Introduction: Determining sentinel lymph node (SLN) status is crucial for treatment decisions in patients with melanoma. Superparamagnetic iron oxide nanoparticles (SPIO) combined with MRI have emerged as an alternative to technetium and lymphoscintigraphy for preoperative mapping of SLN. The MRI protocols so far are extensive with long in-camera time. This study aimed to evaluate an optimized MRI protocol for rapid identification of SLNs using SPIO as a tracer without compromising diagnostic quality, the Fast Acquisition Sentinel lymph node Tracking MRI (FAST-MRI).

Method: Patients with confirmed melanoma on the trunk or limbs, without clinically suspected lymph node metastasis, were eligible. All patients received an injection of 0.1 mL SPIO divided into four quadrants around the scar. The 5-minute FAST-MRI protocol, using only T1-sequences over the axillary and/or inguinal basins, was conducted no earlier than 30 minutes post-injection. Technetium and lymphoscintigraphy were used according to routine. SLN-biopsy was performed using a magnetometer and gamma probe for SLN-detection.

Result: Twenty patients were enrolled, and SLNs were successfully identified in all with both methods. The FAST-MRI protocol detected more SLNs than lymphoscintigraphy (50 vs 39 SLNs), but the number of SLNs identified during surgery was similar (46 vs 44) (Table 1). Out of 53 SLNs removed, four had metastases, all identified by both methods.

Discussion: The novel FAST-MRI protocol, with a 5-minute scan time, was feasible in detecting SLNs without compromising diagnostic quality. Both the preoperative SLN-mapping and intraoperative SLN-detection using the magnetic technique proved comparable to the radioactive technique.