Section: **Future Emerging Technologies**

ID: 37

Abstract-Title:
THE FRAMELESS PLACEMENT OF CONVECTION-ENHANCED DELIVERY CATHETERS USING NEURONAVIGATION DIE RAHMENLOSE NEURONAVIGATIONS GESTÜTZTE KATHETERANLAGE FÜR DIE CONVECTION-ENHANCED DELIVERY

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Abstract-Text:
Purpose:
In convection-enhanced delivery (CED) for intracranial chemotherapy accurate catheter placement is mandatory to achieve the proposed results. If incorrect placed, the infused substrate will evade into areas with less resistance, for example into the ventricles or the subarachnoid space. With no therapeutic effect the placement would then be useless. Frame based catheter placement is time consuming and has technical short comings when multiple catheters are placed. There for, frame less neuronavigational assisted catheter placement is increasingly being used. We present our experiences with the frame less catheter placement and our ideas for improving the technique.

Method:
As part of several multicenter studies using CED for local chemotherapy in supratentorial malignant astrocytomas we have placed 51 microcatheters frame less neuronavigational controlled in 21 patients. Along the way we developed a navigated canula with a removable mandrin to advance the catheter:
The tool has a canula of 14 cm length and a mandrin with a total length of 18 cm for better handling of the canula. There are holes in the tip of canula that a ventricular puncture and CSF drainage is noticed. The canula is fixed to the brainlabä adapter ML and navigated with a brainlabä navigational system. After placing the canula as planned the mandrin is removed and the primed catheter forwarded. When resistance is felt the canula is withdrawn over the catheter. The depth of the catheter is compared to the previously calculated and if necessary adjusted (Fig.1).
Furthermore we established standards for the positioning of the microcatheters. To do so we retrospectively analysed the data of the catheter placements. After correlating the entry points to their anatomic structure we defined preferable gyri to be used as an entry point in catheter placement depending on the different tumour locations. Furthermore we analysed the architecture of the selected gyri with the anatomic literature and looked at their feasibility for convection enhanced delivery.

Results:
In our series there were 2 minor bleedings surrounding the catheter tip and no major (Fig.2). In one patient there was a questionable abscess in the resection cavity more likely a reaction to chemotherapy. In one patient of a trial with a permanent catheter the later caused an intracranial abscess and encephalitis. 2 catheters had to be revised because of

wrong positioning. The problem within our series was depth control: Several catheters were inserted deeper than planed. The results markedly improved using the new tool. It showed excellent accuracy and resulted in a shortened operation time (Fig.3, 4).
With the superior parietal lobule and the superior frontal gyrus we located 2 feasible areas for entry points with a sufficient access to the important target areas (Fig. 5). This in mind, the planning time and with a mere standardization the placement time will be cut.

Conclusion:
The frame less placement is safe and efficient. Using new strategies the results improved and will improve significantly. Despite minor short comings in its accuracy compared to the frame based stereotactic placement, the frame less placement of microcatheters will be the future technique in CED.

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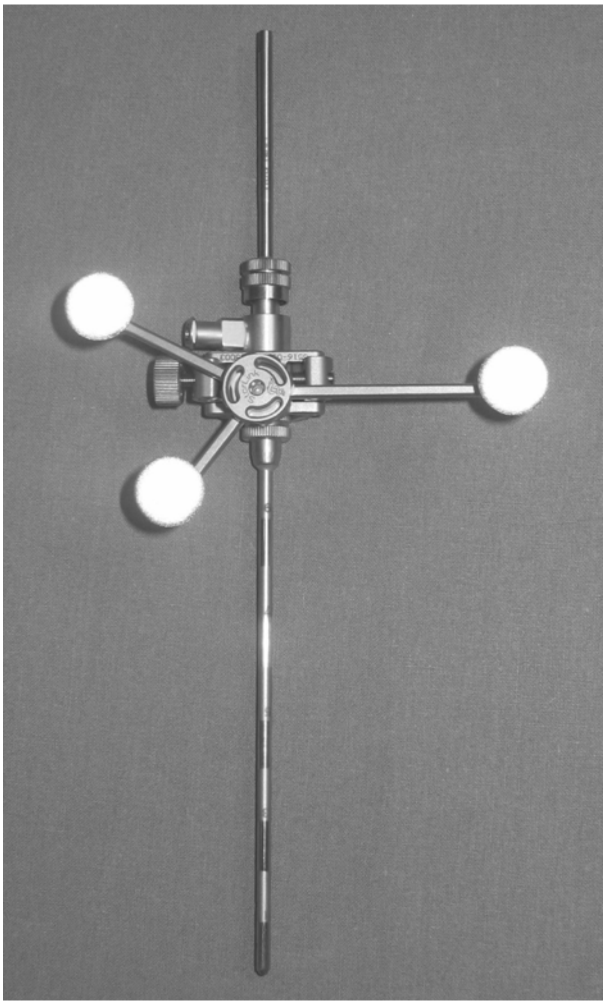

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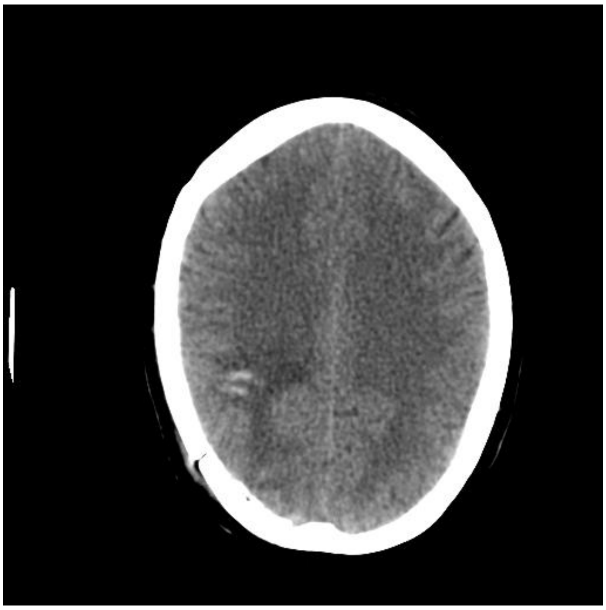

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