Evaluating cochlear implant trauma to the scala vestibuli.

OBJECTIVES: Placement of cochlear implant electrodes into the scala vestibuli may be intentional, e.g. in case of blocked scala tympani or unintentional as a result of trauma to the basilar membrane or erroneous location of the cochleostomy. The aim of this study was to evaluate the morphological consequences and cochlear trauma after implantation of different cochlear implant electrode arrays in the scala vestibuli. DESIGN: Human temporal bone study with histological and radiological evaluation. SETTING: Twelve human cadaver temporal bones were implanted with different cochlear implant electrodes. Implanted bones were processed using a special method to section undecalcified bone. MAIN OUTCOME MEASURES: Cochlear trauma and intracochlear positions. RESULTS: All implanted electrodes were implanted into the scala vestibuli using a special approach that allows direct scala vestibuli insertions. Fractures of the osseous spiral lamina were evaluated in some bones in the basal cochlear regions. In most electrodes, delicate structures of the organ of Corti were left intact, however, Reissner's membrane was destroyed in all specimens and the electrode lay upon the tectorial membrane. In some bones the organ of Corti was destroyed. CONCLUSIONS: Scala vestibuli insertions did not cause severe trauma to osseous or neural structures, thus preserving the basis for electrostimulation of the cochlea. However, destruction of Reissner's
membrane and impact on the Organ of Corti can be assumed to destroy residual hearing.