Educational workshop:
3-D Image-Guided Adaptive Brachytherapy for Gynaecology using the combined Intracavitary-Interstitial Technique

Medical University of Vienna, Vienna, Austria
11 – 12 November 2013
Dear Colleagues,

It is an honor and pleasure to invite you to the clinical workshop “3-D Image-Guided Adaptive Brachytherapy for Gynaecology using the combined Intracavitary-Interstitial Technique”. This workshop will take place at the Department of Radiotherapy of the Medical University of Vienna / Vienna General Hospital (AKH).

The faculty consists of highly recognized experts with extensive experience in image-guided adaptive brachytherapy. During the workshop, you will be introduced to all aspects of image-guided adaptive brachytherapy treatment for gynaecological tumours. Practical issues, solutions and constraints for each participating center are defined during extensive discussions on the practical aspects of implementing the technique. The centerpiece of the program is a live case, in which the participants can directly observe a procedure in the OR itself.

This educational workshop is intended for Radiation Oncologists, Clinical Physicists, Gynaecologists and Radiation Technologists who have already participated in the ESTRO course ‘Image-guided radiotherapy & chemotherapy in gynaecological cancer’.

We warmly invite you to join this unique workshop and to gain invaluable knowledge to bring the advantages of image-guided adaptive brachytherapy to your center and your patients. Please note that space is limited to 16 participants, so be sure to register early. We are looking forward to meeting you in Vienna!

Yours sincerely,

Prof. Dr. R. Pötter and Prof. Dr. C. Kirisits
Department of Radiotherapy
Medical University of Vienna / Vienna General Hospital (AKH)
Workshop: General Information

**Intended Participants**
Radiation Oncologists, Clinical Physicists and Radiation Technologists working in a multidisciplinary team who plan to implement 3-D Image-guided brachytherapy for gynaecology using a combined intracavitary and interstitial technique.

**Workshop Topics**
- Imaging and contouring
- Applicator reconstruction
- Live case (implantation)
- Multidisciplinary treatment planning
- Team roles, logistics, infrastructure, learning curve
- Hands-on exercises

**Entry Level**
Participants have completed the ESTRO Teaching Course on 3-D Image-Guided Adaptive Brachytherapy (IGABT) in Gynaecological Malignancies

**Number of Participants**
The maximum number of participants is 16.

**Length**
2 days

**Language**
The programme will be conducted in English.

**Faculty Members**
- Richard Pötter, MD, PhD – Professor and Chairman
- Christian Kirisits, PhD, Assoc. Prof, Head of Brachytherapy Physics
- Primož Petrič, MD, MSc, Senior consultant radiation oncologist
- Alina Sturdza, MD, FRCPC, Radiation Oncologist
- Daniel Berger, PhD – Clinical Physicist
- Nicole Nesvacil, PhD – Post Doc Fellow, Clinical Physicist
- Maximilian Schmid, MD

* Department of Radiotherapy, Medical University of Vienna, Vienna General Hospital (AKH), Austria
** National Center for Cancer Care and Research, Doha, Qatar

**Training Venue**
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Medical University of Vienna
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You may also visit our website:
www.nucletron.com
3-D Image-Guided Adaptive Brachytherapy (IGABT) for Cervix Cancer using the combined Intracavitary-Interstitial Technique

The aim of IGABT is twofold – to deliver a higher dose to the target tissue, leading to increased local control rates, and to deliver a reduced dose to the surrounding tissue and organs-at-risk (OARs), reducing the occurrence of side-effects. As High-dose-rate (HDR) brachytherapy is carried out over a number of treatments, both the size of the tumour and the position of the OARs can change as the treatment progresses. With traditional brachytherapy, images would only be acquired at the start of treatment and would be used for the entire treatment sequence. With IGABT, images are acquired prior to each treatment session, allowing a new treatment plan to be prescribed according to changes in tumour volume, applicator position and OAR situation.1-4

In a study detailed by Tanderup et al, 2010, in tumours over 32cm³ the use of IGABT allowed an increase of the target dose of 9 Gy over that of standard dose plans. For those with smaller tumours - under 32cm³ - the use of IGABT led to a decrease in the percentage of patients whose OARs received a dose above that deemed acceptable (reduction from 36% to 7%).5 Studies such as these show how beneficial IGABT can be for the patient in terms of treatment precision.

Clinical Workshop on Practical Implementation of IGABT

The workshop focuses on the clinical and practical implementation of IGABT for gynaecological cancers. This workshop is complementary to the ESTRO 3-D GYN brachytherapy course. The program starts with explaining
3-D imaging, focused on MRI and CT protocols (patient preparation, image acquisition), and addresses the principles of tumour and target visualization.

**Brachytherapy Evolution**

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<tr>
<th>Implant-based</th>
<th>Volume-based</th>
<th>Adaptive</th>
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<td>Standardisation through 2D techniques like the Paris system (e.g. breast) and the Manchester method (GYN)</td>
<td>Conversion to dose-volume optimisation using 3-D imaging capabilities</td>
<td>Upfront implant geometry</td>
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<td>Optimised applicator and needle positioning based on real-time dose guidance</td>
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<td>Interfractional adaptation to changes in patient anatomy</td>
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The target concept of the GYN GEC-ESTRO recommendations is illustrated and discussed with the use of clinical examples. Hands-on exercises will focus on target contouring using imaging and clinical examination information, and will be discussed with the group. Particular focus will be given to alternative solutions when access to MRI for the first brachytherapy application is limited and only CT is available for the next implantations. A variety of up-to-date methods for applicator reconstruction will be demonstrated. The optimal reconstruction method for each individual center will be identified during a group discussion.

The 3D IGABT workflow will then be demonstrated on a live case:
- Application preparation (nursing care, anesthesia, target definition)
- Applicator insertion (with a combined intracavitary-interstitial technique)
- Imaging (MRI) Multidisciplinary treatment planning
- Brachytherapy delivery

The main aspects of the combined intracavitary-interstitial application will be outlined, along with demonstration
of how to meet the challenge of treating different tumour geometries. The treatment planning session will start off with standard manual optimization based on loading pattern adaptation, dwell-weight tuning and dose-point definition. Optional methods such as direct dwell-time optimization and graphical optimization are presented, including potential risks. New possibilities for integrating inverse planning into GYN brachytherapy planning will also be discussed, as well as dose-effect relationships for target and OARs. For each type of optimization a concept of dose- and volume-constraints is proposed based on current clinical evidence.

**Objectives and Results**

Participants will obtain a comprehensive and practical insight in the clinical workflow of 3-D IGABT for gynaecological tumours. Practical challenges for the implementation of such a workflow will also be discussed.

**References**


Monday, 11 November 2013
- Participant presentations on current versus required situation
- Imaging (CT/MRI)
- Overview of GYN GEC-ESTRO target concept
- Clinical examples and contouring exercises
- Using 1st fraction MRI data for subsequent CT-based treatment plans
- Applicator reconstruction

Tuesday, 12 November 2013
- Live case
- Discussion of video case
- Application techniques
- Applicator reconstruction
- GTV assessment and target contouring
- Treatment planning: manual optimisation and inverse optimisation
- Dose constraints for target and QARs based on clinical experience
- Clinical impact and plenary discussion on implementation