Pelvic endometrial carcinoma recurrence: MRI including diffusion-weighted imaging

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Section: Genital (female) imaging
Area of Interest: Genital / Reproductive system female
Procedure: Diagnostic procedure
Imaging Technique: CT
Imaging Technique: MR
Imaging Technique: SPECT
Imaging Technique: SPECT-CT
Special Focus: Neoplasia Case Type: Clinical Cases
Authors: Tonolini Massimo, MD.
Patient: 58 years, female

Clinical History:

G1P1 woman with history of grade 3 histology FIGO (International Federation of Gynaecology and Obstetrics) stage IB endometrial adenocarcinoma treated by laparoscopic hysterectomy, salpingo-oophorectomy and lymphadenectomy plus adjuvant pelvic radiotherapy.
After 2 years of well-being and unremarkable follow-up, currently complains of rectal tenesmus and left gluteal pain for 6 weeks.

Imaging Findings:

Two years earlier, preoperative CT (Fig. 1) visualized the endometrial tumour invading over 50% of myometrial thickness.
Currently, gynaecologic examination did not reveal abnormal findings. Follow-up CT (Fig. 2) showed left-sided hydronephrosis caused by ipsilateral ovoid-shaped, peripherally enhancing pelvic lesion. Shortly thereafter, pelvic MRI (Fig. 3) confirmed the pelvic lesion abutting the sigmoid colon and surgical clips, characterised by lobulated contours, tumour-like solid features (moderate T2-hyperintensity and intermediate T1-weighted signal), minimally inhomogeneous contrast enhancement, and restricted diffusion on high b-value diffusion-weighted imaging (DWI) with corresponding low apparent diffusion coefficient (ADC) value.
Suspicion of recurrent carcinoma was confirmed by strong [18F]-fluorodeoxyglucose uptake at positron emission tomography (PET)-CT (Fig. 4). Combination of CT, MRI and PET-CT imaging excluded other signs of vaginal, nodal or distant recurrence.
Having been irradiated before, the patient underwent systemic chemotherapy which relieved symptoms. Post-treatment MRI (Fig. 5) showed resolved hydronephrosis, decreased size of the neoplastic recurrence, development of hypointense signal consistent with post-treatment fibrosis and normalised diffusion.

Discussion:

In industrialized countries, endometrial carcinoma (EC) represents the commonest gynaecologic malignancy with a rising incidence over the last decades due to increased life expectancy and the obesity epidemic. Invariably encountered after menopause (mostly in the 6th-7th decades), EC generally manifests early with abnormal uterine bleeding: as a result, such as in our patient 75-80% of patients have organ-confined disease (stage I according to
the FIGO classification), and surgery (with or without adjuvant therapy according to risk class) is generally curative. Increasingly performed laparoscopically, the standard surgical staging includes total hysterectomy, bilateral salpingo-oophorectomy, peritoneal washing and lymphadenectomy [1-3]. Unfortunately, as in this case EC recurs in 3.6%-16% of patients within 2 or 3 years in 64% and 87% of patients respectively. In descending order of frequency, recurrences involve the vaginal vault, pelvis, regional or retroperitoneal lymph nodes, occasionally the peritoneum or distant sites. The associated prognosis is generally poor: factors affecting survival include advanced stage at presentation, histological subtype and grade, older age, previous radiotherapy, recurrence site and relapse-free interval: compared to noncentral recurrences such as the presented one, isolated vaginal masses are associated with better prognosis [1-4]. Recurrent EC is commonly asymptomatic and identified at imaging follow-up. Albeit CT has high (93%) reported accuracy, MRI increasingly represents the modality of choice for regional staging, treatment selection and post-treatment surveillance of most gynaecological tumours. The recent addition of diffusion- weighted (DW) sequences has improved detection, tissue characterisation, differentiation of benign versus malignant lesion, prediction and monitoring of treatment response. As in this case, MRI comprehensively evaluates suspected recurrence at the vaginal vault, lateral pelvis or lymph nodes. With DW information diagnosis of residual or recurrent EC and of post-treatment fibrosis is generally confident [5-10]. After the early post-treatment setting [18F]-fluorodeoxyglucose (FDG) positron emission tomography-computed tomography (PET/CT) has very high sensitivity and specificity and is useful in patients with clinical and biochemical suspicion of recurrence, particularly after negative or equivocal cross-sectional imaging studies and for detecting distant metastases [7, 8, 11-13]. Treatment options for relapsing EUC include repeated surgery (albeit pelvic exenteration has significant perioperative morbidity), radiotherapy (in women not previously irradiated), various (cytotoxic, hormonal, or molecular targeted) therapies. Salvage radiotherapy allows eradication of pelvic recurrence in almost half of patients, with 5-year local control rates of 80% and 54% in tumours measuring respectively below and over 2 cm. Similarly, combination chemotherapy has been shown to improve the progression-free and overall survival [1-4].

Differential Diagnosis List: Pelvic lateral recurrence of primarily resected and irradiated early-stage endometrial cancer, Postoperative collection, Postsurgical fibrotic tissue, Abscess, Metastatic lymphadenopathy

Final Diagnosis: Pelvic lateral recurrence of primarily resected and irradiated early-stage endometrial cancer

References:

Description: Multiplanar post-contrast images (a...c) showed uterine body with well-demarcated, mildly heterogeneous hypointense endometrial mass (arrowheads), measuring approximately 3x2.5x1.5 cm, which did not appear to involve the cervix. No ascites and lymphadenopathies. Origin: Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)
**Description:** Multiplanar post-contrast images (a...c) showed uterine body with well-demarcated, mildly heterogeneous hypointense endometrial mass (arrowheads), measuring approximately 3x2.5x1.5 cm, which did not extend beyond the uterus. No adnexal enlargement and lymphadenopathies.

**Origin:**
Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Multiplanar post-contrast images (a...c) showed uterine body with well-demarcated, mildly heterogeneous hypointense endometrial mass (arrowheads), which invaded over 50% of myometrium but not full-thickness or beyond the uterus. No adnexal enlargement and lymphadenopathies. Origin: Tonolini M. Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Oblique-axial image from additional excretory-phase CT acquisition after colonic water enema confirmed hypointense endometrial mass (arrowheads) invading over 50% of myometrium but not full-thickness or beyond the uterus. Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Axial (a...c in craniocaudal order) and coronal (d) images showed development of left-sided hydronephrosis (thick arrows) with delayed nephrogram, caused by ipsilateral pelvic mass (arrows). Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Axial (a...c in craniocaudal order) and coronal (d) images showed development of left-sided hydronephrosis (thick arrows) with delayed nephrogram, caused by ipsilateral pelvic mass (arrows). Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: The left lateral pelvic mass (arrows) measured approximately 3x2.5x1.5 cm and showed peripheral contrast enhancement. No ascites, adenopathies and solid organ lesions. Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: The left lateral pelvic mass (arrows) measured approximately 3x2.5x1.5 cm and showed peripheral contrast enhancement. Note ipsilateral hydronephrosis (thick arrows) with delayed nephrogram. Origin: Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)
Description: Multiplanar T2-weighted images (a...c) confirmed ovoid-shaped lobulated left pelvic mass (arrows), with tumour-like solid signal intensity, closely adherent to sigmoid colon (*), causing infiltration of the ipsilateral ureter (thick arrow) and upstream hydronephrosis. Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Multiplanar T2-weighted images (a...c) confirmed ovoid-shaped lobulated left pelvic mass (arrows), with tumour-like solid signal intensity, abutting the surgical clips indicated by ferromagnetic artefacts (arrowhead) and closely adherent to sigmoid colon (*). Origin: Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)
Description: Multiplanar T2-weighted images (a...c) confirmed ovoid-shaped lobulated left pelvic mass (arrows), with tumour-like solid signal intensity, closely adherent to sigmoid colon (*) and mesorectal fascia (thick arrow). Origin: Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)
**Description:** On precontrast T1-weighted images the ovoid-shaped lobulated left pelvic mass (arrows) showed intermediate solid signal intensity, was closely adherent to sigmoid colon (*) and mesorectal fascia (thick arrow). **Origin:** Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: High (800) b-value diffusion-weighted image (DWI, e) showed strong hyperintense signal at the left lateral pelvic mass (arrows), with corresponding low apparent diffusion coefficient (ADC value 0.85x10⁻³ mm²/s, f). Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: High (800) b-value diffusion-weighted image (DWI, e) showed strong hyperintense signal at the left lateral pelvic mass (arrows), with corresponding low apparent diffusion coefficient (ADC value 0.85x10^{-3} mm^2/s, f). Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Additionally, midsagittal T2-weighted image showed normal postoperative appearance of the vagina without signs of recurrence at the usual vault site indicated by thin arrow. 

Origin: 
Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)
Description: Fat-suppressed T1-weighted images after iv gadolinium contrast showed positive, minimally inhomogeneous contrast enhancement at the left pelvic mass (arrows), closely adherent to the sigmoid colon (*). Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Fat-suppressed T1-weighted images after iv gadolinium contrast showed positive, minimally inhomogeneous contrast enhancement at the left pelvic mass (arrows), abutting the surgical clips indicated by ferromagnetic artefacts (arrowhead) and closely adherent to sigmoid colon (*). Origin: Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy).
Description: FDG-PET/CT showed strong tracer uptake in the left lateral pelvic mass (arrows). Note radiotracer in the urinary cavities and bladder, asymmetric increased thyroid uptake attributed to chronic lymphocytic thyroiditis. Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: FDG-PET/CT showed strong tracer uptake in the left lateral pelvic mass (arrows) with corresponding maximum standardized uptake value (SUV) 15.4. No other pathological uptake representing nodal or distant relapse sites. Origin: Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)
Description: Compared to Fig.3, multiplanar T2-weighted images (a...c) showed decreased size and development of hypointense signal at the lateral pelvic recurrence (arrows) consistent with post-treatment fibrosis. Note disappearance of hydronephrosis. Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
**Description:** Compared to Fig.3, multiplanar T2-weighted images (a...c) showed decreased size and development of hypointense signal at the lateral pelvic recurrence (arrows) consistent with post-treatment fibrosis. Note disappearance of hydronephrosis. **Origin:** Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)
Description: Compared to Fig.3, multiplanar T2-weighted images (a...c) showed decreased size and development of hypointense signal at the lateral pelvic recurrence (arrows) consistent with post-treatment fibrosis. Note disappearance of hydrenephrosis. Origin: Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)
**Description:** Fat-saturated post-gadolinium images showed minimal residual contrast enhancement at the lateral pelvic recurrence (arrow). **Origin:** Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Compared to Fig.3, high (800) b-value DWI and corresponding ADC map showed disappearance of abnormal diffusion restriction at the lateral pelvic recurrence (arrows). Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Compared to Fig.3, high (800) b-value DWI and corresponding ADC map showed disappearance of abnormal diffusion restriction at the lateral pelvic recurrence (arrows). Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital – Milan (Italy)