Validation of Computer Assisted Percutaneous Microwave Ablation of Liver Tumours – Feasibility and Safety Assessment

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Introduction
For patients with liver tumours not treatable with open liver surgery due to comorbidities or where the tumour is not visible with ultrasound or in the situation with vanished lesions, an alternative could be CT-guided microwave ablation with computer assisted navigation (CAS-one, Cascination AG, Bern, Switzerland). Compared to standard CT-guidance, the addition of CAS-one could improve accuracy, reduce radiation dose and anaesthesia time.

Methods
Stereotactic instrument guidance is provided based on previously acquired 3D image data. By relating the position of the image data to real-time measurements of the patient position and instrument tracking, the relative position of the needle and the target are visualized without requiring CT acquisitions during needle insertion. General feasibility and safety of the navigated approach is assessed. Targeting accuracy is measured by calculations from control CT-scans. 20 patients scheduled for CT guided percutaneous microwave ablation, with 1 to 2 metastases, are selected from the Stockholm liver conference.

Results
From March until July 2013 11 patients (4 females and 7 males) of the planned 20 patients have been treated. 7 with HCC and 4 with CRLM. Median number of lesions treated were 1 (1-3) with a median size of 28mm (10-42). Patients were discharged after a median of 1 day (1-2) without complications, but one patient showing a thrombosis of the superior mesenteric vein at 30d follow-up. The accuracy of the navigated needle placement was 6.02 +/- 3.58mm. In the analysis two patients were excluded because of malfunctioning targeting system.

Conclusion
The procedure is feasible and continuing logistic and technical improvements have been accomplished. If this proves to be reliable a new group of patients could be offered a minimal invasive approach. It might even expand the indication for ablation in other organs like kidneys, spleen, lungs and pancreas.