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EDITORIAL

Think big–think BiGART. The 21st Acta Oncologica Symposium—BiGART 2023

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Acta Oncologica has supported Nordic symposia from the start in the late eighties and since 2006 they have supported a biannual Acta Oncologica Symposium hosted by radiotherapy research environment in Aarhus, Denmark. The topics have included stereotactic body radiotherapy (2006), image-guided radiotherapy (2008), and since 2010 BIGART (biology-guided adaptive radiotherapy), with the current being the seventh in this series [1]. The BiGART meeting concept is unique for bridging clinical and translational research in radiation oncology. Clinical studies, physics, and radiobiology research are equally important parts that must interact and integrate—and that is just what is the aim of BiGART.

BiGART 2023 and the 21st Acta Oncologica Symposium were held from the 20th to the 21st of June 2023, attracting more than 170 participants from 13 countries (Figure 1), of which 125 presented their ongoing research, either from the stage or during the poster discussion sessions—indicating that it was a lively and very interactive meeting as usual. BiGART is the only multidisciplinary, multimodality, and site unspecific oriented radiation oncology meeting in the Nordic countries and serves as such an important glue for the Nordic radiotherapy community.

This year the themes of the meeting were:

1. State of the art of biology-guided and adaptive radiotherapy anno 2023
2. Oligo-metastatic disease and re-irradiation
3. Automation and artificial intelligence
4. Clinical radiotherapy
5. Proton radiotherapy
6. Preparing for the future

Each session started with one or more internationally invited speakers presenting an overview of the topic, followed by a broad collection of Nordic and international proffered papers. The first day ended with a poster discussion in small groups. This part of the meeting is always a highlight as it gives the opportunity to meet and interact with colleagues from the Nordic countries in a very informal way for sharing and discussing each other's projects. It is indeed the place to expand your network and start new collaborations.

By tradition, BiGART bridges biology, technology, and clinical practice, and the 2023 symposium was no exception. In the current issue of Acta Oncologica, the reader will have the opportunity to get acquainted with some of the presentations from BiGART 2023 in the form of peer-reviewed papers from the conference. Additional papers will be published in upcoming issues of the journal.

The indication for, and application of radiotherapy is ever-changing ranging from exploration of the usefulness of adaptive radiotherapy [2,3], through classical clinical radiotherapeutic indications [4], to the indication for treatment of oligometastatic disease and other scenarios from the border to palliative irradiation [5,6].

Curative intended trimodal treatment of esophageal cancer is complex and a delicate balance between gain and toxicity. The group from Leuven investigated the impact of the dose delivered by 4D radiation to the functional lung volume instead of the more commonly used anatomical lung volume and showed that the dose to the functional parts of the lung much better predicted the risk of pulmonary complications to radiotherapy [7]. Data from the group indicate that radiation exposure to functional volumes predicted the risk of lung complications compared to traditional dose-volume parameters for the lung. Nielsen et al. [8] showed that among 12 different OAR contoured based on AI-algorithms (artificial intelligence-based algorithms) a much higher consistency was found (using DICE indices) compared to delineations performed by dedicated specialists. This might be the promising basis for better and more homogeneous treatment plans in the future among departments and an important step towards homogeneity in treatment planning in clinical trials. However, in the present study, no difference in delta NTCP was noted between AI-derived OAR and manual-delineated OAR.

Defining the volume irradiated and protecting OAR properly influences in the end the quality of life for many patients. A study from Amidi et al. [9] revealed that the quality of sleep was poor, and the frequency of sleep disturbances was very high (for more than one-third of the patients) and associated with irradiation to sleep/awake related brain structures in patients treated for primary brain tumors. This is certainly a topic overlooked by many clinicians. Similarly,

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Figure 1. The BiGART 2023 participants in front of the Varna mansion before the network dinner.

the loss of body mass is also neglected leading to compromised rehabilitation [10].

Proton radiotherapy plays an increasing role in the Nordic countries with the establishment of several proton therapy centers at present and in the years to come. In total, 34 abstracts (or more than a quarter of the presentations) were on biology, physics, or clinical aspects of proton therapy. The spectrum of papers on proton therapy is broad and ranges from unintended exposure of personal or patients' caregivers in the treatment room during delivery of a pencil-beam scanned proton beam which was unexpectedly low [11], to studies presenting experience with proton re-irradiation. Among the latter, a report of seven patients with midline glioma (54 Gy in 30 fractions) showed that although cumulated doses to the brainstem, chiasm, and optic nerves violated dose constraints, the observed toxicity was mild and no radionecrosis was reported [12].

It was characteristic for the 2023 version of BIGART that patient experience and compliance with diagnosis and treatment was increasingly addressed, not least when it comes to vulnerable patients such as children or patients with a poor socio-economical position [9,10,13].

The underlying (radio)biology is always an important part of the BiGART concept and was also prominent at this year's symposia. Immunotherapy in combination with proton therapy [14], the importance of CD20 T-lymphocytes for the outcome of breast radiotherapy or brachytherapy for cervical cancer, the importance of HPV in head and neck cancer [15], hypoxia-guided automated dose planning [16], or skin toxicity by FLASH therapy were some of the topics discussed. In fact, BIGART is one of the few meetings where preclinical studies are brought into the discussion at a clinical platform. This results in a fine-tuning of the concepts and the needed sharpening of our mutual understanding of the potential of not least *in vivo* radiobiological pre-clinical simulation models [14,17,18].

Besides the science, the two-day symposium served as a very important networking place for Nordic radiotherapy and contributed to tying the Nordic radiation oncology communities together. This is really important in the present landscape very dominated by a few leading countries in radiation research—especially from Western Europe and the US. Hosting this important event for Nordic radiotherapy would not be possible without the generous support from Acta Oncologica. The organizers of BiGART are very grateful for this contribution.

Overall, BiGART 2023 was again a successful event, and the organizers are eager to welcome all Nordic colleagues back in Aarhus for BiGART in June 2025!

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