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Title:

## Clinical results after minimal invasive navigated screw osteosynthesis of the acetabulum

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Introduction:

The fracture of the acetabulum is a rare injury of the human body. The treatment of dislocated fractures of the acetabulum is standardized and performed under fluoroscopic guidance with an anterior or dorsal approach and open reduction and internal fixation using a plate and/or screws. Despite the visualization of the fracture a closed reduction can be performed using a minimal invasive approach positioning the screws under navigational guidance. The placement of the screws in the intended corridor of the acetabulum and the reduction of the fracture can be visualized using navigation combined with a 3D mobile C-arm [1]. Clinical results after fracture treatment of acetabulum fractures are important [2 3].

The aim of the study was the investigation of the clinical outcome of patients with an acetabulum fracture who were treated with an minimal invasive navigated screw osteosynthesis. In addition the reduction of the fracture was analyzed comparing the pre- and postoperative fracture position in 3D fluoroscopy.

The study was conducted as a single-center retrospective trial in a primary care institution.

Patients/Material and Methods:

Retrospectively data of 16 patients with dislocated acetabulum fractures between 2001 and 2013 were analysed. The patients were treated minimal invasively with closed reduction and a navigated screw osteosynthesis. The study was setup as a case-control study. The following parameter were conducted: range of motion (ROM), Harris-Hip-Score, Merle d'Aubigné, Postel Score and the SF-12 questionnaire, measurement of fracture gap reduction in mm in the standard planes in the preoperative CT-scan and the intraoperative 3D scan.

Results:

16 patients (age:  $53.13 \pm 13.7$ ) were examined after an average of  $4.13 \pm 3.11$  years to the initial trauma. The fracture patterns were classified according to Letournel in simple (75%) and complex (25%) fractures. The SF-12 score averaged  $53.5 \pm 6.9$  and the Harris-Hip Score  $88.75 \pm 17.16$ . On average  $16.72 \pm 1.94$  points were achieved in the Merle d'Aubigné Score during the examination. The fracture reduction in the sagittal plane was conducted from  $5.05 \pm 4.51$  mm to  $3.57 \pm 3.34$  mm. In the coronar plane the

fracture reduction was achieved from  $7.27 \pm 4.20$  mm to  $5.16 \pm 2.99$  mm. In the axial plane the fracture was reduced from  $6.84 \pm 4.07$  mm to  $5.17 \pm 3.23$  mm.

#### Conclusion:

In the treatment of acetabulum fractures the navigated screw placement has been introduced in the last years. Studies investigating the clinical outcome of the patients after navigated screw placement have been rare [4]. The study analysis the clinical results after the treatment of dislocated fractures of the acetabulum with a navigated screw osteosynthesis. Especially the clinical examinations show promising results and satisfying outcomes in the clinical scores. Long term clinical results have not been published so far [5]. Additionally an investigation of the clinical outcomes of patients in combination with the fracture reduction using 3D fluoroscopy after navigated screw osteosynthesis of the acetabulum has not been described before.

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