O-arm Indications

O-arm® Surgical Imaging with StealthStation® Navigation provides:

Access to real-time, multi-plane 3D images (and 2D images) Complements the unique surgical workflow of spinal procedures Visualization to confirm hardware therapy placement, potentially eliminating revision surgeries.

O-arm 3D imaging with stereotactic navigation may be used to localize lesions intraoperatively with real-time dynamic feedback of tumor resection. Stereotactic guidance may augment resection or biopsy of primary and metastatic spinal tumors. It offers reduced radiation exposure to OR personnel as well as the ability to use minimally invasive approaches that limit tissue injury. Further work may be done to assess the utility of stereotactic guidance in oncological tumor resection, particularly with respect to outcomes for patients [1].

The registration accuracy and precision of CBCT (O-arm O2, Medtronic, Dublin, Ireland) was compared to CT registration study obtained in the same patient (n = 10). Stereotactic coordinate differences were compared. In a second analysis the end-to-end accuracy and precision between the surgical target and lead position was analyzed on postoperative MRI in cases where CBCT was used for registration (n = 31 leads).

The average radial distance of the stereotactic coordinate using the CBCT and CT registration studies was not clinically different (0.46 ± 0.17 mm (max 0.81)). The registration image maximum rod error was more accurate for CBCT (0.50 ± 0.12 mm (max 0.7)), than the CT registration study (1.02 ± 0.63 mm) (max 1.8) (P = 0.018). On average 26 min was saved using only the CBCT to perform registration (P < 0.001). The radial error in the end-to-end analysis was 1.07 ± 0.67 (max 2.4) measured on postoperative MRI.

Registration using a CBCT image is accurate, and using this workflow yields accurate and precise DBS lead placement [2].

A variety of improvements in FBP implementation (geometric calibration, truncation and saturation effects, and isotropic apodization) offer the potential for improved image quality and reduced radiation dose on the O-arm system. Further gains are possible with MBIR, including improved soft-tissue visualization, low-dose imaging protocols, and extension to methods that naturally incorporate prior information of patient anatomy and/or surgical instrumentation [3].

The implantation of deep brain electrodes for Stereoelectroencephalography (SEEG) by using intraoperative CT O Arm® and the Vertek® articulated passive arm is a safe and effective technique with adequate accuracy [4].

O-Arm Assisted Anterior Odontoid Screw Fixation

The use of intraoperative three-dimensional imaging using O-arm for anterior odontoid screw fixation improves accuracy and leads to improved radiological and clinical outcomes. It further enables us to extend the indications of odontoid screw fixation to selected complex Type II and rostral Type III odontoid fractures [5)]

1)
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2)
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3)
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4)
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5)
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