THE SIGNIFICANCE OF THE ‘HOOK’ REGION ANATOMY FOR THE COCHLEAR IMPLANTATION SURGERY

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Purpose of the study:
To find out the optimal electrode insertion route in terms of cochlea fine structures preservation which is especially important in patients with residual hearing

We analyzed the anatomic variations of the “hook” region on 35 cadaveric temporal bones. Basing on the distance between the edges of oval and round windows all 35 cadaveric temporal bones were divided into two groups: “small” and “big” ones (according to the classification of F. Atturo, M. Barbara, H. Rask-Andersen).
Fig. 1. Topography of cochlea fine structures
SF – stapes footplate; RWM – round window membrane; OSL – osseous spiral lamina; SV - scala vestibulæ; ST – scala tympani; V – vestibule; BM – basilar membrane; SL – spiral ligament; ACA – aperture of the cochlear aqueduct
Fig. 2. Scheme of approaches
AC – anterior cochleostomy
AIC – anterioinferior cochleostomy
ERW – extended RW
It was revealed that the least traumatic approach in both “small” and “big” cochleae is the electrode delivery via round window membrane. This approach in all cases enabled electrode insertion without altering “hook” region structures.
Electrode inserted via RW

RW – round window
OSL – osseous spiral lamina
SL – spiral ligament
ICV – inferior cochlear vein
CA – cochlear aqueduct
CONCLUSION:

RW approach tends to be the safest and least traumatic way of active electrode insertion. As the distance between round and oval windows can be measured on temporal bones CT it may help to choose preoperatively the optimal approach in cases of labyrinth rotation and facial nerve dystopia when round window niche cannot be visualized and reached.

Fig. 5. RW approach – inside the vestibulum view

IA – internal auditory canal fundus

– osseus spiral lamina
SL – spiral ligament
SF – stapes footplate
Photo – courtesy of Prof. H. Rask-Andersen

Thank you for your attention!