

Section: Intraoperative Bildgebung

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Abstract-Title:

INTRAOPERATIVE CT WITH INTEGRATED NAVIGATION SYSTEM IN A
MULTIDISCIPLINARY OPERATING ROOM

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Abstract-Text:

Purpose:

To report about our experience with regards to feasibility and work flow using a newly installed computed tomography (CT) scanner combined with a frameless neuronavigation system in a multidisciplinary operating room suitable for neurosurgery, orthopaedic, abdominal and trauma surgery.

Method:

A sliding gantry 24 detector row computed tomography scanner (Somatom Open, Siemens) was installed within a preexisting operating room. The scanner is connected to a frameless infrared-based neuronavigation system (VectorVision Compact, BrainLAB). High-resolution image data obtained intraoperatively can be transferred directly from the scanner into the frameless infrared-based neuronavigation station. This allows updates of the navigation during surgery by automated image registration, based on the position of the gantry. The patient is placed in the final position for operation on a radiolucent operating table (Jupiter, Trumpf) that fits within the bore of the gantry. During image acquisition the gantry moves over the patient. This table allows all positions and movements like any normal operating table without any compromise concerning positioning of the patient. For cranial surgery a carbon made radiolucent head clamp is fixed to the table.

Results:

Experience with 80 patients within the first 6 months of use confirmed the feasibility of intraoperative CT (45 patients with brain tumors, 33 patients with spinal lesions, one patient with a pelvic fracture, one patient with a shoulder fracture). Successful automated import of high-resolution images data suitable for navigation was attained for all cases. Intraoperative patient registration achieved very high accuracy in all cases with subsequent intraoperative anatomical and fluoroscopic control. Following a specific workflow, interruption of surgery for scanning can be limited to 10 minutes. Intraoperative imaging changed the course of surgery in 7 cases. In addition tumor resection could be confirmed.

Conclusion:

The system can be installed into a preexisting operating environment. There is no need for special surgical instruments. It increases the safety for the patient and the surgeon without

the need to change existing surgical protocols and work flows. Imaging and updating of the navigation system can be performed at any time during surgery. This is especially true for patients undergoing skeletal, respective spinal stabilisation procedures in all areas of the spine where intraoperative CT in combination with neuronavigation provides high accuracy of screw placement. The procedure is rapid and easy to perform without restricting access to the patient and - by replacing pre- and postoperative CT imaging - is not associated with additional exposure to radiation. Multidisciplinary use increases utilisation of the system and therefore cost-efficiency.