Sudden Sensorineural Hearing Loss: A Case Study and Pilot Project

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ABSTRACT

Sudden hearing loss is considered a medical emergency that involves a sudden decrease in hearing in one or both ears. Sudden Sensorineural Hearing Loss (SSNHL) is a sensorineural hearing loss of at least 30 dB HL at three consecutive frequencies over a period of 72 hours. Diagnosis and treatment should not be delayed; an audiometric assessment and referral to an otolaryngologist will significantly increase the likelihood of recovery when appropriate. This paper offers a case study and resources for primary care health professionals to differentiate the type of hearing loss observed and obtain a referral as soon as possible for an audiological assessment to confirm SSNHL.

Introduction

Sudden sensorineural hearing loss (SSNHL) is a serious medical condition that requires timely collaboration between audiologists and practitioners to reduce the likelihood of permanent adverse otologic outcomes. SSNHL is defined, at a minimum, to be a sensorineural hearing loss of at least 30 dB HL at three consecutive frequencies over 72 hours (Chandrasekhar et al., 2019). Other symptoms that frequently present with SSNHL include tinnitus, vertigo, inability to localize sound and aural fullness (Stachler et al, 2012; Han et al, 2023). Patients with SSNHL who receive inappropriate or no treatment can experience long-term effects such as a reduction in speech recognition, comprehension and even social isolation (Carlsson et al., 2011). However, if appropriate treatment is administered expediently, hearing may be partially restored (Stachler et al., 2012). Occasionally, SSNHL may also be misdiagosed with otitis media because aural fullness is one of the most common symptoms reported (Leung et al. 2016).

The severity of sudden hearing loss at presentation is directly proportional to the likelihood of recovery (Conlin et al. 2007). Those with mild losses may obtain full recovery, whereas those with severe to profound loss are less likely to recover fully. Other poor prognostic indicators are the presence of vertigo and age <15 years or >60 years (Rauch, 2008). The prognosis can still be good if SSNHL is treated appropriately within 7 days of symptom onset (87%) (Chandrasekhar et al, 2019). Unfortunately, for some, the time of sudden onset may be difficult to determine because hearing loss may have occurred while they were sleeping (Byl, n.d.), there was a lack of medical resources or hearing loss symptoms may have been overlooked by the patient (Coveli et al., 2018).

Currently, the prevalence of SSNHL in the USA is approximately 27 per 100,000. The number is higher as some individuals do not seek medical care regarding SSNHL if the degree of hearing loss is perceived as mild or it is uncertain to the person if medical intervention is necessary (Alexander & Harris, 2013). This prevalence has increased since 1984, when the incidence was cited as 5 to 20 per 100,000 (Byl, n.d.). The prognosis for hearing recovery often depends on many factors such as age, presence of vertigo, the audiogram configuration and severity of hearing loss (Kuhn et al, 2011).

Primary care health professionals may be reluctant to provide immediate treatment or refer for an urgent (i.e., within 24 hours) audiometric evaluation (Shilo et al., 2022) because of the overwhelming amount of data with regard to the management of SSNHL with various treatment protocols and possible spontaneous recovery without treatment (Schwam et al, 2022).

In 2019, the AAO-HNS (American Academy of Otolaryngology-Head and Neck Surgery) released a new guideline to improve the diagnostic accuracy of SSNHL, facilitate prompt intervention, decrease the number of variations in management, reduce unnecessary tests and/or imaging procedures, and improve hearing and rehabilitative outcomes for the affected population (Chandrasekhar et

al., 2019). When a patient first presents with sudden hearing loss, conductive hearing loss should be differentiated from sensorineural hearing loss via a tuning fork test and a referral made for an audiological assessment. (Chandrasekhar et al., 2019).

As per Ng et al., primary care practitioners are often the first professionals to see a patient with SSNHL, meaning it is essential for them to be aware of current practice trends and guidelines that are specific to the diagnosis and management of SSNHL. It is possible to use appropriate screening tools to identify sensorineural hearing loss in a way that does not take extensive time and financial investment. This can be initiated with tools such as Weber and Rhine, followed by a full audiometric assessment. Once a sudden sensorineural hearing loss is confirmed, the family practitioner proceeds with further medical intervention as soon as possible to reduce the possible long-term effects of SSNHL.

It is important to note that this paper is not intended to provide medical guidance to practitioners, but rather to offer a resource to help them confirm a SSNHL and provide a possible pathway for getting patients treatment as soon as possible. We hope that providing this resource and pathway may have the benefit of reducing the long-term effects of SSNHL. If more primary care providers are made aware of these screening tools and resources, a referral for an otolaryngology consult may be accomplished with greater speed at engaging in the recommended AAO-HNS guidelines (Stachler et al, 2012; Chandrasekhar et al., 2019).

Currently, some variance exists in the literature regarding spontaneous recovery from SSNHL in the absence of timely treatment (Ng et al., 2021). Although there are cases of spontaneous recovery, current best practices are to seek medical treatment as soon as possible (Chandrasekhar et al., 2019). The authors of this article are continually monitoring the ongoing research regarding spontaneous recovery and the challenges surrounding this heterogeneous group of patients.

Many primary care health providers are aware of this urgent nature of sudden sensorineural hearing loss; however, they may not be comfortable with treating SSNHL without first establishing the type of hearing loss (conductive/sensorineural/mixed) before starting treatment (Ng et al., 2021).

We contend that additional resources are needed to help primary healthcare providers use screening tools to rule out conductive hearing loss (CHL) versus Sensorineural Hearing Loss (SNHL) to start the appropriate medical intervention as soon as possible. The gold standard for diagnosing the type of hearing loss is a full audiometric evaluation (Stachler et al., 2012; Chandrasekhar et al., 2019). This must be done early to reduce the hesitation for appropriate treatment, and provide a baseline assessment of the patient's hearing (Ahmadzai et al., 2018).

In the absence of being able to obtain an immediate audiometric evaluation, screening tools such as the Rinne and Weber are cost-effective and safe to use to confirm which ear is affected by the sudden hearing loss and whether it is sensorineural. This will allow the care provider to track the patient's hearing, determine the next steps for treatment, and determine if the appropriate treatment is working or if salvage therapy should be considered (Chandrasekhar et al., 2019).

An otolaryngologist can be crucial in this process to achieve successful outcomes and to rule out other underlying pathology. However, support is needed in the meantime to provide resources to primary care providers in order to screen for the type of hearing loss, obtain a full diagnostic audiogram, and start treatment as soon as possible so an appropriate referral can be made to an otolaryngologist for further medical treatment. (Chandrasekhar et al., 2019)

A case study:

The following case study can offer primary care providers an example and encouragement that the prognosis for hearing recovery is possible when identification and treatment are made without delay.

A 42-year-old male contacted one of the authors, a registered audiologist, regarding concerns with his hearing on the morning of 23 June 2022. No history of previous hearing loss was confirmed. He reported left-sided facial numbness, aural fullness and left-sided constant tinnitus. He was seen the same day for a full audiological assessment and was referred to an otolaryngologist for further investigation. The referred otolaryngologist saw this patient on the same day of the referral. Initial test results were consistent with hearing within normal limits for the right ear and normal hearing to a mild sensorineural hearing loss for the left ear. Distortion Produce Otoacoustic Emissions (DPOAEs) were present for the right ear at all test frequencies 1.6 through 8.0 kHz and absent at most test frequencies for the left ear, which was consistent with audiometric findings. The Rhine and Weber screening tools were not used for this case, as a full audiometric assessment was done the same day by an audiologist.

A course of steroids (60mg per day) was started on the same day, 23 June 2022, for this individual for seven days. On the 6th day, the patient reported significant hearing recovery, and most of his symptoms had improved, apart from intermittent tinnitus for the left ear. The audiological assessment results demonstrated a significant improvement in hearing for the left ear and was consistent with hearing sensitivity within normal limits bilaterally.

Otoacoustic emissions were more robust and present compared to the first assessment six days prior. Given the recovery demonstrated, no further steroid treatment was necessary. Another audiological assessment was completed three months later to establish a new baseline of hearing sensitivity. This audiological assessment showed a further improvement with otoacoustic emissions for the left ear and a slight improvement in hearing thresholds again for the left ear.The patient reported he felt his hearing has recovered, with occasional difficulty hearing in noise and occasional left-sided tinnitus. Reports of aural fullness and facial numbness were also resolved. Communication and listening strategies were reviewed, along with tinnitus management options.

A final baseline is essential for monitoring hearing and ensuring that full recovery, in this case, has been met. It also gives the patient peace of mind that their hearing has been restored. If not recovered, then it provides a new baseline and an opportunity to discuss the importance of monitoring hearing along with other options that may be appropriate (Chandrasekhar et al., 2019).

The history behind tuning fork screening tools and how to support practitioners

The Rinne and Weber bedside screening tools are helpful in screening for SSNHL (Crowley et al, n.d.). Both tests utilize a tuning fork and are easy to administer. The Rinne test is used to determine whether a tone is louder by air conduction or bone conduction. When there is conductive hearing loss present, the tone is almost always louder by bone conduction, indicating that the air conduction route through the outer and middle ear is disrupted. When the tone is louder by air conduction, that indicates there is not likely a conductive problem. (Maty et al., 2020). The Weber test is a screening tool that can be used to determine whether or not a tuning fork placed in the centre of the forehead lateralizes to one ear or the other or if it seems to be equal among ears (non-lateralized). If there was no conductive hearing loss indicated by the Rhinne, then the ear that the tone lateralizes to is the one that is non-affect, and the other ear is to be suspected for SSNHL. (see audiologystat.com for information).

These screening tools are considered 'old school' in audiology because further developments have been made with technology that is far beyond a tuning fork. However, they are very valuable when it comes to quickly screening the type of loss and identification of which ear is affected (Abdullah et al., 2022). In addition, the low cost, high efficiency and high accuracy/reliability of the Rinne and Weber screening make the approach an ideal tool for practitioners. The sensitivity and specificity of the Weber tuning fork test can be as high as 78% and 99%, respectively. When the Weber test is combined with the Rinne test, the overall diagnostic accuracy improves (Abdullah et al. 2022; Shuman et al. 2013; Stankiewicz et al. 1979).

Importance of Audiometric Evaluation

In addition to the accessible hearing screening resource, primary healthcare providers also need quick and reliable access to a full audiometric workup, the gold standard of care for patients reporting sudden hearing loss. Audiologystat.com is a website developed recently to provide primary care practitioners, Emergency Room practitioners, nurse practitioners and medical residents a way to access a full audiological assessment for their patient within 48 hours. This website contains a brief summary of tuning fork tests to act as a resource to screen the patient regarding the type of hearing loss that is being demonstrated, in order for prompt medical treatment as soon as possible. As per a study by Lin et al, 2021, practitioners, who have been practicing for less than 5 years, all recognize that SSNHL is a medical emergency requiring urgent care. However, these researchers also determined is that few of these family practitioners use all possible resources to determine if the hearing loss is sensorineural or conductive. This reality supports the idea that easy-to-use, clear resources that are readily available are urgently needed to help family practitioners start appropriate treatment as soon as possible. Finally, the authors also stressed that a referral to an otolaryngologist was critical; however, due to the nature of healthcare in Canada, there may be a wait time for the patient to be seen by an otolaryngologist.

An audiometric evaluation as soon as possible is optimum to identify a SSNHL. A follow-up audiometric assessment is also critical once medical intervention has been made. In Alberta, a pilot program is being tested whereby a website with an urgent referral email is now available to practitioners to call to arrange an audiometric assessment within 48 hours. Given the current strain on the public healthcare setting and the side effects of the COVID-19 pandemic, it is more realistic for primary care practitioners to access private audiology clinics to obtain an audiometric evaluation as soon as possible. An email (audiologystat@gmail.com) is now launched for primary healthcare providers to email a referral form at any time, which will be processed, and an appointment for an audiometric evaluation will be made within 48 hours. Initially, this form is available to primary care providers such as family practitioners, emergency room practitioners, nurse practitioners and residents. Expansion to other professionals may be considered following the dissemination of feedback provided by the first group of primary healthcare providers.

Discussion

Given today's healthcare landscape and the aftermath of the COVID-19 pandemic, primary care providers are stretched to the limit for time (Hibscher et al, 2021). Resources that are easily accessible and efficient to administer by both themselves and their healthcare team (e.g., nurses, residents, etc.) are required. As such, we have created a free online resource for primary healthcare professionals to follow (audiologystat.com). This resource provides guidance on tuning fork placement, for which the SSNHL website can provide guidance. The website provides a quick overview of the Rhine and Weber assessment, in addition to information about the correct positioning of the tuning fork, which is essential when completing these tests (Butskiy et al, 2016). Further research is needed to determine and measure whether this resource is useful and if other resources are to be developed.

Audiologystat.com

A free online audiology resource for primary healthcare professionals

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