establish a control. The positioning of the CHD was then tested using a surgical retractor with a flexible arm. The tip of the CHD was directed to reach the round window. The EA was mounted onto the CHD. An infusion pump was then connected to the CHD and set to drive it at a predetermined insertion velocity of 0.4 mm/s. A postinsertion computed tomography (CT) scan was performed for radiographic evaluation of the insertion.

Results: The CHD can (1) be positioned suitably, as it attaches to the human head, stands alone, and achieves appropriate direction for EA insertion; (2) respond to the hydraulic actuation once placed in the desired position; and (3) introduce the EA into the human cadaver cochlea. Postinsertion CT demonstrates intracochlear positioning of the EA.

Conclusions: The first attempt to perform a CI EA insertion using the CHD was successful. Further testing to validate its performance and reliability is ongoing.

Identifying Eustachian Tube and Middle Ear Abnormalities in the Mechanically Ventilated Patient

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Objectives: Up to 2.8% of hospitalized patients receive mechanical ventilation in the United States. Patients under mechanical ventilation develop a series of complications related to sedation, supine position, and positive-pressure ventilation, such as pressure ulcers, pulmonary embolism, and ventilation-associated pneumonia. Although often overlooked, Eustachian tube and middle ear abnormalities are very common in the mechanically ventilated patient. In these patients, factors such as supine position, mucociliary hypofunction, lack of swallowing, and devices that physically obstruct the Eustachian tube pose a challenge to the adequate functioning of the middle ear.

Methods: A transverse observational study was performed in which otoscopy, tympanometry, and nasopharyngeal endoscopy were performed in intubated patients with varying duration of orotracheal intubation. The study was performed at Hospital Civil de Guadalajara Fray Antonio Alcalde in Mexico.

Results: Fifty patients were included, with ages ranging from 18 to 78 years. The most common diagnosis was traumatic brain injury. Days under mechanical ventilation ranged from 2 to 14. In total, 100% of patients had alterations in their tympanometry results, with the Jerger type B curve being the most prevalent of those. We found nasopharyngeal pooling of secretions and mucosal edema during the endoscopy of all patients.

Conclusions: In this study, we found that every patient under mechanical ventilation had some kind of middle ear or Eustachian tube abnormality. We found a higher prevalence of alterations in the tympanometry of mechanically ventilated patients compared with previous studies. The etiology remains to be defined, as a variety of factors play a role in the Eustachian tube dysfunction.

The Impact of Extracellular miRNA let-7b as a Top-Down Signal in the Auditory Brain

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Objectives: Our objective is to clarify the impact of extracellular let-7b as a top-down signal in auditory brain.

Methods: HEI-OC1 has been used as an auditory cell line. Cell viability was determined using trypan blue. Western blot analysis was performed on whole-cell extracts. Primary rat cortex neuronal cell cultures were prepared from embryonic day 18 Wister rat brains. The neural network was estimated on the high-density CMOS-MEAs.

Results: The cell viability after direct treatment of let-7b was time-dependently decreased. The expression of TLR7, TRPA1, cleaved-caspase-3, LC3-II, and p-ERK were time-dependently increased in let-7b–treated cells, whereas p62 was increased at the peak of 24 hours. The expression of TLR7 was decreased in TRPA1 KD cells, correlating with TRPA1. These results indicate that TRL7 and TRPA1 form a complex, enhanced in response to extracellular let-7b. However, the firing rate of primary neural cells was basically higher after treatment of let-7b, whereas the extremely low firing rate cells were also confirmed. This result suggests that the high-frequency firing rate cells have a possibility of cell death, whereas the low-frequency firing rate cells have a possibility of cellular hyperexcitability. The Fisher discrimination ratio was significantly higher in control cells than let-7b-treated cells. However, it divided into 2 types, the extremely high group and extremely low group in let-7b–treated cells. This result suggests that let-7b led to the neural cell dispersion and disrupted the neural network.

Conclusions: Our results suggest that extracellular let-7b influences hyperexcitability-induced cell death through the interaction of TLR7 and TRPA1 as a top-down signal in auditory brain cells, disrupting the auditory neural network.

Implantation of Bone-Anchored Hearing Aid Simultaneously With Chronic Otitis Media Surgery: Complications and Benefits

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Objectives: The bone-anchored hearing aid (BAHA) is an effective form of hearing rehabilitation. Indications include patients with single-side deafness, bilateral conductive, or mixed permanent hearing loss. We evaluated the safety of the implantation of concomitant BAHA implant with chronic otitis media (COM) and the presence of intra- or postoperative complications.

Methods: A retrospective study was carried out with 6 patients who underwent BAHA implant simultaneously with COM surgery, from March 2018 to December 2019, coming from a private service in Marília, São Paulo, Brazil.