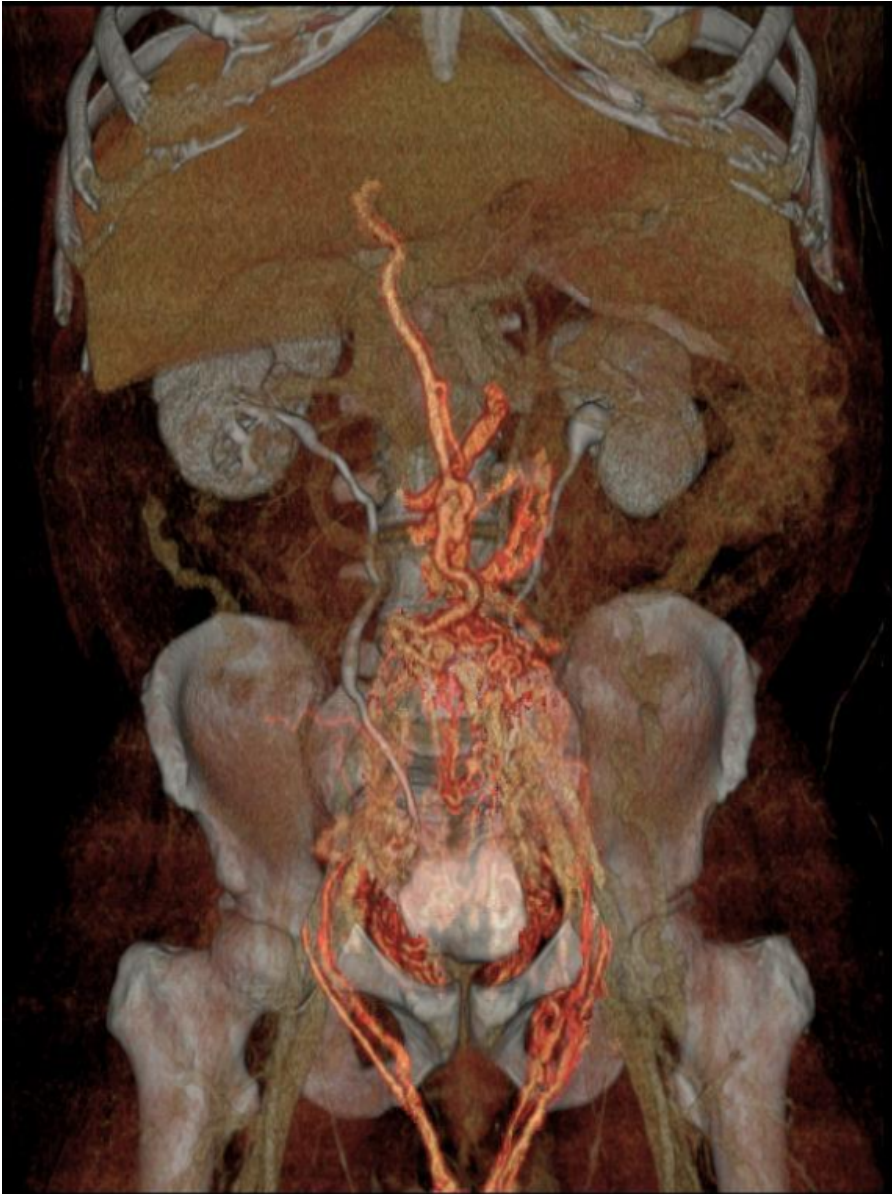
d



Description: Further, C- D, pulsed Doppler confirms that the two flows analysed are venous. **Origin:** IRCCS IST San Martino, Genova

Figure 2

a



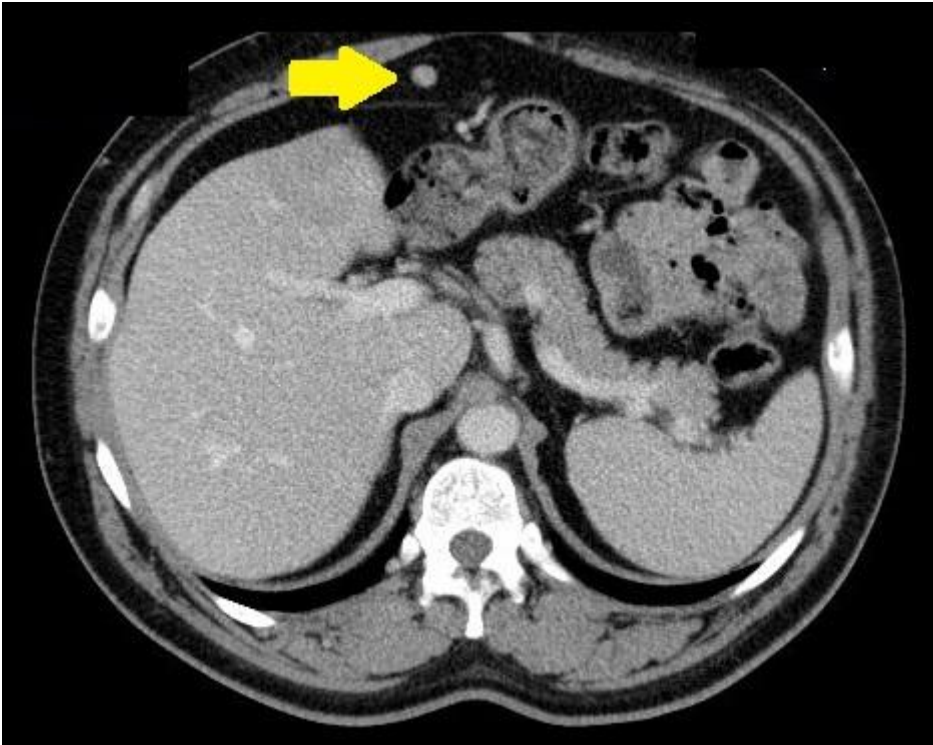
Description: A vein, originating from the ectasic perivescical venous plexus, was directed to the umbilicus following the way of the urachus. This vein and the recanalized paraumbilical veins created a collateral pathway from bladder to liver. **Origin:** IRCCS IST S.Martino, Genova

b



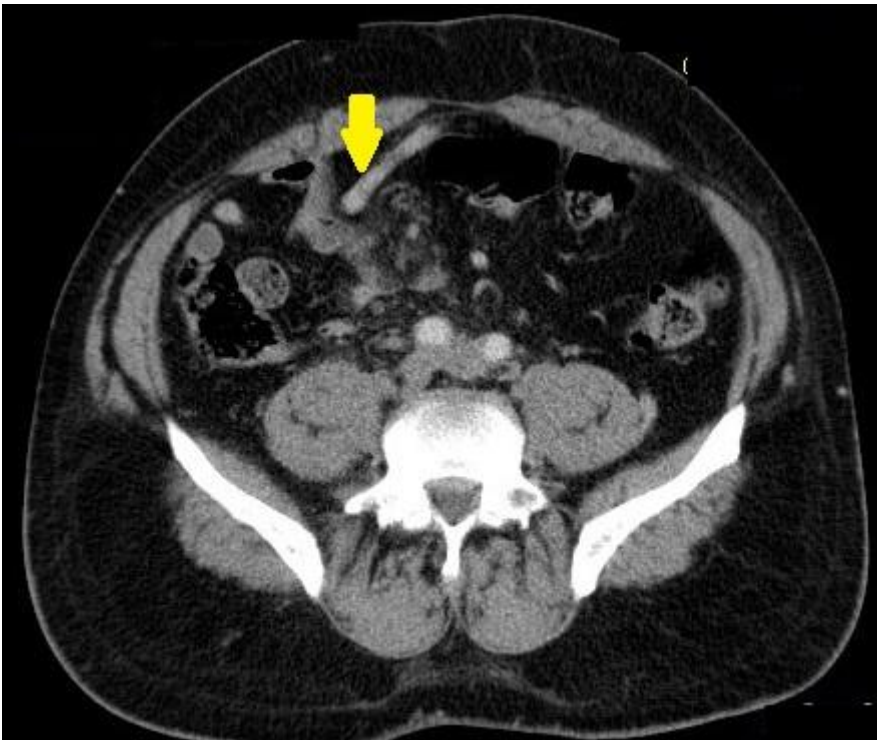
Description: A vein, originating from the ectasic perivescical venous plexus, was directed to the umbilicus following the way of the urachus. This vein and the recanalized paraumbilical veins created a collateral pathway from bladder to liver. **Origin:** IRCCS IST S.Martino, Genova

c



Description: Patent umbilical vein (yellow arrow). **Origin:** IRCCS IST S.Martino, Genova

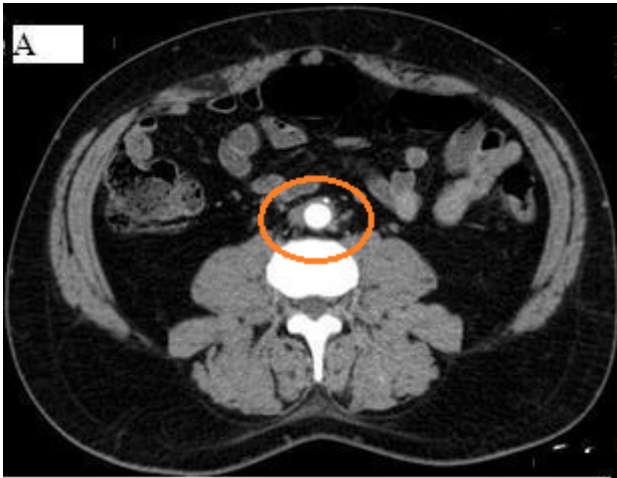
d



Description: Vein, shown in the figure (yellow arrow) originating from ectatic perivescical venous plexus and directed to the umbilicus. **Origin:** IRCCS IST S.Martino, Genova

Figure 3

a



Description: CTI (a/b) and T2WI MRI (c) visualize soft tissue which spares the great vessels, is mainly located distal to the renal hilum and has an infiltrative aspect enveloping rather than displacing adjacent structures. **Origin:** IRCCS IST San Martino hospital Genova

b



Description: CTI (a/b) and T2WI MRI (c) visualize soft tissue which spares the great vessels, is mainly located distal to the renal hilum and has an infiltrative aspect enveloping rather than displacing adjacent structures. **Origin:** IRCCS IST San Martino, Genova

c



Description: MRI shows low T2 signal intensity reflecting poor or absent inflammation activity due to glucocorticosteroid therapy. **Origin:** IRCCS IST San Martino, Genova

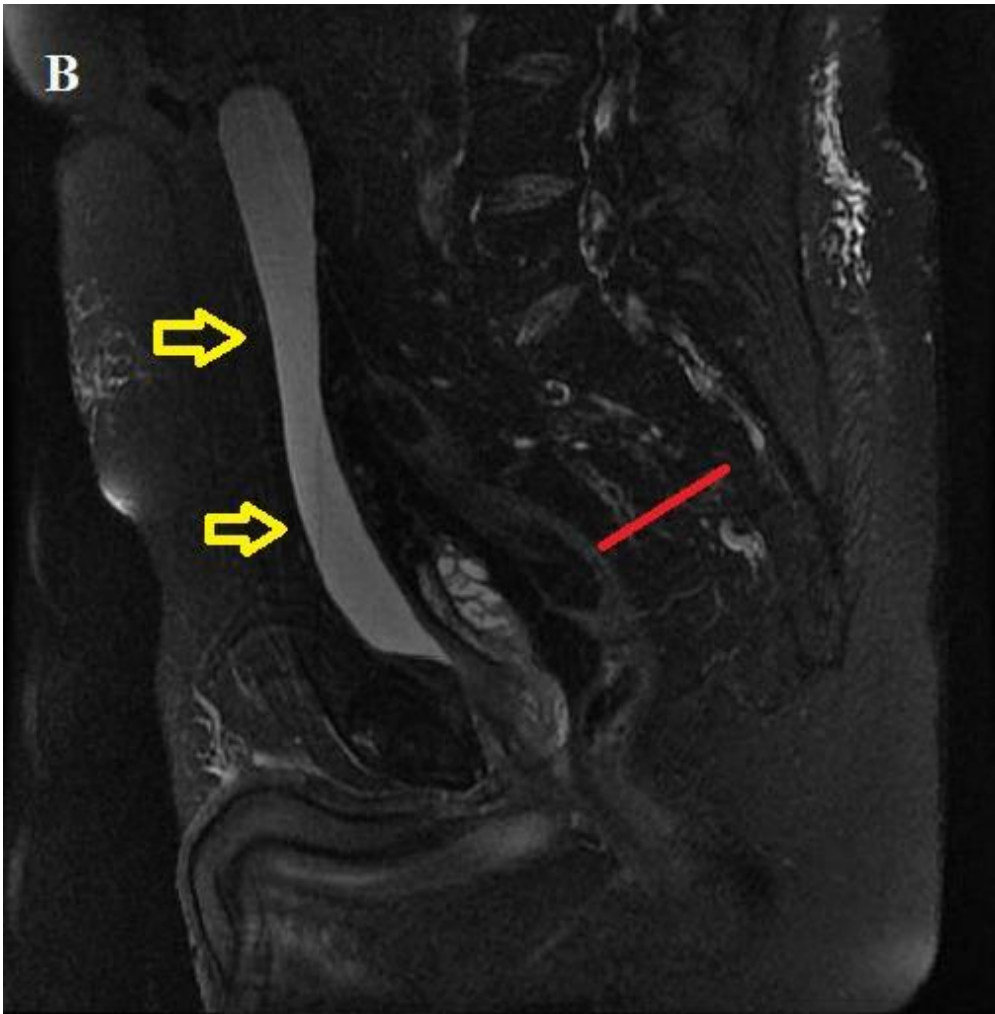
Figure 4

a



Description: T1WI) diagnostic criteria: elongation and elevation of urinary bladder with symmetrical inverted pear-shaped morphology (yellow arrows). **Origin:** IRCCS IST S. Martrino, Genova

b



Description: T1WI fat suppressed.

Diagnostic criteria:

elongation and narrowing of the rectum, elevation of rectosigmoid and sigmoid colon out of pelvis, increase in sacro-rectal space > 10 mm (in our patient 45 mm, red line). **Origin:** IRCCS IST S. Martrino, Genova