

Staging Cancer of the Uterine Cervix

Cancer of the uterine cervix (cervical cancer) is the fourth most common cancer in women worldwide.¹ It is staged using the International Federation of Gynaecology and Obstetrics (FIGO) staging system that is based primarily on findings detected on Magnetic Resonance Imaging (MRI) as well as Positron Emission Tomography/Computed Tomography (PET/CT). The FIGO staging system helps guide treatment decisions, which may include fertility-sparing or non-fertility sparing surgery for early disease and chemoradiotherapy for more advanced tumours. It also serves to monitor the efficacy of treatment.

FIGO STAGING OF CERVICAL CANCER

FIGO Stage	Description
0	Tumor confined to the surface layer (the cell lining) of the cervix; also called carcinoma in situ
I	Extension deeper into the cervix with no spread beyond (extension to the corpus is disregarded)
IA	Invasive carcinoma ≤5mm
IA1	Stromal invasion ≤3.0 mm deep
IA2	Stromal invasion between 3.0 mm and 5.0 mm
IB	Invasion deeper than 5mm
IB1	Invasion >5mm and ≤2.0cm
IB2	Invasion >2.0cm but ≤4.0cm
IB3	Invasion >4.0 cm
II	Disease extends beyond the uterus but not to the pelvic wall or the lower one-third of the vagina
IIA	No parametrial invasion but involves upper two-thirds of vagina
IIA1	Clinically visible lesion ≤4.0 cm in greatest dimension
IIA2	Clinically visible lesion >4.0 cm in greatest dimension
IIB	With parametrial invasion
III	Extension to the pelvic wall, involvement of lower one-third of the vagina, or hydronephrosis or non-functioning kidney
IIIA	Involvement of lower one-third of the vagina with no extension to the pelvic wall

IIIB	Extension to the pelvic wall, hydronephrosis, or non-functioning kidney
IIIC	Extension to pelvic (1) or para-aortic lymph node (2) (based on MRI or PET/CT)
IV	Involvement of the bladder or rectal mucosa or extension beyond the true pelvis (biopsy proved); bullous oedema does not convey stage IV disease
IVA	Spread to adjacent organs (bladder and/or rectum)
IVB	Spread to distant organs

Table 1. FIGO Staging of Cervical Cancer.

Table 1 lists the different stages of cervical cancer. It is based on the extent of tumour spread; in **Stage 0** cancer is limited to the cell surface layer; in **Stage I**, there is cervical stromal invasion ≤4cm; in **Stage IIA**, invasion >4cm but not involving the parametrium; in **Stage IIB** parametrial invasion is present; in **Stage III**, there is spread to lower 1/3 of vagina, pelvic sidewall, or lymph nodes; in **Stage IV** there is involvement of rectum and/or bladder or distant organs.

IMAGING FINDINGS BASED ON FIGO STAGE

Stages 0 and IA1 disease are not detectable on MRI and can only be confirmed on histo-pathologic analysis. However, it may be valid to review a stage IA1 cancer with MRI to exclude the possibility underestimated disease, skip metastases and (although unlikely) lymph node involvement.

Stages IA2 disease and higher are detectable on MRI.² Stages up to IB1 are eligible to fertility-sparing surgery known as trachelectomy (Fig 1). Stage IB1 disease has also been shown to have a significantly better prognosis than stage IB2 disease.³

Stage IB2 (stromal invasion >2cm but ≤4cm) cervical cancers or higher stages are not eligible for fertility-sparing surgery (Figs 2 and 3).

Stage IIA cancers involve the upper two-thirds of the vagina, with stage IIA1 cancers measuring ≤4cm and Stage IIA2 measuring >4cm in diameter (Fig 4). The distinction between tumours measuring up to 4cm and >4cm has prognostic significance in that those measuring >4cm have a higher risk for recurrence and for lymph node metastases.

Stage IIB cancers extend into the tissues between the cervix and the pelvic sidewall; this tissue plane is known as the parametrium. In Stage IIB, there is no involvement of the pelvic sidewall, ureters or bladder (Fig 5).

Stage IIIA and IIIB cancers extend to the pelvic sidewall and involve the lower third of the vagina and the ureter respectively (Fig 6). Stage IIIC cancers involve the pelvic (IIIC1) (Fig 7) or para-aortic (IIIC2) lymph nodes. Lymph node involvement has been shown to be associated with increased recurrence rate and a reduction in overall 5-year survival.⁴⁻⁶

It is important to note that lymph node involvement results in frequent upstaging of patients with small primary tumours; however the 5-year survival of a patient with a small primary tumour and lymph node involvement is better than that of a patient with a large primary tumour and lymph node involvement.⁴ In addition, patients with para-aortic lymph node involvement (stage IIIC2) have a better prognosis than those with distant metastases (stage IVB).⁷

Stage IV cervical cancer involves other pelvic (bladder and/or rectum) or extrapelvic (supraclavicular, lung, bone, other viscera) organs. Stage IVA cancer involves the bladder and/or rectal mucosa with loss of the intervening fat plane between the cervix and bladder or rectum on MRI (Fig 8). Stage IVB is best assessed with CT or FDG (fluorine-18 fluorodeoxyglucose) PET/CT due to their ease of coverage of the neck, chest, abdomen, and pelvis in one rapid scan (Fig 9).

MRI is the modality of choice for evaluating the primary tumour and local spread (i.e. up to Stage IIIA). CT is more valuable for assessing extra-pelvic spread (Stage IIIB-IVB). FDG PET/CT has the advantage of showing increased metabolic activity in viable tumour tissue. However, poor or no radiotracer uptake in necrotic tumour may lead to underestimating the extent of tumour spread.

CONCLUSION

Treatment options depend on tumour stage that is based on the imaging findings described above. Up to stage IB1, fertility-sparing surgery may be considered if required. If not, a radical hysterectomy and pelvic lymphadenectomy are advised.

For Stages IB2 and IIA1, radical hysterectomy and lymphadenectomy are recommended. In patients who are not fit for surgery, external beam radiation, brachytherapy with or without concurrent chemotherapy are the options. For Stages IB3, IIA2 and higher, non-surgical management with chemoradiotherapy is recommended since the disease is considered locally advanced. The radiotherapy field is extended based on the extent of lymph node involvement that is established on CT or PET/CT.

Finally, there are different types of trachelectomy and hysterectomy procedures that may be employed based on extent of disease and also, on tumour histologic type. This article has concentrated mainly on the staging process of cervical cancer and how it influences treatment.

References:

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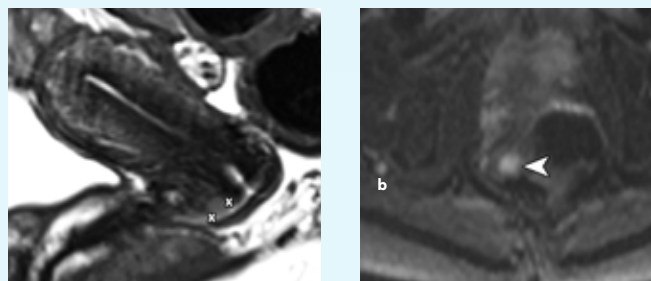


Figure 1. a. Sagittal T2-w MRI scan in a 23-year-old woman showing a lesion of intermediate signal (between callipers) measuring 1.4cm in diameter in the anterior lip of the cervix consistent with Stage IB1. Transverse diffusion weighted imaging (DWI) scan (b) and ADC map (c) showing a lesion (arrowheads) with high signal on b with low signal (diffusion restriction) on c.

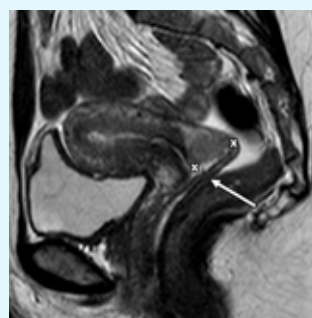


Figure 2. Sagittal T2-w MRI scan in a 34-year-old woman showing a 3cm tumour (between callipers) abutting the posterior vaginal fornix (arrow) consistent with Stage IB2 disease.

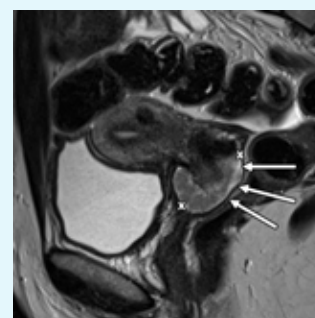


Figure 3. Sagittal T2-w MRI scan in a 46-year-old woman showing a 4.3cm cervical cancer (between callipers) protruding into the upper vagina (arrows); this is consistent with Stage IB3 disease.

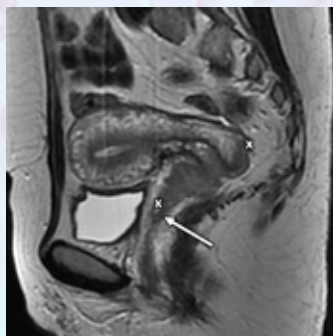


Figure 4. Sagittal T2-w MRI scan in a 50-year-old woman showing a 6.1cm lesion involving the cervix and anterior vaginal wall (between callipers) consistent with a stage IIA2 cancer.

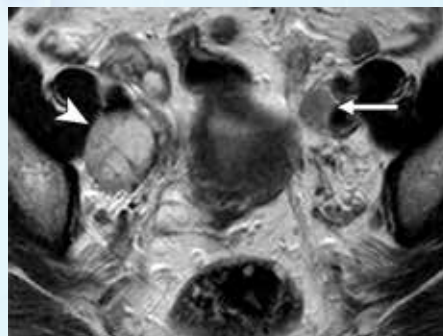


Figure 7. Axial T2-w MRI scan showing enlarged right obturator (arrowhead) and left external iliac lymph nodes (arrow). This is consistent with a stage IIIC1 cancer.

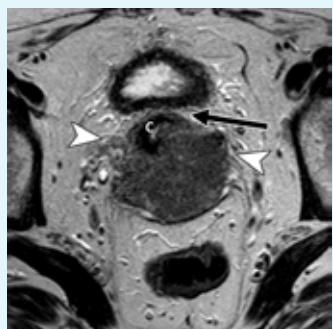


Figure 5. Axial T2-w MRI scan in a 54-year-old woman showing a large tumor of intermediate signal (arrowheads) originating from the posterior aspect of the cervix (C) extending into the parametrium; the posterior upper vaginal wall was also involved. The fat plane between the cervix and posterior bladder wall (arrow) is maintained. This is consistent with a stage IIB tumour.



Figure 8. Sagittal T2-w MRI scan in a 56-year-old woman showing a cervical cancer (T) extending into the lower uterine body, the lower two-thirds of the vagina (arrows) and the posterior and anterior bladder walls with mucosal involvement (arrowheads). This is consistent with a stage IVA cancer. V – vagina.

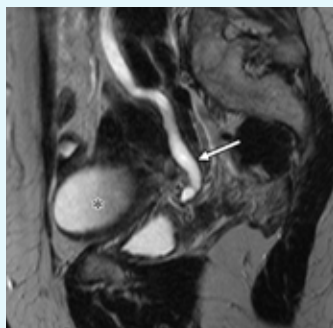


Figure 6. Sagittal T2-w MRI scan in a 50-year-old woman showing a right hydronephrosis (arrow) due to infiltration by cervical cancer; this is consistent with a stage IIIB cancer. Haematometra (*) is present due to cervical stenosis.

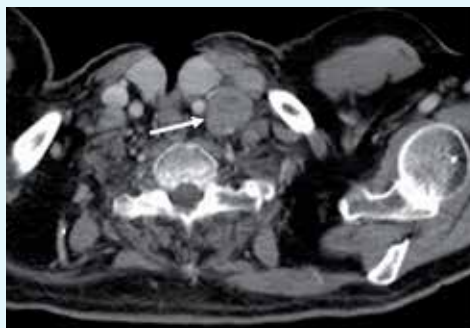


Figure 9. Axial CT Scan slice just above the sternal notch shows a left supraclavicular enlarged lymph node (arrow). This was biopsy proven metastatic cervical cancer. This is consistent with a stage IVB cancer.



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