The impact of brachytherapy boost for anal canal cancers in the era of de-escalation treatments

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What was your motivation for initiating this study?

Anal cancer is an unusual disease, however, the incidence of carcinoma of the anal canal is rising (1). The majority of anal cancers are related to the presence of human papilloma virus (HPV) infection. There are different approaches to achieve cure with locoregional control and preservation of anal function. For small lesions, radiation therapy demonstrated excellent rates of local control and survival (2,3). In case of locally advanced stage, combination of radiotherapy and chemotherapy (CRT) [5- fluorouracil (5-FU) and mitomycin C (MMC)] is the current standard of care (4–7). Although this treatment is effective, 40% of survivors of anal cancer have gastrointestinal toxicities such as urgency and faecal incontinence with a negative impact on the quality of life (QOL). Locally advanced tumours are frequently associated with more faecal incontinence than surviving patients with smaller tumours (8). With the EBRT boost technique, the entire anal canal and sphincter are irradiated. The idea of our study was to evaluate survival outcomes, safety and the impact on gastrointestinal toxicity for patients treated with a high-dose-rate interstitial brachytherapy boost (HDR-ISBT) for SCC anal carcinoma in our institution. Furthermore, the dose to the non-tumoural sphincter delivered by HDR-ISBT was evaluated and correlated with gastrointestinal toxicity (faecal incontinence).

What were the main challenges during the work?

This is a very special work. We know that the dose to the OAR delivered by brachytherapy is usually low due to the rapid fall of in dose, but we aimed to deal with the dose to the non-tumoural sphincter in depth, because the problem of faecal incontinence would be there. For that reason, the non-tumoural or contralateral sphincter was also delineated on CT images at the time of brachytherapy (anal canal wall + internal and external sphincters excluding the CTV). Dose constraints for normal sphincter were: Dmean (Gy α/ β3) ≤10 Gy, D90 (Gy α/ β3) ≤5 Gy and D 2 cm3 (Gy α/ β3) ≤20 Gy.

What is the most important findings of your study?

We found that the dose to the normal sphincter of patients undergoing HDR-ISBT is negligible. As a consequenceconsequence, chronic faecal incontinence grade 2 was present in 7.7% of patients, no fecal incontinence grade 3 was reported.
Furthermore, excellent rates of tumuortumour control were acquired with a tumour dose up to 60 Gy (EQD2 α/ β10). Colostomy-free survival (CFS) at 5 years was 88% [79–94%], this is superior to the results of patients who underwent an EBRT boost reported in historical cohorts , even compared with the most modern series of ACC treated with IMRT technique (9).

What are the implications of this research?
Despite the retrospective character of this work, HDR-ISBT demonstrated that this technique is still a valuable modality boost to de-escalate the toxicity of treatments for ACC. Due to the low dose delivered to the normal sphincter, brachytherapy must be discussed in a multidisciplinary approach and proposed to patients to decrease long-term related treatment toxicities.

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