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Surgical margin status and cancer patients' outcome: The potential of intensification with intraoperative electron radiotherapy

Intraoperative delivered electron beam irradiation (IOERT) is a super-precise (real time vision control and surgically guided irradiation) technique for dose-escalation local cancer treatment strategies. As a component of treatment it has been tested in a variety of cancer sites and histological subtypes in which the combination of surgical resection and external beam radiotherapy is recommended for local treatment. IOERT boost to the tumor bed for dose-escalation has proven to promote high local control rates in breast, rectal, pancreatic, esophago-gastric bone and soft tissue sarcomas and oligo-recurrent disease. Electron (IOERT) boost doses in the range of 10-20Gy combined with external beam conventional fractionation (45-50Gy) and RO surgical resection achieved local control rates > 90% in all the disease models mentioned and > 50% in R1 status. Our reported institutional experience includes > 600 patients with primary cancers locally advanced boosted with IOERT and > 300 with oligo-recurrent cancer rescued with IOERT containing maximal surgical effort. R status, tumor fragmentation, proven radioresistance (previous radiotherapy), interval to recurrence, differentiation and size are a constellation of adverse factors for low-regional control that will be discussed in the different cancer models analysed. Intraoperative electron irradiation, as a component of treatment, induces non-anecdotal cohorts of long-term surviving patients in all subgroups studied (20-50%) and local control rates ranging from 30-60%. R+ patients have an associated increased risk of distant metastasis which has to be considered for systemic intensification treatment strategies. Mature IOERT data indicates electron boost intensification in the treatment of resectable locally advanced and oligo-recurrent cancer contributes to quality cancer control for R+ patients.

Biography

Felipe A Calvo obtained his initial Medical degree at the Autónoma University of Madrid (1978), completed his Residency in Radiation Oncology at the University Hospital Puerta de Hierro (Madrid), and his Post-graduate education as fellow at the Radiotherapy Unit of the Royal Marsden Hospital (London) and in the Department of Radiation Oncology and Nuclear Medicine at Hahnemann University (Philadelphia). In 1984, he joined the Medical staff at the University Clinic of Navarra (Pamplona) as the first Specialist responsible for Radiotherapy (designated Vice-Chairman of the Department of Oncology in 1987). In 1991, he took over an academic position as Full Professor in the Department of Radiation Oncology and Nuclear Medicine at Hahnemann University, where he developed the IORT project and was, in addition, the Residency Training Program Director. He was selected as Chairman of the Department of Oncology at the General University Hospital Gregorio Marañón (Madrid, Spain) in 1993, his serving position at present, which implies the coordination of an integrated Cancer Center in the context of a large University Hospital. In 1995, he was promoted to Full Professor (tenure track) in Radiation Oncology at the Complutense University of Madrid (Spain), where, since 2006 he is the Hospital Vice-Dean of the Medical School. In 2007, he obtained a permanent position as University Chair-Professor. He has been Vice-President of the Spanish Association of Radiotherapy and Oncology, President of the Spanish Commission of Radiation Oncology and Founding President of the International Society of Intraoperative Radiation Therapy. He belongs to the Editorial Board of the *International Journal of Radiation Oncology Biology and Physics*, *Radiotherapy and Oncology* and *Clinical & Translational Oncology*.

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