SNMMI 2019 Annual Meeting

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The Society of Nuclear Medicine and Molecular Imaging (SNMMI) 2019 annual meeting was held in Anaheim, CA, USA on June 22–25, 2019.

New radioligand combination for prostate cancer

[^{177}Lu]-prostate-specific membrane antigen (PSMA)-617 is an effective treatment for metastatic castration-resistant prostate cancer. However, not all men respond to this therapy. Presenting data from an ongoing phase 1–2 trial, Louise Emmett (St Vincent's Hospital, Sydney, NSW, Australia) and colleagues showed that combining [^{177}Lu]-PSMA-617 with idronoxil (NOX66), a radiosensitiser, could improve response. Among 16 heavily pretreated men with metastatic progressive disease, who received two different doses of idronoxil (400 mg or 800 mg per day), 11 (70%) had a 50% reduction in their prostate-specific antigen concentrations. Fatigue and pneumonitis affected five (31%) men. The trial is now recruiting patients for the phase 2 expansion cohort.

Predicting T-DM1 response

PET–CT with a new radiotracer, [^{89}Zr]-trastuzumab, can identify patients who are most likely to respond to trastuzumab emtansine (T-DM1), according to new research by Gary Ulaner and colleagues (Memorial Sloan-Kettering Cancer Center, New York, NY, USA). In their exploratory phase 2 trial, the investigators enrolled 112 patients with a wide range of cancers with *HER2* aberrations, including 12 patients with *HER2*-mutant lung cancer. Of these, four patients with [^{89}Zr]-trastuzumab-avid tumours responded to T-DM1, whereas just three of eight patients who had low uptake of the radiotracer responded. In an era in which treatments are increasingly expensive, upfront selection of probable responders has obvious benefits for patients and health systems alike.

Measuring CXCR4 expression

Ankit Watts (Post Graduate Institute of Medical Education and Research, Chandigarh, India), presenting the first Asian experience of [^{68}Ga]-pentixafor PET–CT, showed that differential CXCR4 expression could be imaged in 86 patients with various types of lung cancer. CXCR4 is a chemokine receptor found in many cancers that regulates function and trafficking of immune cells and the tumour microenvironment, and upon which novel targeted therapies are being developed. The investigators speculated that this new PET tracer has potential for monitoring treatment responses to CXCR4 inhibitors and for the development of new alpha/beta radioligand targeted therapies. Interestingly, the highest [^{68}Ga]-pentixafor uptake, and thus CXCR4 expression, was found in small-cell lung cancer. In a separate study, Qingquing Pan and colleagues (Peking Union Medical College Hospital, Beijing, China) further showed that [^{68}Ga]-pentixafor PET–CT was highly selective, and outperformed [^{18}F]-fluorodeoxyglucose PET–CT, for assessment and visualisation of multiple myeloma. Studying 22 patients diagnosed with multiple myeloma, of 19 patients who were assessed with both scans, just one was a false negative with [^{68}Ga]-pentixafor PET–CT compared with six visualised with [^{18}F]-fluorodeoxyglucose PET–CT.

Imaging paraganglioma

[^{68}Ga]-NODAGA-LM3, a novel somatostatin receptor antagonist, is superior to the existing standard tracer, the somatostatin receptor agonist [^{68}Ga]-DOTATOC, for PET–CT imaging of paraganglioma, according to specialists at Central Clinic, Bad Berka, Germany. In the first-in-human trial of this new tracer, studying ten patients with this rare malignancy, Aviral Singh and colleagues successfully identified 243 lesions with [^{68}Ga]-NODAGA-LM3 compared with 177 using [^{68}Ga]-DOTATOC, including lesions in the lymph nodes, liver, and bone metastases. Furthermore, physiological uptake of [^{68}Ga]-NODAGA-LM3 was lower than that of [^{68}Ga]-DOTATOC in the liver and spleen, and [^{68}Ga]-NODAGA-LM3 was well tolerated in all patients with no adverse effects reported.

Wearable technology

Targeted therapy with [^{177}Lu]-DOTATATE is the new standard of care for somatostatin receptor 2-positive neuroendocrine tumours. Tailoring the dose to spare crucial organs at risk can double survival. To do this, however, requires several PET scans during a 7-day period, which is both highly expensive and uses a lot of clinical resources. Robert Miyaoka and colleagues (University of Washington, Seattle, WA, USA) described the development of a personal lightweight vest containing 15–20 small radiation detectors designed to acquire data on organ-specific radiotracer washout that is then sent via WiFi or cellular services to a secure website. The patient simply needs to wear the vest for 2 min, at home, once a day for 1 week. Preliminary results from simulations show the wearable technology is similar to four single-photon emission CT images in the clinic. The researchers hope this new technology will lower the cost of personalised [^{177}Lu]-DOTATATE therapy.

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