



# BRACHYTHERAPY

## News from GEC-ESTRO gynae working group

The gynaecological cancer working group of the Groupe Européen de Curiethérapie (GEC) and the European Society for Radiotherapy and Oncology (ESTRO) has increasingly become an efficient platform and network during the last few years. Through this network:

- Clinical studies are supported to provide clinical evidence for new treatment approaches that employ advanced technology such as brachytherapy and external beam radiotherapy;
- Research that is related to these studies is facilitated on a multi-centre basis;
- Dissemination of such studies is promoted through international publications, presentations and educational and training activities (such as the ESTRO School).

Furthermore, activities on translational research and imaging are initiated as sub-studies of EMBRACE II. The EMBRACE project (on image guided intensity modulated External beam radiochemotherapy and Magnetic resonance imaging-based adaptive BRACHytherapy in locally advanced CErvical cancer) was designed and initiated in 2008 by the GEC ESTRO gynae network to develop, perform and evaluate image-guided radiotherapy in cervical cancer with a special focus on improving clinical outcomes. EMBRACE II is an extension of the working group's activities to external beam radiation therapy (EBRT) and radiochemotherapy, in particular to include intensity-modulated radiation therapy (IMRT)/ volumetric modulated-arc therapy (VMAT) and image-guided radiation therapy (IGRT) for research and development (R&D).

The last annual GEC-ESTRO gynae network meeting was held in Budapest prior to the GEC-ESTRO workshop in November 2019. A total of 56 participants from 31 institutions and three companies gathered to share experience and to discuss current and future initiatives.

## GEC-ESTRO gynae recommendations: new and ongoing efforts

One of the highlights of 2020 has been the publication of recommendations for a target concept for image-guided brachytherapy in primary vaginal cancer [1]. The target concept defines adaptive target volumes for volumetric dose prescription and should improve comparability of different radiotherapy schedules of this rare disease. A prospective evaluation of the target volume concept within a multicentre study is being prepared (EMBRAVE, see below). There is ongoing work on further GEC-ESTRO gynae initiatives within the recommendations, which cover:

- Target contouring that is based on computerised tomography (CT) for cervical cancer brachytherapy (coordinator Umesh Mahantshetty, radiation oncologist at Tata Memorial Hospital, Mumbai, India).
- Treatment planning for cervical cancer brachytherapy (coordinator Kari Tanderup, oncologist at Aarhus University Hospital, Denmark).
- Target concept recommendations for vaginal recurrences in collaboration between GEC-ESTRO / American Brachytherapy Society (ABS) / Canadian Brachytherapy Group (CBG) (coordinator and ESTRO representative Remi Nout, professor of radiation oncology at Erasmus Medical Centre, Rotterdam, The Netherlands).
- Joint multidisciplinary guidelines on vaginal cancer that are being prepared as a collaboration between the European Society of Gynaecological Oncology (ESGO) and ESTRO (coordinator and ESTRO representative, Remi Nout)
- Joint multidisciplinary guidelines on endometrial cancer in collaboration with ESGO and the European Society for Medical Oncology (ESMO).

## NEW review articles in 2019 and 2020

The GEC-ESTRO gynae group has been active in the provision of summaries of some of the latest developments in review articles. The references for these are:

- Image guided adaptive radiotherapy in cervical cancer; Tan et al., Seminars in Radiation Oncology [2]
- Management of nodal disease in advanced cervical cancer; Jürgenliemk-Schulz et al., Seminars in Radiation Oncology [3]
- Definitive radiotherapy with image-guided adaptive brachytherapy for primary vaginal cancer; Westerveld et al., Lancet Oncology [4]
- Image registration, contour propagation and dose accumulation of external beam and brachytherapy in gynecological radiotherapy; Swamidass et al., Radiotherapy and Oncology [5]

- Evidence-based dose planning aims and dose prescription in image-guided brachytherapy combined with radiochemotherapy in locally advanced cervical cancer; Tanderup et al., Seminars in Radiation Oncology [6]
- Education and training for image-guided adaptive brachytherapy for cervix cancer - the (GEC)-ESTRO/EMBRACE perspective; Tan et al., Brachytherapy [7]
- Initiatives for education, training, and dissemination of morbidity assessment and reporting in a multi-institutional international context: Insights from the EMBRACE studies on cervical cancer; Kirchheiner et al., Brachytherapy [8]

## Clinical studies and publications

The GEC-ESTRO gynae working group has provided a central hub which has proved very useful for the development of clinical studies. From this hub, a large consortium has grown, which since 2018 has been enrolling patients into prospective studies.

### ***EMBRACE I (2008-2015)***

The overall aim of EMBRACE I was to document clinical benchmark data regarding outcomes of treatment with MRI-based IGRT in locally advanced cervical cancer. A total of 1416 patients have been enrolled to the EMBRACE study from 24 centres. The study finalised accrual of patients in 2015. The data were very comprehensive and covered a median follow-up period of 51 months. The overall outcome analysis has been completed. It will be presented at the ESTRO 2020 meeting and will be published soon.

### ***EMBRACE II (2016-2021)***

EMBRACE II is prospectively assessing the clinical outcome of high-quality radiotherapy that includes systematic use of intracavitary (IC)/interstitial (IS) application techniques, dose prescription protocols for image-guided adaptive brachytherapy, increased EBRT conformality through application of IMRT/VMAT and IGRT, and risk-adaptive EBRT for elective nodal target selection. The overall aim of EMBRACE II is to benchmark an excellent level of local, nodal and systemic control, and overall survival, as well as excellent outcomes in terms of morbidity and quality of life, through use of these state-of-the-art techniques. The EMBRACE II study initiated accrual of patients by March 2016 and 42 institutions have finished the EMBRACE II accreditation. By October 2020, >900 patients had been enrolled into the EMBRACE II study. The work will be ongoing until the end of 2021.

### ***EMBRACE III+ studies (2022-)***

The next generation of EMBRACE studies is currently under discussion. The aim is to have new study protocols ready for 2022 when the EMBRACE II study has finalised accrual. Initial plans are to be able to offer interventions to low/intermediate as well as to high-risk patients that are tailored to their disease, risk of recurrence and risk of morbidity.

### ***EMBRAVE (2021-)***

A prospective multi-centre clinical registration study on radiochemotherapy and image-guided adaptive brachytherapy in vaginal cancer (EMBRAVE) will be launched in 2021, according to the target concept that was published this year. This study will follow the EMBRACE template to evaluate the target concept, which is to benchmark results and derive evidence-based recommendations for dose-planning aims and constraints in the treatment of vaginal cancer. The protocol is ready for submission to the ethics committee. The principal investigator is Remi Nout, with the members of the vaginal cancer task force as project leaders.

### ***Primary endometrium: retrospective data collection (-2018)***

A multicentric retrospective collection of data has been carried out regarding 183 patients. A publication is in progress. The coordinator is Angeles Rovirosa, consultant in oncological radiotherapy at the Hospital of Barcelona, Spain.

### ***Publications related to EMBRACE and the gynae working group***

Based on the ongoing research projects and the EMBRACE data, a wealth of research papers have been published from the gynae network. Coordinators of the many research projects are located in different institutions of the EMBRACE consortium and of the gynae network. In total, 37 original manuscripts and 10 reviews/editorials have been published since 2015.

## ESTRO teaching courses related to gynae brachytherapy

### ***ESTRO gynae course: now going online***

In 2019 the ESTRO teaching course entitled "Image-guided radiotherapy and chemotherapy in cervical cancer: focus on adaptive brachytherapy" took place in Cluj, Rumania, with 128 participants. The course comprised different tracks for newcomers in the field and for those who were already experienced. In addition there was for the first time an extra physics track. The 2020 edition of the course has moved fully online. The course is comprised of six modules (one module per week) with interactive contents and is



combined with preparations that are required between the modules, which take the form of listening to pre-recorded lectures and contouring and treatment planning homework. While on-line teaching has shortcomings, there are also advantages; it is hoped that the future course will develop into a combination of online and live components.

### ***Association of Radiation Oncologists of India /ESTRO gynae course: transition of clinical practice***

Many participants in this course in India aim to transition into MRI-guided brachytherapy with combined intracavitary (IC) and interstitial (IS) applicators. The participants are actively involved in the changes of their practices and can benefit from attendance at several editions of the course. In between the live courses, follow-up with the actively participating institutions is being prepared to follow and support their transition from 2D to 3D brachytherapy. This is a new template for an ESTRO teaching course which is to serve change of clinical practice during a period of several years. In 2020 the Association of Radiation Oncologists of India (AROI)/ESTRO course took place for real in Mumbai in March– just on the verge of the Covid19 restrictions (the European faculty provided its teaching online).

### ***ESGO/ESTRO multidisciplinary course: new multidisciplinary training***

The first edition of a joint ESGO and ESTRO course on the multidisciplinary management of cervical cancer was held in January 2020 at Institut Gustave Roussy in Paris, France. The course was attended by 80 participants. A second edition of the course is planned for May 2021 in Rotterdam, Covid19 restrictions permitting.

## **Richard Pötter awarded with the Jens Overgaard legacy award**

The EMBRACE group and the GEC-ESTRO gynae network has been honoured by the Green Journal; Richard Pötter, professor and head of the Department of Radiotherapy at the Medical University of Vienna/Vienna General Hospital, Austria, is to receive the Jens Overgaard legacy award. This prize is given for a significant contribution to the development of radiotherapy that is published in Radiotherapy & Oncology. Specifically, Professor Pötter is recognised for the creation of an evidence-based platform for the improvement of the radiotherapeutic treatment of cervical cancer, not least through the EMBRACE project, and for bringing this knowledge forward in international guidelines. The publications that are related to this activity are among the most cited and downloaded papers from the Green Journal. The work is a clear demonstration of the importance of clinical science that generates evidence, and the results have implications for ESTRO members as clinicians, medical physicists or radiotherapists. Professor Pötter dedicates the award to the GEC ESTRO gynae network, the EMBRACE study and research group, and to the International Commission on Radiation Units and Measurements (ICRU) 89 report committee.



**Kari Tanderup**  
GEC-ESTRO gynae working group chair

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