Airo Mobile Intraoperative CT

MOBILE intraoperative Computed tomography from Brainlab for cranial, spine and trauma procedures, designed to function inside existing O.R. Suites.

Mertens et al. evaluated the accuracy of intraoperatively measured computed tomography (CT) Hounsfield unit (HU) values by comparison with preoperative CT HU values and to compare the radiation exposure between preoperative and intraoperative CT scans.

Methods: HU values of lumbar vertebrae were measured and compared between preoperative and intraoperative CT scans in patients undergoing lumbar interbody fusion. In patient group one, Canon CT scanners were used preoperatively and the AIRO CT scanner was used intraoperatively. In patient group two, Canon CT scanners were used preoperatively and the O-arm Cone Beam CT (CBCT) scanner was used intraoperatively. In a subgroup analysis of patient group one, radiation by means of CT Dose Index (CTDI) was compared between Canon and AIRO CT scanners.

Results: In the first patient group, a total of 250 vertebrae were analyzed in 74 patients showing a strong Pearson correlation of >.94 between pre-and intraoperative HU values. Bland-Altman analysis indicated consistency and equivalence with a bias of 3.9 and 95% limits of agreement from -27.17 to 34.97 when comparing all pre-and intraoperative HU values of L1-5. In the second patient group, a total of 27 vertebrae were analyzed in 10 patients showing weak Pearson correlation and Bland-Altman analysis indicated no equivalence. CTDI did not differ between Canon and AIRO CT scanners.

Correct and reliable CT HU measurement as a mandatory key factor for the intraoperative assessment of bone quality and robotic-assisted surgery is feasible with intraoperative AIRO CT imaging without an increase of radiation exposure [1].

Airo iCT Minimally invasive transforaminal lumbar interbody fusion can be used for initial planning of the skin incision, precise screw, and cage placement, without the need for fluoroscopy. “Total navigation” (complete intraoperative 3D navigation without fluoroscopy) can be achieved by combining Airo navigation with navigated guide tubes for screw placement [2].

1)
Mertens R, Hecht N, Bauknecht HC, Vajkoczy P. The Use of Intraoperative CT Hounsfield Unit Values for the Assessment of Bone Quality in Patients Undergoing Lumbar Interbody Fusion. Global Spine J. 2022 Mar 1:21925682221078239. doi: 10.1177/21925682221078239. Epub ahead of print. PMID: 35229676.
2)
Lian X, Navarro-Ramirez R, Berlin C, Jada A, Moriguchi Y, Zhang Q, Härtl R. Total 3D Airo® Navigation for Minimally Invasive Transforaminal Lumbar Interbody Fusion. Biomed Res Int. 2016;2016:5027340. doi: 10.1155/2016/5027340. Epub 2016 Jul 27. PubMed PMID: 27529069; PubMed Central PMCID: PMC4978816.