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A new minimally invasive approach to pathological and impending fractures of the upper limb

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Introduction: Bone metastases are getting nowadays more frequent and affect mostly elderly people. Patients present with longer survival and a complex clinical history and often require minimally invasive treatments. Metastases in the upper limb have different biomechanical requirements from the lower limb because direct and bending loads are limited while torsional forces prevail. The aim of the study is to evaluate a new method to internally stabilize long bones in the upper limb.
Methods: We evaluated 5 patients treated with IlluminOss Photodynamic Bone Stabilization System (IlluminOss Medical GmbH, Germany) for bone metastases in the upper limb. Mean age was 57,8 years (range 35 - 77). The primary tumour was: hemangioendothelioma, multiple myeloma (2), lung adenocarcinoma, and invasive ductal breast carcinoma. 4 humeri and 1 radius were treated. The mean expected survival was lower than 1 year. The ASA grade risk was 4. Complication rate (fracture stability, symptomatic non-union/instability) and pain control were evaluated.
Results: One intraoperative displaced fracture occurred in a humeral lesion and it required an internal fixation with plate and screws. Pain control was achieved within one week postoperative (VAS< 3). No other complications were observed and particularly no symptomatic instability at fracture site (follow up range 4-10 months).
Conclusion: IlluminOss is a reliable system to stabilize pathological fractures and lytic lesions in the upper limb. No intramedullary devices are to date available for the radial and ulnar shaft. Even if it is a good solution for diaphyseal bone, meta-epiphyseal lesions are at high fracture risk with this technique and often require an additional stabilization with plate and screws. Potential further developments to adapt the procedure for the lower limb and to execute it in the radiologic room under local anesthesia.