the presence of lymphovascular invasion. In patients with these risks factors RNI would be recommended. Currently, there are two prospective trials (Alliance A11202 and RTQG 1304) that will potentially allow us to optimize nodal treatment.

**SP-0560** Radiotherapy after breast reconstruction

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**Abstract text**

Immediate breast reconstruction (IBR) rates are increasing in high risk breast cancer patients having postmastectomy radiation therapy (PMRT). PMRT combined with reconstruction increases the rate of complications regardless of the type (implant or autologous) and the timing of reconstruction. Fewer complications and better long-term cosmetic outcome are seen with autologous flap-based reconstruction compared to implant-based reconstruction, however, implant-based reconstruction is increasing in combination with PMRT. Despite thousands of women are treated, contouring guidelines for target volumes in the setting of IBR are lacking. Therefore, many patients who receive IBR receive PMRT to target volumes similar to CT-simulator based conventional breast irradiation. The aim of this presentation is to present a delineation guideline for PMRT after IBR with implant endorsed by a consensus among a global multidisciplinary group of breast cancer experts. If a consensus for patients having autologous IBR is reached before the ESTRO38 conference, this will also be presented.

**Joint Symposium: ESTRO-EORTC: Moving radiation oncology forward to improve patient outcomes**

**SP-0561** EORTC State of Science in Radiation Oncology: Overcoming barriers to practice change by collaboration; why now, and how....

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**Abstract text**

The EORTC conducted a State of Science in Radiotherapy Workshop in September 2018 to explore collaborative research in radiobiology as applied to radiation oncology. The workshop was attended by clinicians, medical physicists and basic scientists in order to delineate areas of innovative research potential in the biological sciences that could augment technologic approaches within the specialty of radiation oncology. This was particularly of interest in an era where the cost-effectiveness of new technologies, including particle therapies, are being evaluated for their ability to step-change clinical practice in relation to biological approaches. The latter approaches include stratified medicine approaches using big data and genomics, immuno-modulation of treatment response using radiotherapy, molecular predictive assays married to molecular drug treatments in combination with precision radiotherapy for localised and (oligo)metastatic disease. Using an interactive group discussion approach, a number of new areas for clinical trials were explored that marry technology with best biology in a multidisciplinary manner: these will be discussed in the session. Other important elements were the interactive team science approaches to novel ideas generation and implementation across disparate health care jurisdictions and competing health resources within the EORTC. Exciting areas for collaboration can come from discrete team science approaches which focus on specific clinical impact and routes that afford rapid translation from the basic through discovery to clinical trials sciences.

**SP-0562** Cohorts studies versus randomised controlled trials: can we combine the best of both worlds?

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**Abstract text**

Randomised controlled trials (RCTs) provide the best evidence for effectiveness of new interventions. RCTs are often hampered by slow and time-consuming recruitment, and complicated informed consent procedures. RCTs may also suffer from limited generalisability, due to strict inclusion and exclusion criteria, and enrolment of healthier and more educated individuals. In cohort studies, recruitment of large groups of representative patients is more straightforward. However, the cohort study design is less suitable for evaluation of treatment effectiveness, due to the ‘selection by indication’ phenomenon. The ‘Trials within Cohorts’ (TwIcs) design, also known as the cohort multiple RCT (cmRCT) design, aims to combine the advantages of RCTs and cohorts and is increasingly being applied as an alternative to classic RCTs. The basis of TwIcs is a prospective cohort of people with a condition of interest, in which trials can be embedded. According to the classic cohort study design, characteristics and outcomes of participants (e.g. demographics, clinical data, laboratory findings, patient-reported outcomes etc.) are collected at baseline and at fixed time intervals during follow-up. In addition, at cohort entry, participants provide broad consent to be either randomly selected to be approached for experimental interventions, or to serve as control without further notice. In a second stage, at the start of an RCT, cohort participants eligible for an experimental intervention are identified within the cohort and randomized to the intervention or control arm. Only those randomized to the intervention arm are informed about the trial, and offered the intervention, which they can accept or refuse. Participants randomized to the control arm are not informed about the trial and receive treatment as usual. Relevant outcomes of participants who have been offered the the intervention are compared with those of participants who were not offered the intervention and who received standard care. Starting in 2013, several radiotherapy TwIcs cohorts have been set up including patients with breast cancer (2400+), bone metastases (1400+), oligo lymph nodes (n=20), brain metastases (starting), and rectal cancer (700+). Of those patients, 80-85% provided broad consent for future randomization. Response rates of patient-reported outcome questionnaires varied from ~85% at baseline to 60-70% at 3 years follow-up. Three RCTs have now been completed: RECTAL BOOST (n=128), VERTICAL (SBRT for vertebral metastases, n=110) and FIT (exercise trial, n=260). Advantages of the TwIcs design included easier and more representative recruitment (>60% of all eligible patients were enrolled), and prevention of contamination and cross-over in the control arm. One of the main challenges of TwIcs was the selective drop-out in the intervention arm (i.e. patients refusing to undergo the experimental intervention), which was substantial in some of the trials. This presentation will address the above challenges, as well as other practical, ethical, and statistical issues associated with the TwIcs design.

**OC-0563** First experience with the model-based selection of head and neck cancer patients for proton therapy

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**Abstract text**

Proton therapy (PT) provides a precise method of localised delivery of radiation therapy. The field of head and neck oncology has been one of the early adopters of PT, with particularly high interest in oral cavity, skull base and nasopharyngeal areas. The use of PT in these leaflet areas is well established. However, the treatment of hypopharyngeal, laryngeal and pharyngeal areas has been more limited due to treatment constraints and concerns related to the lack of data. In order to better plan such treatments, we have developed a model-based approach for the patient selection at our institution. The approach is based on the in house developed treatment planning system (TPS) and takes into account the dose distribution in the normal tissues in order to select patients who can benefit from PT. The model is based on a statistical learning scheme that allows to classify patients into groups with a significant difference in the dose distribution in the normal tissues. After development, the approach was retrospectively applied to a cohort of patients with laryngeal tumors treated with PT. The model-based selection was able to improve the plan quality by reducing the dose to the normal tissues, such as the spinal cord, brachial plexus, and contralateral larynx. The expected benefits are a reduction of the acute and chronic complications of the treatments. We will present the full details of the model as well as the clinical implications of its use.