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Idiopathic Sudden Sensorineural Hearing Loss in a Pandemic Context: Epidemiology and Prognostic Factors in the SARS-Cov-2 Era (A Case Series of 23 Patients)

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Abstract **Original Research Article**

Idiopathic sudden sensorineural hearing loss (ISSNHL) is an otologic emergency. The COVID-19 pandemic has raised questions regarding SARS-CoV-2 as a potential etiological agent for sudden sensorineural hearing loss. This study aimed to analyze the epidemiological profile and prognostic factors of ISSNHL over a period including the COVID-19 pandemic and to investigate the potential link with SARS-CoV-2 infection. A single-center retrospective study was conducted, including 23 patients managed for unilateral ISSNHL between January 2020 and January 2025. Demographic, clinical, and audiometric data, COVID-19 infection status, and therapeutic outcomes were analyzed. The mean age was 43 years. A male predominance was observed (78.3%, M/F sex ratio=3.6). Five patients (21.7%) had a positive SARS-CoV-2 RT-PCR at the time of ISSNHL diagnosis. COVID-19 positive patients presented with a more severe initial hearing loss on average. The overall complete recovery rate was 26.1%. The presence of an active COVID-19 infection and age > 45 years were associated with a less favorable prognosis. This study suggests a possible association between active SARS-CoV-2 infection and the occurrence or severity of ISSNHL. Classic prognostic factors (age, initial severity) remain determining. SARS-CoV-2 screening should be considered in the etiological workup of ISSNHL, especially in a pandemic context. Increased vigilance is recommended for these patients who may present with more severe forms.

Keywords: Idiopathic sudden sensorineural hearing loss (ISSNHL), SARS-CoV-2, COVID-19, Prognosis, Hearing loss, Etiology.

INTRODUCTION

Idiopathic sudden sensorineural hearing loss (ISSNHL) is defined as a sensorineural hearing loss ≥ 30 dB over at least three contiguous frequencies, occurring in less than 72 hours, without an identifiable cause. While traditional etiopathogenic hypotheses include viral, vascular, and autoimmune causes, the emergence of SARS-CoV-2 has introduced a new potential actor. The virus, known for its neurological tropism via the angiotensin-converting enzyme 2 (ACE2) receptor present in the ciliated epithelium and cochlear neural tissue, could induce hearing loss through several mechanisms: direct inflammation (cochlear neuritis), vascular microthromboses, or cytokine storm. Cases of ISSNHL during or following COVID-19 infection have been reported, although a direct causal link remains to be established. This study aims to describe the characteristics of ISSNHL over a recent period including the COVID-19 pandemic, to assess the prevalence of SARS-CoV-2 infection in this population, and to analyze its potential impact on the clinical presentation and prognosis of ISSNHL.

METHODS

A retrospective study was conducted over 5 years (January 2020 - January 2025) in the ENT department of the Moulay Ismail Military Hospital in Meknes. Twenty-three consecutive patients hospitalized for unilateral idiopathic sudden sensorineural hearing loss were included. Exclusion criteria were bilateral sudden hearing loss, chronic hearing loss, and incomplete medical records. Data were collected from medical records and the hospitalization register using a pre-established form including: demographic parameters, medical history, time to management, associated symptoms (tinnitus, vertigo), audiometric results (type and degree of hearing loss), and treatment modalities. COVID-19 status was systematically

investigated: suggestive symptoms, recent history of infection, and performance of a systematic nasopharyngeal RT-PCR upon admission. Laboratory workup also included CRP and ferritin as indirect markers of inflammation. All patients received standard treatment including: strict rest, systemic corticosteroid therapy (Methylprednisolone 1 mg/kg/day for 7 days), antiplatelet agent (Lysine Acetylsalicylate 160 mg/day), and vasodilator (Naftidrofuryl 400 mg/day) for a duration of 15 days. Management of comorbidities was systematically addressed. In accordance with recommendations, systemic corticosteroid therapy was used with caution in cases of proven active COVID-19 infection, favoring intratympanic injections if necessary. A descriptive analysis was performed, and a comparison of the mean initial hearing loss between COVID-19 positive and negative groups was conducted.

RESULTS

The mean age was 43 years. A male predominance was noted (78.3%, n=18). Five patients (21.7%) had a positive SARS-CoV-2 RT-PCR at the time of ISSNHL diagnosis. None had a severe form of COVID-19 requiring oxygen therapy. Pure-tone audiometry revealed different profiles: ascending (40%), descending (25%), U-shaped (20%), and flat (15%). Isolated tinnitus was present in 45% of patients, isolated vertigo in 15%, and an association of both in 15% of patients. Overall, tinnitus was present in 60.9% of patients and vertigo in 21.7%. No significant difference was noted in the prevalence of these signs between the COVID-19 positive and negative groups. The mean time to consultation was 9.8 days. The complete recovery rate was 26.1%, partial recovery 39.1%, failure 21.7%, and worsening 13%. A pooled analysis shows a lower recovery rate (complete or partial) in COVID-19 positive patients (40%) compared to COVID-19 negative patients (72.2%). Factors of good prognosis (young age, absence of comorbidities, less severe initial hearing loss) were confirmed. The presence of an active COVID-19 infection appears to be a factor associated with more severe initial hearing loss and a trend towards poorer recovery.

Table 1: Cohort characteristics and COVID-19 status

Characteristic	Total (n=23)	COVID-19 Positive (n=5)	COVID-19 Negative (n=18)
Mean age (years)	43	45	42
Male Sex (%)	78.3% (18)	80% (4)	77.8% (14)
Right ear (%)	56.5% (13)	60% (3)	55.6% (10)
Mean initial hearing loss (dB)	**78 dB**	**92 dB**	**73 dB**

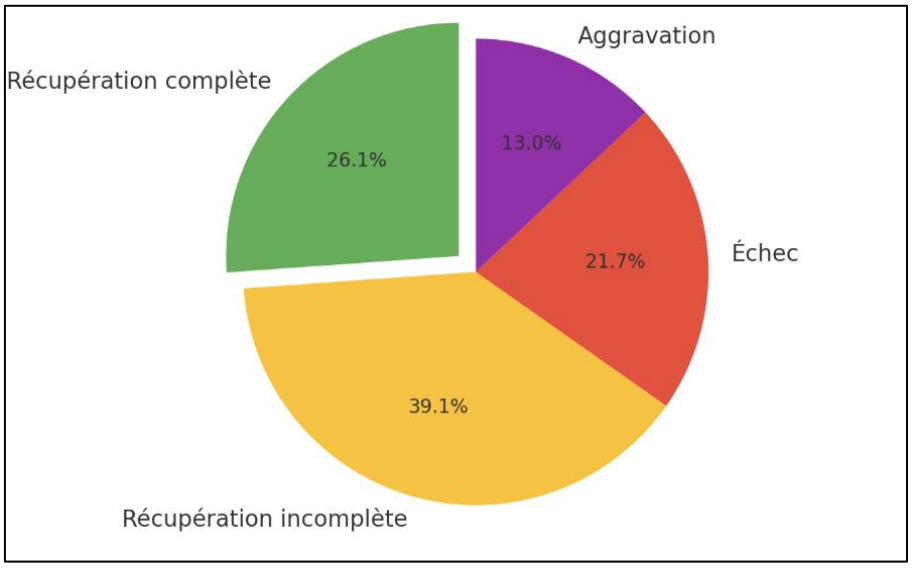

Figure 1: Overall hearing recovery rates (Pie chart: Complete recovery 26.1%, Partial recovery 39.1%, Failure 21.7%, Worsening 13%)

DISCUSSION

This study, conducted over a period covering the COVID-19 pandemic, found an epidemiological profile of ISSNHL comparable to that in the literature. The male predominance is still explained by the recruitment bias of a military hospital. The major finding is the detection of 5 cases of active SARS-CoV-2 infection among patients presenting with ISSNHL. Although this association does not prove causality, it is suggestive and corroborates emerging data. Plausible pathophysiological mechanisms include the neurotropism of the virus via the ACE2 receptor present in hair cells and the spiral ganglion, or a pro-thrombotic microvascular injury leading to cochlear ischemia. The observed trend towards a more severe initial hearing loss

and a lower recovery rate in COVID-19 positive patients requires further investigation on larger cohorts. This could be explained by a higher viral load or a more significant local inflammatory response. The therapeutic management had to be adapted to the pandemic context, favoring intratympanic corticosteroids to limit systemic immunosuppression in case of active infection. The study's limitations include its small sample size, especially of the COVID-19 positive subgroup, which limits the statistical power. The study of COVID-19 serology to detect past infections would have been a useful addition.

CONCLUSION

In conclusion, this study strengthens the hypothesis of a link between SARS-CoV-2 infection and idiopathic sudden sensorineural hearing loss. SARS-CoV-2 should now be integrated into the etiological workup of ISSNHL, particularly in a pandemic context or in the presence of suggestive signs. Patients presenting with ISSNHL and an active COVID-19 infection may have a less favorable prognosis, justifying increased vigilance and close audiological follow-up. Prospective multicenter studies are needed to confirm these observations and clarify the underlying pathophysiological mechanisms.

Competing interests

The authors declare no competing interest.

Authors' contributions

Moussaoui Abdeljabbar: Conceptualization, Project administration, Writing - Review & Editing. Abdelsalam Iselmou: Data curation, Formal Analysis, Writing - Original Draft. Boukhari Ali: Investigation, Data Collection. Hmidi Mounir: Investigation, Data Collection. Attifi Hicham: Methodology, Validation. All authors read and approved the final manuscript.

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