

75. Uterine and Cervical Cancer

First line imaging for endometrial changes and endometrial cancer (EC) is transvaginal ultrasound (TV-US), which can be supplemented with 3D US and saline sonohysterography. MRI is performed as a problem solving tool and is the preferred imaging modality for depicting the depth of myometrial invasion and cervical stromal invasion preoperatively, the former being one of the most important prognostic factors, and for tailoring surgical approaches. Furthermore, MRI has value for detection of and interpreting pelvic lymphadenopathy, despite its limited sensitivity in detecting smaller lymph node metastases.

Endometrial carcinoma is predisposed by the development of endometrial hyperplasia and polyps, MR being of little utility in distinguishing benign and malignant varieties of the latter. Both benign and malignant polyps are of variable SI, the latter identifiable only by myometrial invasion. Submucosal fibroids may appear similar but arise from the myometrium and display uniformly low SI unless degenerative. Endometrial thickness varies considerably in premenopausal women, depending on phase of the menstrual cycle and hormonal status. In postmenopausal women (PMP) without vaginal bleeding a myometrial thickness of 11 mm can be used as a cut-off for referral for hysteroscopy, whereas all PMP women with vaginal bleeding need endometrial assessment. Cystically dilated high SI glandular structures on T2WI are often present in hyperplastic endometrium and do not typically enhance. Findings of endometrial hyperplasia are indistinguishable from those of endometrial carcinoma on MR with only myometrial invasion proving the latter—the most common invasive carcinoma of the female genital tract. Treatment is guided by grade, but early staging is performed with MR due to accurate depiction of zonal anatomy on T2WI. Stage 1A lesions, as in Fig. 75.1, are manifest as endometrial thickening without junctional zone disruption. On (A) coronal T2WI, a low SI lesion (white arrow) involves the right-side of the endometrium. A hypointense lesion is present on (B) axial T1WI without depiction of the zonal anatomy. The junctional zone, disrupted in 1B lesions, in the (A) T2WI is clearly intact thus establishing the stage as 1A. If distinction between the junctional zone and myometrium is poor, as in adenomyosis or post-menopausal patients, CE T1WI aids in diagnosis by depicting areas of absent early phase myometrial enhancement, corresponding with endometrial carcinoma. Axial CE T1WI in Fig. 75.1C exhibits intact hyperintense myometrium with the hypointense carcinoma (black arrow) confined to the endometrium. On delayed images, such tumors appear hyperintense to myometrium, similar to fibroids. The distinction between Stage 1B and 1C disease is crucial, the latter correlating with a high probability of extrauterine and lymphatic disease.

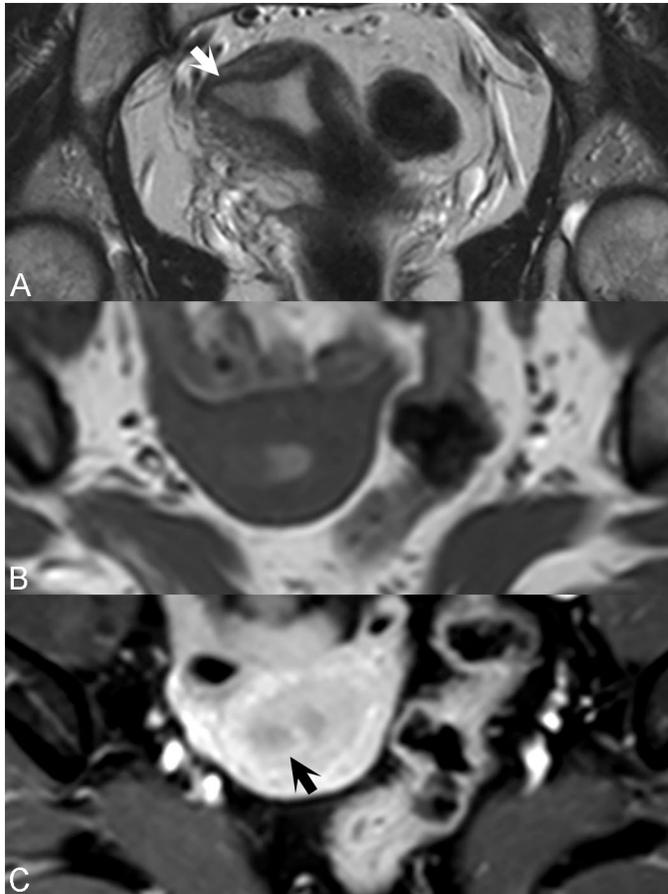


Fig. 75.1

MR reliably identifies Stage 1C lesions, confined to but involving greater than one half of the myometrium, by their complete disruption of the junctional zone. Recently diffusion weighted imaging (DWI) has been recognized to be of high diagnostic value in the pre-operative assessment of the myometrial invasion.

MR similarly depicts involvement of the endocervical canal (2A) or cervical stroma (2B). The former manifests as endocervical canal widening, whereas the low SI of the normal stromal ring is interrupted in the latter.

On CE T1WI Stage 2B lesions are seen as a hypointense lesion in the stroma. It is important, however, for the slice orientation to be perpendicular to the long axis of cervical channel to avoid false positive findings. True invasion of the endocervical canal rather than mere extent of a polypoid lesion must be demonstrated. Invasion of the parametrial fat constitutes a stage 2B lesion or higher. In the absence of rectal mucosal or bladder wall involvement stage 3 lesions involve the uterus, adnexa, or peritoneum (3A), the vagina (3B), or para-aortic or pelvic lymph nodes (3C). Urinary bladder wall and rectal mucosal invasion constitute stage 4A lesions, while distant metastases or involvement of other lymph nodes indicate 4B disease.

Nodal involvement is of importance in deciding for comprehensive surgical staging. Lymph node involvement is best detected and should be suspected on pre-contrast T1WI with the presence of lymph nodes measuring greater than 1 cm in short axis diameter. DWI serves well for lymph node detection, however hyperintensity of lymph nodes on DWI is unfortunately nonspecific and not a criterion for malignancy.

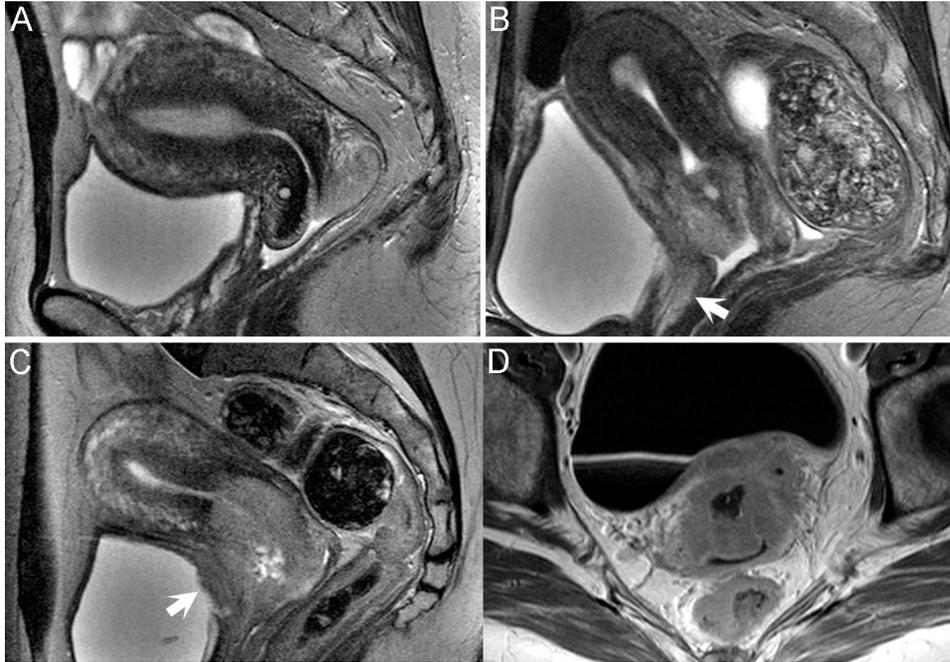


Fig. 75.2

MRI is preferred for the staging of cervical carcinoma. Stage 0 or carcinoma in situ is not reliably detected, whereas Stage 1A lesions, seen on T2WI as hyperintensity against the low SI cervical stroma, are well-seen as microinvasive lesions confined to the cervix. Stage 1B lesions, as in Fig. 75.2A, are greater than 5 mm in depth or 7 mm in transverse extent. (A) Sagittal T2WI illustrate the intact, low SI stroma of the anterior cervical labium interrupted only by a high SI Gardner's cyst. The low SI of the posterior labium is replaced by a hyperintense mass without a containing low SI stromal capsule. The carcinoma in Fig. 75.2B is a Stage 2A lesion, involving the upper two-thirds but not the lower third (i.e. Stage 3A) of the ventral vaginal wall (white arrow). Parametrial invasion, reflected by hyperintensity on T2WI constitutes a Stage 2B lesion, whereas pelvic sidewall invasion signifies a Stage 3B lesion. Contrast enhanced sequences do not improve the diagnosis of parametrial invasion. However, having the slice orientation perpendicular to the long axis of the cervical channel is of great importance for accurate evaluation.

Post-radio chemotherapeutic edema can masquerade as tumor involvement of these structures with its hyperintensity on T2WI. Distant metastases or involvement of the rectal

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or bladder mucosa constitute Stage 4 lesions. The latter case is illustrated in the sagittal T2WI of Fig. 75.2C with heterogeneously hyperintense cervical tumor infiltrating the upper third of the vagina and interrupting the low SI bladder wall (white arrow). A similar appearance is present on the axial CE T1WI of Fig. 75.2D where the irregularly enhancing tumor protrudes into the bladder wall. Contrast enhancement of cervical cancer is variable, but CE T1WI may greatly aid in evaluating the extent of an invasive cervical carcinoma.