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Clinical Radiology
The Royal College of Radiologists

Recommendations for cross-sectional imaging in cancer management, Second edition

Carcinoma of the cervix, vagina and vulva

Faculty of Clinical Radiology

Contents

Carcinoma of the cervix

Clinical background

There were 3,064 new diagnoses of cervix cancer in 2011 in the UK with 972 deaths.[1] The vast majority of cervical carcinomas are of squamous cell histology with adenocarcinomas and adenosquamous carcinomas being less frequent.[2] Cervical carcinoma spreads by direct tumour invasion through the stroma into the parametrium toward the pelvic wall. The uterosacral ligaments can also act as pathways of spread to the pelvic sidewall. Spread also occurs upward into the corpus of the uterus or downward into the vagina. Spread to the lymphovascular space extends to the paracervical, parametrial and presacral chains, and then the external iliac (obturator) internal iliac and common iliac nodes. Retroperitoneal and supraclavicular nodal involvement is only seen in advanced disease. Spread to the lungs, bone and liver is unusual at initial presentation. In potentially locally confined tumours, the key decision on imaging is to decide whether the parametrium is invaded, as this often determines the form of treatment: tumours less than 4 cm with no parametrial involvement are usually treated with radical surgery. In young women, with small tumours who wish to retain the option to have children, consideration is given to a trachelectomy, conserving the uterus. Here, imaging must indicate the size of the tumour, its distance from the internal os, the length of the cervix, and the size of the uterus.[2]

Who should be imaged?

All patients presenting with cytologically proven cervical cancer for staging, to monitor response in patients who have been treated with chemoradiotherapy, and to detect recurrent disease.

Staging objectives

- To assess the size of the primary tumour.
- To identify the presence of parametrial spread.
- To identify proximal extension in relation to the internal os in small tumours in patients being considered for trachelectomy.
- To identify invasion of the vagina, bladder or rectum.
- To evaluate the pelvis and abdominal lymph nodes.
- To detect distant metastases.

Protocol for imaging of carcinoma of the cervix

Sequence	Plane	Slice thickness	Field of view	Principle observations
T1W	Axial	5/6 ± 0.5/1 mm	Large From renal vessels to symphysis pubis	To identify para-aortic and pelvic lymph nodes and rule out hydronephrosis
T2W	Axial	5/6 ± 0.5/1 mm	Whole pelvis	
T2W	Sagittal	5/6 ± 0.5/1 mm	Small	To assess size and position of tumour in relation to internal os and adjacent tissues
T2W perpendicular to cervix	Oblique+	3 ± 1 mm	Small	To assess for parametrial spread and measure size
T2W*	Coronal or axial	6/7 ± 1 mm	Large	Abdominal lymph nodes and kidneys

T1W + fat sat +gad	Axial	5 ± 1 mm	Optional sequence; to identify enhancing soft tissue nodules

+ Perpendicular to plane of endocervical canal.
** Choice of axial or coronal upper abdominal images can be according to local preference.*

Staging

MRI is the modality of choice for local disease stage, but CT is also a valuable technique for staging abdominal and pelvic disease as well as chest disease in locally advanced disease.[3]

MRI
Coil selection will depend on equipment available but a surface coil should be used for pelvic images. An anti-peristaltic agent should be used.

CT

- Oral administration of 1 litre of water or iodinated contrast medium.
- 100–150 ml of intravenous iodinated contrast medium injected at 3–4 ml/sec.
- MDCT is commenced at 60–75 seconds post-injection through the abdomen and pelvis.
- 5 mm axial sections using spiral technique.
- Using MDCT, slice thickness will depend on scanner capability. In general, images are reconstructed from one acquisition. Image slice thickness ranges from 1–5 mm. Thin sections are needed for multi-planar reformats, for viewing in the coronal or sagittal planes.

Values of $CTDI_{vol}$ should normally be below the relevant national reference dose for the region of scan and patient group (see Appendix and section on Radiation protection for the patient in CT in Section 2).

PET-CT
^{18}FDG PET-CT is not generally used in the evaluation of early-stage carcinoma of the cervix. However, where available, it may be helpful in determining the extent of disease in advanced stage carcinoma of the cervix where the patient is being considered for radical radiotherapy treatment. FDG PET-CT findings may help to inform the radiotherapy planning. FDG PET-CT is the modality of choice for determining the extent of metastatic recurrent disease.[3,4]

Follow-up

- Frequency depends on: form of treatment (surgical and/or radiotherapy) and size and histology of tumour at time of presentation.
- Following radiotherapy: MRI at six months, one year and two years.
- Following surgery: MRI at one year, and two years. Following a trachelectomy, patients can have an additional MRI at six months following surgery.
- In suspected recurrence, FDG PET-CT may be used to identify the extent of disease, particularly if exenterative salvage surgery is being considered.[4]

Tips

- Care should be always be taken to ensure that the oblique axial T2 sequence is truly at right angles to the long axis of the cervix, otherwise mistakes can arise in interpreting parametrial invasion.
- Following intervention (such as a cone biopsy), changes can arise at the site of the biopsy that can be mistaken for the primary tumour. It is recommended that an interval of at least one week to ten days be allowed between the biopsy and MRI.
- Occasionally, when the primary tumour remains poorly seen, dynamic contrast-enhanced scans in the sagittal plane may be used to better delineate tumour extent (as in endometrial cancer).

Carcinoma of the vagina and vulva

Clinical background

Primary vaginal cancer and primary vulval cancer are rare.[1] These are predominantly squamous cell carcinoma occurring in postmenopausal, often elderly women.[5] Rarely, tumours are adenocarcinomas, leiomyosarcomas, or melanomas. Superficial carcinomas at the vaginal vault are treated by vaginectomy and pelvic lymphadenectomy. Tumours of the lower third of the vagina are usually treated by vulvectomy and inguinal lymphadenectomy.

Who should be imaged?

All patients who present with histologically proven carcinoma of the vagina or vulva.

Staging objectives

- To identify nodal disease in the pelvis and inguinal regions.
- To determine the extent of the primary tumour.
- To identify intra-abdominal spread.

Staging

MRI
See Table below.

Follow-up

If there is suspicion of clinical recurrence; this may be done with CT or PET-CT.[4]

Tips

- Care should be taken to include the entire perineum, inguinal and femoral regions to ensure that all possible sites of infiltration and nodal involvement are included.
- For low vaginal and vulval tumours, ultrasound with fine needle aspiration biopsy may be extremely valuable in planning the lymph node dissection.

Protocol for imaging of carcinoma of the vagina and vulva

Sequence	Plane	Slice thickness	Field of view	Reason
T1W	Axial	5 ± 1 mm	Whole pelvis and perineum	To identify pelvic lymph nodes. A coronal plane may also be helpful
T2W	Axial	5 ± 1 mm	Whole pelvis and perineum	To localise primary lesion
Short tau inversion recovery (STIR)	Axial	5 ± 1 mm	Perineum	Particularly to identify vulval tumours and inguinal nodes
T1W	Axial	6 ± 1/2 mm	Medium/large (abdomen)	In cases with pelvic nodal enlargement
T1W or T2W*	Coronal or axial	6/7 ± 1 mm	Large	Abdominal lymph nodes and kidneys
T1W + fat sat +gad	Axial	5 ± 1 mm		Optional: to identify enhancing soft tissue nodules

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