

Navigierte Iso-C 3 D Osteoid Osteom Resektion- Este klinische Ergebnisse

Navigated iso-c 3d based percutan osteoid osteoma resection

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Discussion: Threedimensional imaging is more accurate in the interpretation of intraarticular tibial plateau fractures. The Iso-C3D allows a reliable intraoperative control of reduction and hardware placement and provides significant more information compared to the usual twodimensional c-arm based imaging. Tibial revision surgery based on the knowledge of threedimensional postoperative CT scans might be avoided.

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Introduction

Computer tomography (CT) based osteoid osteoma resection showed good results [1]. Exact positioning of needles and hollow drills is technical demanding and drill failures occur. If unsuccessful resection results by drill failures or inadequate visualisation of the lesion, a direct alternative in switching to an open procedure is not possible and revision surgery in the operation theater becomes necessary. Alternatively CT and fluoroscopic based navigation do not allow minimal invasive procedures with proper visualisation of the osteoid osteomas. Fluoroscopy based technique is limited by twodimensional imaging, CT based technique by necessary invasive matching procedures with preexisting CT Data sets. Iso-C 3 D based navigation obtains intraoperative multiplanar reconstructions and allows good visualisation of osteal lesion under possible percutan resection technique. We report about our first two clinical cases of Iso-C 3D based navigated resection of osteoid osteomas.

Material and Method

Two symptomatic patients with osteoid osteoma lesions of the retropatellar surface and at the tibia edge were included in this study. Both patients underwent preoperative MRI scans

for diagnostics. Both patients were informed about the included navigation part at their operations. Positioning was done on full-carbon Tables (VIWAS; Maquet).

In general anaesthesia under regular steril OR conditions a Iso-C 3D (Siemens, Germany) scan of the region of interest was performed.. The dynamic reference bases (DRB) were fixed to the patella in one and to the tibia shaft in the other case. Before scanning the region of interest a secondarily sterile draping was done, covering the whole situs except the top of the dynamic reference base. Osteoid osteoma lesions were adequate visible in all multiplanar reconstructions. Lesions were identified in frontal, sagittal and coronar planes. Trajectories in all multiplanar reconstructions were planned on the navigation system and saved.

In percutan technique and under permanent navigated multiplanar image control first a 3.0 mm drill was placed direct in the nidus in both cases, along the planned trajectories. Following over a replaced k-wire a navigated 6.0 mm hollow drill was inserted to the nidus in the same technique. No other radiological imaging was done during these procedures. With the control of the hollow drill in all planes the procedure was finished but no final skin closure was done. Before, still under steril conditions, a second intraoperative Iso-C 3D control scan was done. It approved exact resection of the lesions in both cases and regular skin closure was done. Both patients left hospital the following day. Defined parameters like total operation time and total radiation time were compared to the last 12 conventional CT based cases at our clinic.

Results

Histology confirmed the diagnosis of an osteoid osteoma in both cases. One patient became pain free directly post operative and no further complications occurred. The other patient became pain free after a total time of 7 weeks. After 5 weeks we decided to have another post operative control CT scan done in this case. The scan confirmed the exact drill canal into the former nidus of the lesion. It was congruently to the Iso-C 3 D scan. No further complications occurred. At the 5 month follow up both patients remained pain and complication free.

The netto radiation time during one Iso-C 3D based procedure was 20 seconds (plus 20 seconds for the control scan). Contrasting 93 seconds (range: 56-402 seconds) at the CT based cases. The average operating time with navigation was 78 minutes, in the conventional method 60 minutes (range: 36-140 minutes)

Discussion

Techniquel guidance of hollow drills under percutan CT based technique is demanding and usually a direct control of surgical tools only inbetween control scans possible. Drill failures, repeated CT scans and sterility problems are associated..A stepwise drilling without further radiation is possible. If necessary a intra operative Iso-C 3D control scan

can be done. In our cases these were congruently to post op CT scans and consequently postop scans are not needed anymore.

Furthermore the collaboration with the radiologists and dependance on the CT suite is not longer necessary, compared to the conventional Ct based technique. The implementation of Iso-C 3D to minimal invasive operating procedures offers new possibilities in the general use of navigation in orthopedic surgery. Further clinical studies will show comparisons about cost and effectiveness factors