Carcinoma of the endometrium and cervix are the two most common malignant uterine tumors. Both are staged and managed according to the International Federation of Gynecology and Obstetrics (FIGO) staging system. Recent revision of FIGO staging in cervical cancer encourages the use of imaging techniques if available to assess the important prognostic factors, the most crucial ones being the depth of myometrial invasion (and cervical stroma invasion) in endometrial cancer and parametrial invasion in cervical cancer.

Endometrial Carcinoma

In new FIGO staging, there are three major changes, two of which have important implications for MR imaging:

1. The previous stages IA and IB have been combined into stage IA (inner myometrial invasion). The previous stage IC has become stage IB (outer myometrial invasion).
2. Stage II (cervical stroma invasion) no longer has a subset A and B as previously; cervical stroma invasion now represents stage II whereas involvement of the endocervical gland is now classified as stage I.

MRI plays a crucial role in the preoperative assessment and surgical planning of patients with endometrial cancer by accurately predicting depth of myometrial invasion, cervical stroma invasion, lymph node involvement and metastatic spread. In high-risk patients due to presence of co-morbidity, MRI is useful in planning non-surgical treatment options such as radiotherapy or hormonal therapy.

Patients are imaged in the supine position using a pelvic surface array multi-channel coil. The MRI protocol includes axial SE T1WI with a large FOV to evaluate the entire pelvis and upper abdomen for lymphadenopathy as well as bone marrow changes; high-resolution FSE T2WI in the sagittal, axial and axial oblique planes for the evaluation of the primary tumor; and dynamic contrast-enhanced T1WI (small FOV) in the sagittal and axial oblique plane to evaluate the extent of myometrial and cervical invasion. The oblique planes perpendicular to the long axis of the uterine corpus are favored for the evaluation of primary tumor and myometrial invasion. The tumor/myometrium interface should be assessed in at least two planes. The maximum tumor to myometrium contrast is achieved in the equilibrium phase (2 minutes post injection) which is the most optimal phase of enhancement for assessment of the depth of myometrial invasion. One could even argue that since the distinction between tumors confined to the endometrium and those who invade the inner myometrium is no longer of clinical importance, as both categories are classified as stage IA in the revised FIGO staging system, the early phases of enhancement (arterial and portal phase) may no longer be needed for staging of endometrial cancer. Recent prospective data has shown that DWI is very accurate in assessing the depth of myometrial invasion and could potentially replace dynamic contrast-enhanced MRI as an adjunct to routine T2WI for staging of endometrial cancer.

Cervical Carcinoma

In new FIGO staging there are three major changes that have important implications for MR imaging:

1. The use of diagnostic imaging techniques to assess the size of the primary tumor is now encouraged.
2. Stage IIA (tumors without parametrial invasion that involve less than the upper 2/3rds of vagina) has been subdivided into stage IIA1 (≤4cm) and stage IIA2 (≥4cm). This subdivision reflects recent prognostic data.
3. Examination under anesthesia including a cystoscopy and proctoscopy is optional and no longer mandatory.

The most important issue in staging of cervical cancer is to distinguish early disease (stages IIA1 and below) that can be treated with surgery from advanced disease (stage IIB or greater) that must be treated with radiation alone or combined with chemotherapy. The exception is stage IB2 in which the lesion is over 4cm in diameter, and is treated as for advanced disease. MRI is the best single imaging investigation that can accurately determine tumor location (exophytic or endocervical), tumor size, depth of stromal invasion and extension into the lower uterine segment. MRI is very accurate for evaluation of tumor size, usually within 0.5 cm of the surgical size in 70-90% of cases.

The MRI protocol should include axial SE T1WI with a large FOV and FSE T2WI in the axial and sagittal planes with a small FOV. Cervical tumors are best seen on T2WI. The sagittal plane allows evaluation of tumor extension into the body of the uterus and vagina. The axial oblique T2W FSE perpendicular to the long axis of the cervix is important in assessing parametrial invasion. Axial T1WI of the abdomen are also included to identify enlarged abdominal lymph nodes. The use of intravenous contrast medium is optional, as it does not improve staging accuracy compared to T2WI. The addition of DWI may increase reader’s confidence.

References