



Learn & Improve Professional Skills (LIPS) Track – Session 14

Translational Molecular Imaging & Therapy + Physics + Radiation Protection + Oncology & Theranostics + Ethics Committee

Wednesday, September 13, 09:45 – 11:15

Session Title

Beta Emitters for Radioguided Surgery - Challenges and Opportunities

Chairpersons

Pedro Fragoso Costa (Essen, Germany)

Tereza Kráčmerová (Prague, Czech Republic)

Programme (example for 3 speakers, each 30 min)

08:00 – 08:30 Kuangyu Shi (Bern, Switzerland): Developments in instrumentation and probes

08:30 – 09:00 Esther Ciarrocchi (Pisa, Italy): Radiation protection in beta RGS nuts and bolts

09:00 – 09:30 Christopher Darr (Essen, Germany): Protocols and clinical relevance of beta RGS

Educational Objectives

1. Get acquainted with recent technological developments at instrumental and radiopharmaceutical level
2. Understand the different methods of detection that can be used in beta particle radioguidance
3. Acknowledge the principles and of radiation protection applied to radioguided surgery, particularly using beta particles
4. Get insight about the logistics involved in different radioguidance protocols using beta particle detection
5. Get insight about the clinical relevance and evidences gained or yet still to be gained in beta radioguided surgery

Summary

Radioguided surgery using beta particles is a technique that has shown promise for improving the accuracy of surgical procedures. This technique involves the use of radiolabeled probes that emit decay-resulting quanta to help locate and remove cancerous tissue. Radioguided surgery using beta particle-emitting radiopharmaceuticals has emerged as a promising technique for intraoperative detection of tumor margins and sentinel lymph nodes. Recent developments in instrumentation and radiopharmaceutical probes have led to improved sensitivity, specificity, and localization accuracy in radioguided surgery. Advances in imaging systems, such as handheld gamma and beta probes and intraoperative imaging devices using Cerenkov radiation or PET/CT back table imaging, have enabled real-time detection of radiopharmaceuticals, reducing the need for multiple surgical procedures. Additionally, novel radiopharmaceutical probes, including beta-emitting radiopharmaceuticals, are being developed for radioguided surgery to improve the detection and localization of tumors and lymph nodes. These developments hold great promise for improving surgical outcomes and reducing patient morbidity in the context of breast cancer, prostate cancer and other malignancies.



This technique requires adequate radiation protection measures to minimize exposure to patients, surgical personnel, and the environment. The minimization of administered activity, dosimetry, and monitoring equipment is crucial to ensure the safety of all individuals involved in radioguided surgery. Moreover, proper training and education of medical staff in radiation safety practices is essential to minimize the risks associated with beta-emitting radiopharmaceuticals. Recent developments in radiation protection, including optimization of surgical procedures, more sensitive detection devices that require less administered activity and real-time dosimetry systems, have improved the safety and efficacy of radioguided surgery. These developments are crucial in the context of breast cancer, prostate cancer and other malignancies, where radioguided surgery using beta-emitting radiopharmaceuticals can provide significant benefits to patients while minimizing the risks associated with ionizing radiation.

Key Words

Beta radioguidance, intraoperative imaging, PET tracers, radiation exposure



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