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Elevation of tissue response markers after radiotherapy may occur in patients classified using clinical scoring as 'non responders' suggesting that the difference in cell and molecular phenotype between 'responders' and 'non responders' is not understood and that there may in fact be a spectrum of subclinical changes at the tissue level across the two groups.
Identification of biomarkers used as simple biological endpoints of normal tissue toxicity may therefore be useful in the following settings:
1) A tool for scoring or characterisation of established late normal tissue effects which could be used in conjunction with clinical score.
2) To assess response to therapy.
3) To improve classification between 'responders' and 'non responders' in terms of radiotherapy toxicity.
4) As response markers, involved mechanistically in the radiation response, to improve understanding underlying molecular pathology or phenotype.

SP-0171
Pediatric Normal Tissue Effects in the Clinic (PENTEC): An international collaboration
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With advances in multi-modality therapy, childhood cancer cure rates approach 80%. However, both radiotherapy and chemotherapy may cause debilitating or even fatal "late effects" that are critical to document, mitigate, or prevent. QUANTEC provided a comprehensive overview of dose-volume-response relationships for adverse effects of radiation therapy in adults. Special attention for data on children treated with radiation therapy is needed, because of the intrinsic role of growth and development both during radiation exposure as well as in the attained life span, the much longer life-expectancy for children, and the less prominent role of co-morbidities.
PENTEC is a research collaboration aiming to critically analyze radiation dose-volume effects on normal tissue tolerances and second cancer risk as a function of age/development in pediatric cancer patients in order to: (a) inform treatment planning; (b) improve outcomes for survivors; (c) describe relevant physics issues specific to pediatric radiotherapy; and (d) propose dose volume outcome reporting standards to improve the knowledge base to inform future treatment guidelines. Late effects occurring decades after therapy, such as second malignancies and other health problems, are a special concern for pediatric cancer survivors.
The impact of other critical contributors to normal tissue damage, including chemotherapy, surgery, stem cell transplantation and underlying genetic predispositions will also be considered. The Consortium Steering Committee (Chair: Prof L.S. Constine) has representation from many different disciplines, including radiation oncology, pediatric oncology, medical physics, radiology, radiobiology, biomathematics/biostatistical modelling, epidemiology and evidence-based medicine. We have developed protocols on several topics including guidance for systematic literature searches, data extraction. We are currently identifying literature and developing data analysis guidance.
In this presentation we focus on an outline of the content, methods and challenges, and on the current status of the literature selection process.

OC-0172
Irradiation of soft tissue sarcomas in extremities: the need for a non-radiated strip
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Purpose/Objective: Classically radiotherapy for soft tissue sarcoma in extremities had to include a strip of normal tissue for preventing lymphedema. Lterature shows that dermal lymphatics, whose obstruction causes lymphedema, lay at a 1.5-2mm form the surface. This location implies that energy deposition in the superficial area is basic for explaining this side effect.
Cobalt units did indeed irradiate this superficial layer, (maximum 0.5.cm) thus making necessary leaving a non - irradiated strip. The use of higher energies such as 6 MV and higher (maximum at least at 1.5 cm,) avoids significant dose in the first millimeters, so the superficial layers are not irradiated, thus a normal strip would be unnecessary
Materials and Methods: Treatment planning for extremities soft tissue sarcoma was performed in 10 patients, with different beam energies. The dose in build up region or superficial, was quantified, for every situation and different beam parameters: a comparison was made between high and low energy, and also to theoretical Cobalt distribution
Results: 6 and 15 MV beams spared tissue in buid up radiation in the first millimeters. Volumetric studies showed that in a large treatment area, this implied that there was also a large supeficial non irradiated volume; this effect was greater for higher energies, and practically nonexistent for Cobalt
Conclusions: The need for leaving a strip of tissue without irradiation comes from a time when beam energy did not spare the first milimeters. Also in some situations the strip would avoid a correct irradiation of the target volume. As superficial layers are spared with current beam energies, the strip would be unnecessary. So there would be no restrictions for treatment planning. The higher the energy, the bigger the effect, this might imply that the beam energy in sarcoma should be as high as possible preserving the radiation of CTV/PTV.