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Abstract # 4063

Title: Implantation of Carbon-Fibers-PEEK Intramedullary Humeral nail for Trauma and Pathological Fracture Fixation – a Multi-Center, International Retrospective accumulated experience.

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Abstract:

Background: carbon-fiber based trauma fixation implants had been developed and produced for a few decades, though not gaining widespread popularity. Recently a new type of carbon-fibers-PEEK implants had been introduced demonstrating en-par biomechanical implant characteristics with inherent radiolucency and better-then-ever MRI and CT compatibility. This work is a retrospective description of the cumulative experience gained in Germany, Israel and Croatia with the carbon-fibers-PEEK humeral nail for bone fixation.

Methods: All consecutive uses from 2009 and up to 2012 of carbon-fibers-PEEK humerus nail were identified, collected and analyzed in 3 international sites. The following data was collected: demographics, major concomitant disease, indication for surgery, time to surgery, Muller-AO classification of the fracture (if applicable), operative characteristics, clinical evaluation and radiographic evaluation of callus formation at follow up visits.

Results: a total of 25 patients underwent humerus fixation using the CF-PEEK humerus nail; 8 in Croatia, 11 in Germany and 6 in Israel, including 9 males and 19 females. 20 patients were indicated for internal fixation due to traumatic fracture, 3 due to pathological fracture and an additional 2 due to pending fracture of neoplastic origin. Time from injury to surgery was recorded a 3.56 ± 4.08 days (0 to 17) and all performed in the antegrade approach. Mean Surgery duration: 72.5 ± 21.84 minutes (34 to 103) and X-Ray Exposure time (n=14): 70.86 ± 54.11 seconds per patient (27 to 204). All procedures were completed successfully with no intraoperative Adverse Events (AEs) and no technical malfunctions / difficulties. At follow up average time for patients showing callus determined as FAIR was 58.5 ± 18.24 days (29 to 86) and showing progression of callus formation (determined GOOD callus) 112.67 ± 22.75 days (86 to 155). A single case of non-union was reported at 6 months post operation with no other post-operative complications reported.

Conclusions: the newly produced carbon-fibers-PEEK implants show promise for humerus internal fixation demonstrating ease of use, intraoperative safety and functionality and post-operative relative safety combined with good callus formation and progression. With additional inherent radiolucency and MRI compatibility facilitating intraoperative undisturbed field of vision and better post-operative surveillance, these implants make for a valid alternative to their metallic counterparts. Further clinical investigations are mandated.