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GYNECOLOGY WORKSHOP

Workshop in gynaecology: Cervical cancer

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The main purpose of this theoretical and practical workshop is to clearly define why and how to define volumes such as gross tumour volume (GTV), clinical tumour volume (CTV) and organs at risk (OAR) for use in intensity modulated radiotherapy (IMRT), as well as in for computed tomography (CT) and magnetic resonance imaging (MRI)-based brachytherapy (BT) for the exclusive and post-operative approach of cervical cancer. The workshop consists of two parts; the first is theoretical and the second will be developed in two practice groups: one for volume definition in brachytherapy and the other for IMRT. Finally, we will close the workshop with the take home conclusions.

Until recently, gynaecologic cancer treatment planning in many centres was only based on two-dimensional (2D) X-ray images to perform external radiotherapy and BT treatments. When moving from 2D- to 3D-based treatment planning in clinical routine, it is necessary to consider three major topics in each modality: volume definition, volume parameters, radiobiological concepts, and finally the integration of the two. Quantitative radiobiological modelling is highly useful to compare treatment regimens, to design a personalised strategy and to analyse clinical trials.

Most radiation oncologists routinely use dose–volume histograms, with the input from radiobiological modelling allowing their interpretation. The utility of other tools such as equivalent uniform dose, tumour control probability, normal tissue complication probability and uncomplicated tumour control probability will be discussed with clinical examples in this workshop.

Nowadays, a properly implemented IMRT treatment (which implies good imaging, delineation of volumes, careful planning and treatment delivery) can offer adequate GTV coverage with a reduction of dose in OAR. Several retrospective studies have reported positive results in local control and survival and a reduction of dose in OAR with clinical impact. As a result, the 0418 RTOG trial is currently analysing this topic and has found a reduction in early G2 gastrointestinal (GI) toxicity. Nevertheless, despite the reduction in late GI complications, the follow-up of the patients does not at present, allow significant results. The INTERTEC multicentric international trial is now analysing the reproductibility of GTV and OAR delineation between different centres as well as the results of IMRT in the exclusive treatment setting of cervical cancer. Until the results of these studies are available some guidelines by the RTOG describe how to perform volume delineation in IMRT in the treatment of cervical cancer patients.

Several studies have shown benefits in local control, survival and complications when MRI-guided BT is performed after external beam irradiation. The results have led the GEC-ESTRO to set out some clear recommendations to delimit gynaecological BT volumes by MRI. These GEC-ESTRO recommendations define several volumes of different risk of disease for prescription of the dose at the time of BT and at diagnosis, always based on the image parameters (MRI) and physical examination. They define:

Gross tumour volume (GTV) as the macroscopic residual tumor at BT and visualized on T2-MRI (high signal intensity mass).

High-risk CTV (HR CTV): the area of major risk of local recurrence because of residual macroscopic disease. This includes the GTV, the whole cervix and the presumed extracervical

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tumour extension at the time of BT (clinical examination and MRI findings). HR CTV includes palpable indurations and/or residual grey zones in the parametrium, uterine corpus, vagina and organs at risk without margins.

Intermediate CTV (IR-CTV): the area of mayor risk of local recurrence because of microscopic disease. This also includes HR-CTV with a margin of 5–15 mm chosen according to tumour size, location, potential tumour spread, response to external radiotherapy and treatment strategy.

Organs at risk: rectum, bladder and sigmoid. The outer contour of OAR must be drawn to limit the dose to 2 cc (DV2cc, DR2cc, and DS2cc).

When using CT, the GTV cannot be distinguished, therefore only a CTV or target can be drawn that includes the cervix, the lower part of the uterus and upper vagina, but the parametrial extension cannot be defined. If parametrial involvement is present, interstitial BT using plastic needles adapted to the colpostats/ring applicator or MUPIT is useful, and MRI is mandatory.

The dose in cervix BT traditionally was prescribed to anatomic points (points A or B) or reference isodoses (60 Gy) considering the tolerance dose in rectum and bladder based on ICRU points. After the GEC-ESTRO recommendations the dose should be prescribed to ensure that the tumour and the cervix are encompassed; nonetheless, the dose to the classical reference points A–H should also be taken into account. Two consensus of the Spanish BT Group have described the rules to draw contours for cervical and endometrial carcinoma. At present, a new ICRU report is currently in progress on "Dose and volume reporting in brachytherapy in cervical cancer".

The "new-tech" for cervical cancer treatment seems to offer solutions for the considered "old problem in cancer treatment", that is the continuous war to increase local control and survival with a reduction of treatment-related toxicity. Nevertheless, this "new-tech" is not equitatively available in all the hospitals and thus the "old problem" albeit reduced, continues.