West Midlands Radiotherapy Clinical Protocol

Gynaecological: Vulva and Vagina

Revision History

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1. Purpose

Radiotherapy for Gynaecological cancers is delivered across the West Midlands as part of collaborative partnership working. The purpose of this protocol is to provide a standardised protocol for planning and delivery of radiotherapy (RT) for Gynaecological cancers within the West Midlands.

VULVAL CARCINOMA

2. Vulval carcinoma

Vulval cancer is rare. There are 1400 cases/ year in the UK. 90% are squamous carcinoma. There is an association with HPV in most cases but also of lichen sclerosis and chronic inflammation.

Guidelines for screening, diagnosis of vulvar cancer have been published by the National Institute of Health and Care Excellence (NICE).[1] Guidelines on treatment and management of vulvar cancer have been published by the British Gynaecological Cancer Society (BGCS) in 2024, and the European Society of Gynaecological Oncology (ESGO) in 2023 and the Royal College of Radiology in 2024.[2-4]

Histological confirmation of malignancy should be obtained prior to definitive treatment. Basal cell carcinoma (BCC) of the vulva is managed according to standard treatment of BCC and malignant melanoma of the vulva should be referred to the skin MDT for management. These guidelines are for squamous cell carcinoma. It also does not encompass Paget's and Bartholin adenocarcinoma.

Clinical examination, biopsy and radiological tests like pelvic MRI scan will help with elucidating the extent of local disease. Clinical photographs for assessing disease extent and response can also be considered as part of medical records.

Fine needle aspiration of lymph nodes may provide useful information for nodal staging. CT scan of the thorax, abdomen and pelvis should be considered to exclude distant metastasis especially in advanced disease and a PET CT scan may provide additional staging information when there is ambiguity or uncertainty about the presence of metastatic disease. All patients should be discussed in a Gynaecological multidisciplinary team (MDT) meeting.

Table 1: FIGO staging of vulval cancer (2021) [5]

Stage	
I	**Confined to the vulva**
	IA Tumour ≤ 2cm in size and stromal invasion ≤ 1mm

	IB Tumour > 2cm in size or stromal invasion > 1mm
II	**Tumour of any size with extension to lower 1/3rd of (urethra, vagina or anus) with negative nodes**
III	**Tumour of any size with extension to upper part of adjacent perineal structures or with any number of non-fixed, non-ulcerated nodes**
	IIIA Tumour of any size with extension to upper 2/3rds of urethra or vagina, bladder or rectal mucosa or regional nodes <= 5mm
	IIIB Regional nodes > 5mm (inguinal and femoral)
	IIIC Regional Nodes with extracapsular extension
IV	**Tumour fixed to the pelvic bone, or fixed or ulcerated regional node metastasis**
	IVA Pelvic bone fixity or fixed or ulcerated regional nodes
	IVB Distant metastasis

Surgery remains the mainstay of treatment for most patients with carcinoma of the vulva. Sentinel lymph node biopsies are often considered for clinically node negative unifocal disease, tumour < 4 cm and depth of invasion > 1mm. Inguino-femoral node dissection is recommended for larger tumours or disease with clinically positive regional lymph nodes. Depending on risk factors and lymph node status identified at surgery, recommendations for adjuvant radiotherapy/chemoradiotherapy are discussed in this guideline.

Following a discussion in the MDT, patients considered as unsuitable for primary surgery may be considered for concurrent chemoradiotherapy based on performance status and medical co-morbidities. In patients with large tumours in whom primary surgical resection would damage central structures (anus, urethra), chemo-radiotherapy has been well described with long term responses reported.[6,7]

Neoadjuvant treatment with chemotherapy or chemo-radiotherapy has also been reported to be effective for preservation of the anal sphincter and/or urethra in patients with advanced vulvar cancer. This is still the subject of ongoing clinical research. Those deemed to be unsuitable for a radical treatment approach can be treated with hypo fractionated palliative RT or palliative chemotherapy.

For primary treatment of small tumours, interstitial brachytherapy may be a suitable option.

3. Indications

Indications for adjuvant Radiotherapy +_ chemotherapy
Adopted from RCR expert panel recommendations- Feb 2024[3] *(see clinical notes below)

Indications for adjuvant chemo-radiotherapy
1. Extracapsular lymph node involvement is an indication for adjuvant chemo-radiotherapy
2. Two or more involved lymph nodes is a definite indication for chemo-radiotherapy[8,9]

Indications for adjuvant radiotherapy or chemo-radiotherapy
1. Positive or close margins (≤3mm) and further surgery is not feasible
2. Involved nodes:
    a) 1 involved lymph node
    b) 1 node with micro metastasis after a complete nodal dissection is a relative indication for adjuvant radiotherapy
    c) Inguino-femoral radiotherapy instead of nodal dissection surgery if recommended if a sentinel node is involved with a micro metastasis <- 2mm

***Clinical Notes:**

For Involved nodes: The role for adjuvant chemoRT/RT in 2 or more positive nodes is established based on the GOG37 trial.[8] The role of adjuvant radiotherapy/chemoradiotherapy in a single node remains controversial. [10] The National cancer database study showed an overall survival benefit for adjuvant chemoradiotherapy (compared to radiotherapy alone) in 2 or more involved nodes.[9] In patients with 1 positive lymph node, it showed a survival benefit for radiotherapy but did not show additional benefit of concomitant chemotherapy over adjuvant radiotherapy alone. However the AGO-Care 1 retrospective study and original GOG 37 data did not show any benefit of adjuvant radiotherapy in single positive node after lymph node dissection.[8,11] ESGO, BGCS, NCCN and RCR guidelines have varied recommendations for adjuvant radiotherapy in a single positive node ranging from surveillance to adjuvant radiotherapy to adjuvant chemo-radiotherapy.[2-4,12] Cases should be individualised discussed at MDT taking into account patient factors and clinical characteristics of the involved node.

In the prospective GROINSS-V-II study which established inguinal regional radiotherapy as adequate treatment in positive sentinel lymph node with micrometastatic disease ≤2mm, only 11% of patients had concomitant chemotherapy with adjuvant radiotherapy. Subgroup analysis did not show differences in recurrence rates between the adjuvant radiotherapy alone group or chemo-radiotherapy group.[13]

Currently, completion lymphadenectomy is preferred to RT if >2mm metastasis on SLNB.[13] The role of chemoradiotherapy for macrometastases/ECE in sentinel lymph nodes with dose escalation as an alternative to inguino-femoral lymphadenectomy is being studied in the GROINSS -V III trial and is yet to be reported.[14]

For positive/close margins: There is no consensus for threshold for close pathological margins and the data for recurrence rates and pathological margins is varied. This threshold is based on expert consensus and is consistent in the BCGS (≤2mm) and RCR guidelines (≤3mm). Cases should be individualised and discussed at MDT, taking into account patient factors (co-morbidities, previous treatment), location of close margins, and need for groin/pelvic radiotherapy.

Chemotherapy

- Cisplatin 40 mg/m^2 given weekly, concurrent with radiotherapy, for 4-6 cycles
- In Cisplatin ineligible patients, Carboplatin AUC2 can be given weekly concurrent with radiotherapy.
- If platinum ineligible, consider MMC and 5FU d1-4 on week 1 and 5. DPD testing is mandatory before 5FU use.

Palliative chemotherapy options include platinum or taxane based chemotherapy either as a single agent or in combination. Strong consideration should be given for referral of patients to clinical trials.

5. Clinical Trials

Information about open clinical trials can be found at Clinical trials - West Midlands Radiotherapy Network

6. Information & Consent

- Each Patient should be consented with individualised information of planned treatment, risks and benefits and toxicities.
- Use of the RCR consent forms should be considered.
- Booking form and consent completed by IR(ME)R practitioner.
- Patients should also receive a local patient information sheet or Macmillan cancer support information booklets.

7. Responsibilities

To comply with the Ionising Radiation (Medical Exposure) Regulations 2017, the following roles are defined:

- Referrer and Practitioner: The Consultant Clinical Oncologist is responsible for the care of the patient, including consent, prescription and treatment authorisation as per departmental IR(ME)R procedures.

- Operators: Radiographers, Physicists and Technologists are responsible for the plan production, verification and treatment delivery as per departmental IR(ME)R procedures and under the auspices of the Practitioner.

8. Planning Technique

- Local CT scanning protocols to include scanning levels and patient immobilisation.
- The primary tumour could be demarcated with wires which helps with delineation of the GTV on the planning CT scan.
- Bolus may be applied to cover the primary tumour (consider whether patient can sufficiently "self bolus" with normal skin folds) and any fungating lymph nodes. Adequate bolus coverage should be confirmed with visual inspection. Bolus could be applied at the time of simulation or virtual bolus can be added to guide actual bolus as needed.
- Patients should be supine, with arms on chest and full bladder approx. 200-400ml. Patients may be immobilised in the "frog leg" position or with legs straight. Frog leg position will allow skin sparing on the upper inner thighs.
- A vac bag is recommended if using frog leg position.
- Local protocols for Bladder & Bowel preparation should be considered when the rectal diameter is more than 4cm.
- IV contrast is recommended to delineate the nodal chain. Oral contrast may be considered to aid with bowel outlining.
- The diagnostic MRI scan should be fused with the planning CT scan to assist with delineation of the primary tumour. Alternatively, a planning MRI scan may be performed and fused with the planning CT scan if available.
- The use of consistent contour colours and names for target structures within a department is encouraged.
- Intensity modulated radiation therapy (IMRT) with daily cone beam CT is recommended.
- It is important to monitor for vulvar swelling during treatment on daily CBCT as vulva can swell outside of target volume.

9. Target delineation

The Royal College of Radiologists expert panel recommendations for radiotherapy treatment for vulval cancer (Feb 2024) is recommended as a reference guide for target delineation.[3]

Radical:
GTV_V = Primary vulval tumour (if present)
CTV_V = GTV_V + 10mm isotropic expansion to include whole vulva and expanded to include relevant anatomic sites depending on local tumour invasion of surrounding organs.
CTV_VB = GTV_V + 5mm isotropic expansion

Post operative:
CTV_TB = Postoperative bed (vulvar or nodal excision site) + 0-5mm

Nodal volumes for radical/post operative patients (details in target description below):

GTV_N = Involved nodes (if present)
CTV_NB = GTV_N + 0-5mm

CTV_EN = Elective Nodes (Ensure that CTV_NB are included in this volume.)

PTV_V, PTV_VB, PTV_TB, PTV_EN, PTV_NB are grown from CTV with margins dependent on local protocols.

The RCR guidelines recommendations for PTV margins are:

PTV_V = CTV_V + a 7-10mm isotropic margin.
PTV_EN = CTV_EN + 5-7mm margin
For PTV_VB, PTV_NB and PTV_TB, a 5-10mm isotropic expansion of CTV is recommended. Smaller margins of 5mm can be used if using daily online imaging.

PTVs should be applied according to department image guidance frequency and local data. Daily IGRT with online correction recommended.

Target description:
GTV_V: Not needed in the adjuvant setting if all disease has been surgically excised. For patients referred for neo-adjuvant or radical treatment, the primary tumour should be contoured.

CTV_V: This should include the whole vulva, up to the skin surface, including the pre-pubic fat. The whole vulva includes labia majora, minora, clitoris, vestibule, urethral meatus, introitus and perineum. The skin bridge between the vulva and lymph node regions should be included where vulval region and lymph node areas are being treated. In cases of locally advanced disease, the CTV should be extended to include the involved organs such as

vagina (or at least 3cm of caudal vagina), anus and mesorectum, urethra or clitoral crus as clinically appropriate based on clinical and radiological assessment of organ involvement.

GTV_N: Will not be required if surgically excised. Any suspicious involved lymph nodes should be contoured and labelled individually e.g. GTV_N1, GTV_N2.

CTV_NB: The GTV_N should be extended isotropically by 5 mm to derive the CTV_NB. This should be cropped away from bone and muscles unless there is evidence of direct involvement. Each CTV_NB should be labelled separately.

CTV_EN:
Elective nodal volumes to the groins and pelvis are treated in cases of radical radiotherapy/chemoradiotherapy for vulval cancers. It is recommended to treat the pelvic nodes even in the absence of positive inguinal nodes if there is invasion of neighbouring organs or extensive vaginal, anorectal or urethral involvement.[7]

In the adjuvant setting, radiation of elective nodal regions in the groin and pelvis is recommended when radiotherapy is indicated due to advanced nodal involvement.

CTV_EN typically includes inguino-femoral and pelvic lymph nodes not suspicious for involvement by metastatic disease. Elective lymph nodes include the inguino-femoral, obturator, internal iliac and external iliac lymph nodes. Treat the echelon above the highest involved LN. Clitoral lesions may drain directly to the pelvic nodes. If post vaginal wall involvement, consider coverage of pre-sacral LNs (to S2/S3 interface). If anal involvement, consider mesorectal LN. If pelvic nodes are involved, consider treating the entire common iliac LN chain.

In early stage vulval cancer with no clinically suspicious nodes on imaging, the GROINSS-V II study indicates that it is acceptable to treat the 'inguinal nodal region' (comprising the inguinal and lower external iliac LN only) when there are micrometastases in the sentinel LN ≤2 mm.[13]

There is no consensus on whether the 'inguinal nodal region' alone can be treated (and vulva and pelvic nodes omitted) if there is a single sentinel LN metastases >2 mm or if there is extracapsular extension and if there are clear negative margins on the vulval specimen (generally interpreted as >8 mm). This is currently being studied in GROINSS-V III.[14] Therefore, it is acceptable to take either approach – including or omitting the vulval volume and pelvic nodes.

In margin positive or close margins of the primary vulval cancer treated with surgical excision and pathologically negative nodes, the post operative tumour bed alone is treated, and elective lymph nodes irradiation is not necessary.

10. Dose and Fractionation

For definitive radiotherapy/chemoradiotherapy for inoperable vulvar cancers:

PTV_EN and PTV_V are treated to 45–50.4 Gy in 25–28 fractions

- PTV_VB and PTV_NB (nodal boost) are treated to 60 - 68 Gy EQD2 $_{10}$ in 30 - 34 fractions

For adjuvant radiotherapy:

- PTV_V and PTV_EN are treated to 45-50.4 Gy in 25 - 28 fractions

CTV_TB is treated to 56- 60 Gy EQD2 in 25- 30 fractions for close or positive margins.

In the presence of <2mm micrometasatic disease in a sentinel LN, PTV_EN to the inguinal nodal region is treated with 50Gy in 25 fractions as per GROINSS -V II.

Involved nodal bed with fully resected nodes can be treated with 50Gy-56Gy EQD2 and a nodal bed with extra capsular extension should be boosted to at least 60Gy EQD2.

BOOSTS

Involved lymph nodes should be treated with a simultaneous integrated boost (SIB) when feasible and OAR constraints are met.

Boost doses to the primary vulvar tumour or vulvar tumour bed can be treated either with a traditional two-phase sequential boost technique, with a simultaneous integrated boost (SIB) or with a combination of SIB and sequential boosts to achieve EQD2 targets.

Sequential boost doses of 10–20 Gy in 1.8–2 Gy fractions are typically used, bringing the total dose to 60–70 Gy (or equivalent doses, EQD2)

Consideration must be taken of dose per fraction to vulva, risks of local skin toxicity, immobilisation techniques, hot spots and potential for tumour shrinkage and adaptive volumes when planning boost doses.

Possible treatment strategies for a PTV_VB for a target EQD2 of 60 - 68 Gy include (but are not limited to):

1. 45 Gy in 25 Fractions to PTV_V and PTV_E followed by sequential boost of 20 Gy in 10 Fractions. ($EQD2_{10}$ = 64.25 Gy to boost volume)
2. 45 Gy in 25 Fractions to PTV_E, SIB of 50Gy in 25 Fractions to PTV_VB and sequential boost of 10 -18 Gy in 5 - 10 Fractions ($EQD2_{10}$ of 60 - 68 Gy to boost volume)
3. 45 Gy in 25 Fractions to the PTV_E, with an SIB of 60 Gy in 25 fractions to the PTV_VB($EQD2_{10}$ = 62 Gy, with dose per fraction for the PTV_VB = 2.4Gy)

When using SIB, note that the RCR guidance from management of unscheduled gaps does not recommend treating twice daily above 2.2Gy/fraction. The Table from the RCR guidelines below illustrates suggested equivalent doses when using simultaneous integrated boosts.

Suggested equivalent doses when using simultaneous integrated boosts
Equivalent doses in Gy to tumour for different fractionations (α/β=10)

Required fractions	45 Gy/25F	50.4 Gy/28F	54 Gy/30F	60 Gy/30F	66 Gy/33F
25	n/a	49.6	52.6	58.4	63.2
28	45.7	n/a	53.5	59.4	64.4
30	46.0	50.9	n/a	n/a	65.1
33	46.5	51.5	54.7	60.8	n/a

α/β = alpha/beta ratio; F = fractions

Vulva boost doses can also be delivered by interstitial brachytherapy to a minimum of 60Gy $EQD2_{10}$. But if the disease is primarily vulvovaginal in nature up to 70-80Gy $EQD2_{10}$ may be appropriate.

Alternative dose/fractionation schedules include:

- 50.4Gy in 28 fractions
- 56-66Gy in 28-30 fractions including boost doses to primary and/or involved lymph nodes

11. Palliative radiotherapy options

Cover the macroscopic disease with 1.5-2cm margin.
3D CFRT or IMRT planning.
Brachytherapy alone may be considered to deliver a biological similar dose in a fractionated course.
Dose fractionations will be dependent on frailty and comorbidity.

- 20Gy in 5 daily fractions of 4Gy over 1 week
- 30Gy in 10 daily fractions of 3 Gy over 2 weeks
- 8–10Gy in a single fraction
- 16Gy in 2 fractions over 2 weeks
- 36-40 Gy in 15 fractions daily over 3 weeks
- 24-36Gy in 4-6 fractions over 4-6 weeks.

12. Peer Review

Peer review should be undertaken in line with the West Midlands regional guidance agreed in December 2025 which identifies which cases should be subject (as a minimum) to peer review.

13. Treatment delivery

VMAT/ IMRT with simultaneous integrated boost as clinically indicated. A field-based treatment approach may be suitable in some cases. Suggested organ at risk tolerances to use for radiotherapy planning based on the RCR guidelines are detailed below.

Organ at risk	Hard dose constraints*	Soft dose constraints

Bowel	Dmax <105% in regions outside 15 mm from PTV_NB	V40 Gy <250 cc** V30 Gy <500 cc** Bowel space Keep as low as possible. Volume outside PTV receiving >45 Gy should be <195 cm^3 (grade 2 toxicity). Gr 0 / Gr1 V45 Gy 78 cc / 158 cc V50 Gy 17 cc / 110 cc V55 Gy 14 cc / 28 cc V60 Gy 0.5 cc / 6 cc V65 Gy 0 cc / 0 cc
Bladder	Dmax <105% in regions outside 15 mm from PTV_NB	V30 Gy ≤80%** V40 Gy ≤60%** V50 Gy ≤50% V60 Gy ≤25% V74 Gy ≤5%
Rectum	Dmax <105% in regions outside 15 mm from PTV_NB	V30 Gy ≤80% V40 Gy ≤75% V50 Gy ≤55% V60 Gy ≤40% V65 Gy ≤30% V70 Gy ≤15% V75 Gy ≤3%
Femoral heads	Dmax <50 Gy	Dmean <40 Gy
Kidney	Dmean <15 Gy	Dmean <10 Gy V12 Gy ≤55% V20 Gy ≤32% V28 Gy ≤20%
Body	Dmax <107% in regions outside 15 mm from PTV_NB	

Anus		No defined constraint D50% <45 Gy may be appropriate
Weight-bearing bone		V50 Gy ≤50%

*The Dmax percentages refer to the main prescription (not boost volumes).

**Soft constraints that can be used in the treatment plan optimisation; these values are based on dose volume histogram (DVH) parameters of EMBRACE II cervical cancer patients entered in the study before June 2017 and from the IMRiS trial, which was used for sarcoma patients with similar dose prescriptions to those used in vulval cancer. The constraints are not supposed to be fulfilled in all patients but in ~70–80% of them.

Other normal tissue structures may require delineation, depending on the specific anatomical location. Accepted normal tissue tolerance constraints should be taken into account at all times. Reference can be made to consensus guidelines as outlined by Emami et al and the Quantitative Analyses of Normal Tissue Effects in the Clinic (QUANTEC) documents.

14. Treatment Verification

- Daily 3D CBCT imaging with online corrections recommended, however, verification imaging as per local imaging protocol. Monitor for tumour shrinkage, vulval oedema or other issues (lymphocyst) which could warrant replanning.
- Consider placement of a dosimeter on the vulva at the first 3 fractions to ensure adequate skin dosing.

15. On Treatment Review

- Patients reviewed weekly for radiotherapy toxicities. This may be a Review Radiographer or Advanced Nurse Practitioner or Clinical Oncologist dependant clinical situation and local guidance.
- A treatment break may need to be considered dependent on skin toxicity and patient tolerance.
- After completion of treatment patients are seen in out-patient clinic for regular medical review.

16. Treatment Letter

- On completion of treatment a summary of the radiotherapy dose and toxicities experienced are documented.
- In addition, expected acute and late side effects are detailed with recommended treatments.

17. Recurrence

Patients with local recurrence of disease may be treated with surgical re-excision, RT or chemo-radiation (RT not previously given), ISBT or palliative systemic therapy. Patients with isolated nodal recurrence not suitable for surgical resection may be referred for SABR. Patients should be referred for clinical trial where suitable.

VAGINAL CANCER

18. Vaginal cancer

Primary vaginal cancers are rare and account for 5-10% of cancers affecting the vagina. Most cancers affecting the vagina are metastatic deposits from another primary site e.g. cervical, endometrial, colorectal, urogenital tract, or more distal sites. Tumours touching the vulva or cervix are classified under those disease sites (even if appears centred in vagina).

Examination under anaesthesia should be performed for clinical staging, and a biopsy should be taken for histological confirmation. A cystoscopy and sigmoidoscopy may be undertaken, and an endometrial biopsy should be considered. Scans should be undertaken to exclude a primary cancer from elsewhere. These may include MRI scan of the abdomen and pelvis, CT scan of the chest, abdomen and pelvis and PET CT scan.

FIGO and TNM staging of primary vaginal cancer

FIGO stage	TNM stage	Stage description
I	T1a	Primary tumour confined to vagina, ≤ 2cm
	T1b	Primary tumour confined to vagina, > 2cm
II	T2a	Primary tumour ≤ 2cm, invading beyond vaginal wall but not pelvic side wall

	T2b	Primary tumour > 2cm, invading beyond vaginal wall but not pelvic side wall
III	T3 Or T1-T3 N1	Involvement of pelvic side wall, and/or lower third of vagina and/or causing hydronephrosis Or Metastasis to pelvic or inguinal lymph nodes
IVA	T4 Any N	Spread beyond the true pelvis or involvement of rectal or bladder mucosa or has perforated the peritoneum.
IVB	M1	Distant metastasis

Surgical excision followed by radiotherapy may be possible for smaller tumours. Consider radiotherapy alone for stage I only if surgery is not feasible.

Vaginal brachytherapy (VBT) alone may be an option for small tumours which have been surgically excised. Radical chemoradiotherapy remains the preferred option for the treatment of most vaginal cancers to reduce morbidity associated with extensive surgery, including pelvic exenteration, which is often required for more locally advanced disease.

Chemotherapy protocols are typically extrapolated from data in cervical cancer and 40mg/m2 of weekly cisplatin with radiotherapy is acceptable.

EBRT + brachytherapy is preferred in all cases. MRI can help define local tumour extent and a PET can help evaluate lymph nodes.

19. Target delineation

Contouring guidelines below are based on the gynaecological GEC-ESTRO working group recommendations for target concepts and are being applied in the EMBRAVE study.[15,16] The American Brachytherapy Society Guidelines 2012 for vaginal brachytherapy have also been referenced.[17]

GTV-T init. = the initial macroscopic gross tumour volume at time of diagnosis based on imaging and clinical examination

CTV-T LR = GTV-T init. Expand the CTV so that the CTV includes the whole vagina, paravaginal space, paracolpia, parametria and cervix.
Edit the CTV off uninvolved muscle and bone. Vaginal CTV should not extend beyond levator ani (i.e. should not extend into ischorectal fossa).

Including only the upper 2/3rd of the vagina in the CTV-LR can be considered if small (<2cm) Stage I tumours limited the upper one-third of the vagina. The American Brachytherapy Society guidelines expand the GTV-T init. by 1-2cm to create the CTV.

CTV_EN = Bilateral pelvic lymph nodes including common iliac, external iliac, internal iliac, obturator and pre sacral nodal region. If the distal one third of the vagina is involved the inguinal lymph nodes should also be included (to the lesser trochanter as the inferior border).

The omission of the common iliac LN regions can be considered in node negative patients. In patients with multiple lymph node metastases including the common iliac region - para-aortic lymph nodes unto the renal veins should be considered as part of the CTV-E.

Involved nodes should be separately delineated as GTV_N1, GTV_N2
CTV_NB = GTV_N + 0-5mm

PTV_T-LR, PTV_EN, PTV_NB are grown from CTV with margins dependent on local protocols. If both full and empty bladder scans performed at sim, consider an IT-T LR + 5-7mm margin to PTV. This practice may vary in different centres.
In the absence of an ITV structure, PTV-T LR = CTV-T LR + a 7-10 isotropic margin.
PTV_EN = CTV_EN + 5-7 mm
For PTV_NB a 5-10mm isotropic expansion of CTV is recommended. Smaller margins of 5mm can be used if using daily online imaging.

20. Dose and Fractionation for EBRT

PTV_T-LR and PTV_EN is treated to 45Gy in 25 fractions
PTV_NB are usually treated to 55 - 57.5 Gy in 25 fractions

Alternative schedules include:

- 50.4Gy in 28 fractions
- 56-66Gy in 28-30 fractions including boost doses to primary and/or involved lymph nodes.

21. Brachytherapy

If the residual tumour is ≤5mm after EBRT, intracavitary vaginal brachytherapy is sufficient. Target doses in brachytherapy are EQD2 70-75Gy for distal lesions, and 80-85Gy for upper vaginal lesions (particularly if poor response to EBRT).

Cancers arising in the upper third of the vagina are treated similarly to cervical cancer (reference the WM protocol for cervical cancer). Cancers arising in the lower third of the vagina are treated akin to carcinoma of the vulva (see above). The whole length of the vagina needs to be included if cancers arise or involve the middle third of the vagina. Referral for treatment with interstitial brachytherapy (ISBT) may be considered where clinically appropriate.

Patients with recurrent disease should undergo staging investigations to determine extent of recurrence. Following discussion in the MDT, patients with recurrence limited to the vagina may be suitable for surgical management including pelvic exenteration.

Other options include re-irradiation (provided there are no contra-indications) or brachytherapy including (ISBT). Patients with isolated pelvic lymph node recurrence may be suitable for treatment with SABR. Palliative chemotherapy may be a suitable option for those with distant metastasis or if either surgery or radiotherapy is not feasible.

22. Follow up and Late Effects

Patients should be followed up, in keeping with local departmental protocols.

The use of toxicity criteria to collect toxicity such as CTCAE v6 or EOTRC/RTOG Radiation Grading System Criteria is recommended.

Assessment of late effects should be undertaken at follow up visits. Any late effects should be managed, as clinically appropriate including referral to other relevant medical or surgical specialties.

Significant Late Toxicities include

- Vaginal stenosis associated with vaginal dryness and dyspareunia
- Vulval skin changes
- Anal canal stenosis or anal leakage
- Urinary frequency / urgency
- Diarrhoea / loose stools
- Rectal bleeding
- Haematuria
- Pelvic bone thinning and increased risk of insufficiency fractures
- Lymphoedema
- Bowel stenosis /fistulation
- Risk of 2nd cancer (1-2% per 10yrs of follow up)
- Risk of infertility and early onset menopause in younger (pre-menopausal) women.

23. References

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