Asymptomatic SARS-COV-2 infection in children's tonsils

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SARS-CoV-2 pandemic killed over 6 million people worldwide. Although COVID-19 is mainly known for lung infection, several extrapulmonary tissues had been described as infected by SARS-CoV-2 during the acute disease. At least for the initial variants, children were supposedly less exposed to the virus, predominantly presenting mild or asymptomatic infection. In the present study, we describe how SARS-CoV-2 can silently infect palatine tonsils and adenoids from asymptomatic children. We studied 48 children who underwent adenotonsillectomy between October 2020 and September 2021. None of them had experienced signs or symptoms of acute upper airway infection in the month prior to surgery. Nasal cytobrush, nasal wash and adenotonsillar tissue samples were tested by RT-PCR, immunohistochemistry (IHC), flow cytometry and neutralization assay. SARS-CoV-2 was detected in at least one sample in 12 patients (25%). SARS-CoV-2 genome detection rate was 20% in the tonsils, 16.27% in the adenoids, 10.41% of nasal cytobrushes and 6.25% of nasal washes. IHC confirmed the presence of SARS-CoV-2 nucleoprotein in 15 out of 16 positive tonsils samples, both in epithelium and lymphoid compartment. Flow cytometry revealed that CD123+ dendritic cells were the most frequently infected cell type (10.57%) followed by CD14+ monocytes (6.32%), CD4+ T lymphocytes (1.75%), CD20+ B lymphocytes (1.67%), and in less extent CD8+ T lymphocytes cells (1.36%). In conclusion, tonsils and adenoids are important sites of SARS-CoV-2 infection in asymptomatic children. Positive immunostaining in adenotonsillar tissue samples suggest that lymphoid tissue can be a reservoir of SARS-CoV-2 and may play an important role in community dissemination. It remains unclear for how long the lymphoid tissue can sustain the SARS-CoV-2 in a persistent infection, and whether this persistence has any impact on virus transmission.

Keywords: COVID-19; SARS-CoV-2; Children; Tonsils; Adenoid.

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Surgical results and clinical performance of an active transcutaneous osseointegrated implant

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Objective: To investigate the surgical results and clinical performance of an active osseointegrated implant system with piezoelectric technology.

Method: National, prospective multicenter study of repeated measures. The study was approved by the Ethics Committee under opinion CEISH 0559-2019. Patients with conductive or mixed hearing loss in the ear to be implanted with quadritonal mean (MQT4 = mean of 0.5, 1, 2 and 4 kHz) of bone pathway thresholds for pure tone of up to 55 dB NA were included. Patients with unilateral sensorineural hearing loss (PANU) who were candidates for osseointegrated implant surgery were also included. Surgical parameters, functional gain (GF) and self-perception of benefits were evaluated. Surgical data were recorded on an electronic data collection platform. The funiconal gain was obtained by comparing the pre-surgical audiometric thresholds without assistance, with the post-cirugic thresholds with the implanted system, in a free field with the speaker positioned at @@0. Azimuth 1 meter from the participant's head. Participants also completed the COSI questionnaires reporting subjective expectations and perceptions of benefit.

Results: Between June 2020 and July 2022, 380 participants aged 5–73 years were included; 87% adults, 52% men, 50% of devices implanted in the right ear and 19% bilateral. Most patients had a diagnosis of conductive hearing loss (61%) followed by mixed hearing loss (24%) and the remainder of PANU. Among the surgeries, 13% corresponded to the conversion of other devices to piezoelectric. The surgeries lasted an average of 53 min. The average skin thickness was 5.7 mm with only 22% soft tissue reduction and 7% bone polishing. The mean FREE-FIELD GF observed for pau cases was 65.4 dB. In conductive hearing loss, the mean GF obtained was 41.2 dB and finally in mixed hearing loss, the GF observed was 47.9 dB. The comprehension of speech in noise was pointed out as the main issue to be improved with the device and the improvement was reported by the patients.

Discussion: A new active transcutaneous BCHI design using piezoelectric stimulation for rehabilitation of patients with LHC, MHL, or SSD was clinically evaluated in this national multicentric clinical investigation. Surgical and clinical–audiological results collected during the 6-month follow-up period demonstrate that the system is safe and presents itself as an excellent option for auditory rehabilitation. The implant has a low profile, with fine design of the piezoelectric actuator, does not require frequent bone chopping, and when necessary, bone removal is minimal compared to other active transcutaneous systems, which

require the electromagnetic actuator to be Indented. This ability to place the actuator on the bone surface and design of componente único do implante, permite alguma versatilidade cirúrgica, culminando em uma cirurgia mais simples e rápida. O tempo de cirurgia, embora seja curto, tende a surgeons become familiar with the procedure, reaching cases of 30 min of surgical time. Transcutaneous systems generally result in lower rates of complications compared to percutaneous systems, and this was reflected in our safety data. Few complications have been reported and the complications are mostly considered mild. The device provided a statistically significant improvement in the comparison of thresholds with and without the device, including in the high frequency region, between 4000 and 6000 Hz. It is worth commenting that in implantable hearing aids or not, no acoustic gains above 4000 Hz are expected. accompanied by the greater distance between the actuator and the sound processor.

Conclusion: These results confirm the clinical safety, performance and benefit of an innovative active transcutaneous bone conduction implant using a piezoelectric transducer design in individuals with conductive hearing loss, mixed hearing loss, or unilateral sensorineural deafness.

Keywords: Deafness; Implant; Piezoelectric; Hearing aid.

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Sinaptical transmission in brainstem auditory structures in patients with tinnitus treated with nimodipine: A randomized clinical trial

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Objective: To evaluate the synaptic transmission in brainstem auditory structures in patients with chronic subjective tinnitus treated with nimodipine.

Methods: Randomized, triple-blind clinical trial, which selected 40 patients (number close to that suggested by previous sample calculation) allocated equally and randomly in intervention and control group. At first, the brainstem auditory evoked potential (AEP) was performed with a click stimulus of 80 dB for both ears and the tinnitus handicap inventory (THI) and Visual Analog Scale (EVA) questionnaires were applied for intensity and discomfort in each ear. Demographic data were collected with each participant; the characteristics of tinnitus; associated symptoms; factors of improvement or worsening; and personal history. Participants were instructed to take one tablet per day for 30 days of nimodipine at a dose of 30 milligrams or placebo, which were previously manipulated into identical-looking tablets and delivered to participants. After this period, in a second moment, the participants were submitted to a new APE and THI and EVA questionnaires. From the collected data, descriptive and comparative statistical analysis was performed.

Results: The study had the participation of 38 patients, 18 of which were allocated in the control group and 20 in the intervention group, and 2 participants from the control group were excluded from the study due to the discontinuity of the taking of the tablets. The descriptive analysis of the data obtained in the interrogation was similar between the groups, with a predominance of elderly and female participants. Tinnitus was mostly referred to as continuous, ''in cicada'', modulated mainly by noise or stress and usually associated with hypoacusis. Most participants had at least one chronic disease and reported poor sleep quality and exacerbated consumption of xanthenes and sugars in the diet. The comparative analysis of wave latency between the two AEP tests showed a significant difference for wave ncy III and V, with increased values, only in the intervention group. The comparative analysis of the interpeak intervals between the two AEP tests showed a significant difference for the I–III and I–V intervals, with an increase in the values, only in the intervention group. The comparative analysis of the THI and VAS questionnaires showed no significant difference in both groups.

Discussion: The results of this study allow us to assume that nimodipine, a specific calcium channel blocker for the ''Type L'', has action on the central auditory processing pathway, delaying the formation of waves in the topography of the Superior Olivar Complex, where wave III originates; and in the Lateral Lemnisc or Inferior Colliculus, where the V wave originates. These changes would lead to a delay in the afference of the auditory pathway's synaptic transmission and would act in reducing the perception of tinnitus. Previous studies have suggested that nimodipine has neuroprotective action, helping to maintain the integrity of neuronal and peripheral pathways; and otoprotective, preventing injury to ciliary cells and improving blood flow in the cochlea. Studies at higher doses or over a longer period may be an alternative to define whether nimodipine is effective in treating tinnitus. No previous studies were found that tested the use of nimodipine in humans to evaluate tinnitus objectively through the APE; and subjective through THI and EVA.

Conclusion: Nimodipine at a dose of 30 milligrams per day for 30 days in individuals with bilateral chronic subjective tinnitus has evidence to alter the synaptic transmission in brainstem structures. On the other hand, there was no significant improvement in tinnitus complaints reported by patients through the THI and EVA questionnaires.

Keywords: Tinnitus; Nimodipine; Brainstem auditory evoked potential; PEATE; BERA; Tinnitus handicap inventory; THI.

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