

Updated neoadjuvant/adjuvant/definitive radiotherapy guidelines for the management of newly diagnosed soft-tissue and bone sarcoma

Authors: Dr Beatrice Seddon, Sarcoma Unit, University College Hospital and Dr Shane Zaidi, Sarcoma Unit, Royal Marsden Hospital

In response to the coronavirus pandemic, we have reviewed and updated our current radiotherapy guidelines to continue to provide safe and effective radiotherapy treatments for sarcoma patients. The situation is changing rapidly, and may require further updates. We will continue to support our patients and clinical teams during this uncertain time.

Soft tissue sarcoma

Newly diagnosed patients with non-metastatic soft tissue sarcoma would normally be treated with surgery in combination with either pre-operative or post-operative radiotherapy. Surgery is the most important component of local therapy, and should be prioritised. Pre-operative and post-operative radiotherapy schedules use fractionations over 5 – 6 weeks, and in the current pandemic, there is a significant risk that patients will become infected during radiotherapy, resulting in a significant interruption to radiotherapy. For patients undergoing pre-operative radiotherapy, this is potentially detrimental to their long-term outcome. For this reason, the proposal is that standard pre-operative radiotherapy should be discontinued during the pandemic, and all patients should be considered for surgery as their first local therapy. In addition, with the impact of limited radiotherapy delivery capacity and a reduced radiographer workforce, we will need to consider using shorter fractionation schedules or indeed consider deferring radiotherapy completely until there is confidence that a complete course of radiotherapy can be delivered. Each case will need to be discussed on an individual basis. Patients with newly diagnosed non-metastatic soft tissue sarcoma should be managed as follows:

- All patients should now be considered for surgery as the first local therapy for their tumour
- Pre-operative radiotherapy:
 - The standard fraction fractionation of 50 Gy in 25 fractions should not be routinely used
 - For a small number of selected patients with non-complex tumours not close to critical structures, pre-operative hypo-fractionated radiotherapy using 25Gy in 5 fractions, with surgery 1 – 2 weeks after completion of radiotherapy may be used¹. This has the advantage of completing all local therapy within 1 month, reducing patient hospital attendances for radiotherapy, also means that the radiotherapy resource requirement is reduced from 6 weeks to 1 week, which is an important consideration in a time of likely significantly reduced radiotherapy delivery capacity.
 - For very occasional patients, 50Gy in 25 fractions may be used if they are not suitable for 25Gy in 5# and it is felt that they have a significant need for pre-operative radiotherapy rather than primary surgery, such that the benefits outweigh the risks of a long pre-operative schedule.
- Post-operative radiotherapy:

- The need and timing for post-operative radiotherapy should be considered on an individual patient basis. It may be necessary to defer post-operative radiotherapy if there is insufficient capacity to deliver a standard 6 week course (60 – 66Gy in 30 - 33 fractions). For deferred patients, post-operative radiotherapy can be reconsidered as and when capacity is greater, and can be considered to still be of value as long as local recurrence has not occurred, even if the radiotherapy is deferred by several months.
- Consideration should be made for hypo-fractionated schedules such as 40 – 45Gy in 15 - 20 fractions and 36Gy in 6 once weekly fractions, which will reduce the number of radiotherapy fractions needing to be delivered, and patient hospital attendances for radiotherapy. Weekly hypo-fractionated schedules are associated with greater late radiotherapy toxicity, so this may not be considered suitable for younger patients.
- If post-operative radiotherapy is interrupted due to COVID-19 infection, ideally treatment should be completed once the patient has recovered, if this is within a reasonable time-frame

Fibromatosis

As a non-malignant locally aggressive condition, definitive radiotherapy for fibromatosis can be safely deferred.

Bone sarcomas

- Ewing's sarcoma – local therapy for Ewing's sarcoma can be surgery, definitive radiotherapy, or a combination of the two. Early local therapy is important for best outcomes, and delayed local therapy can result in poorer outcomes. As with pre-operative radiotherapy for soft tissue sarcoma, there is a high risk of interruption of treatment due to COVID-19 infection, which will be detrimental to long term outcomes. Surgery should therefore be prioritised for local therapy, and consideration should be given to bringing surgery forward to ensure that it is not delayed later in the treatment pathway. Recommendations are as follows:
 - All patients should now be considered for surgery as the first local therapy for their tumour, earlier rather than later.
 - Pre-operative radiotherapy should not be used.
 - Post-operative radiotherapy can be considered on basis of resection histology, although there may be delays in delivering this if there is reduced radiotherapy delivery capacity.
 - Definitive radiotherapy should be used as normal if surgery is not possible/appropriate, as this is potentially curative treatment.
- Non-Ewing's bone sarcomas (osteosarcoma, chondrosarcoma, chordoma):
 - Post-operative radiotherapy – this may need to be deferred if there is reduced radiotherapy delivery capacity, which is acceptable for low grade tumours such as chordoma or lower grade chondrosarcomas. For high grade tumours, urgency of radiotherapy needs to be considered on an individual patient basis.
 - Definitive radiotherapy:

This document was published on 24 March 2020. Please check www.rcr.ac.uk/cancer-treatment-documents to ensure you have the latest version. This document is the collaborative work of oncologists and their teams, and is not a formal RCR guideline or consensus statement.

- Locally advanced high grade tumours including osteosarcoma – where radiotherapy is being delivered to achieve local control for incurable inoperable disease, this should proceed if possible, as not treating may result in significant problems with symptom control that could result in needing prolonged hospital admission for symptom control. Consideration should be given to using shorter fraction schedules.
- Low grade tumours including chordoma – these are slow growing indolent tumours, and it is likely that radiotherapy can be safely deferred for several months without a negative impact on outcomes. Exceptions may be made for patients with symptomatic disease.

¹ Koseła-Paterczyk et al. Preoperative hypofractionated radiotherapy in the treatment of localized soft tissue sarcomas. *Eur J Surg Oncol.* 2014 Dec;40(12):1641-7. doi: 10.1016/j.ejso.2014.05.016. Epub 2014 Sep 20.