CASE REPORT

Paediatric Unilateral Sudden Hearing Loss: Treatment Challenges

Satesh Kumaran Ganeson[1], Farah Liana Lokman[2], Danny Kit Chun Wong[3], Noor Azrin Anuar[1], Hilmiyah Syam[1], Ujdora Goh[4], Mohd Afzal Izzat Kamal Ariffin[5], Bee See Goh[1,3]

[1] Department of Otorhinolaryngology and Head and Neck Surgery, Faculty of Medicine, Universiti Kebangsaan Malaysia, 56000 Kuala Lumpur, Malaysia
[2] Department of Otorhinolaryngology and Head and Neck Surgery, Hospital Canselor Tuanku Mukhriz, Universiti Kebangsaan Malaysia, 56000 Kuala Lumpur, Malaysia
[3] Otorhinolaryngology Unit, Hospital Tunku Ampuan Besar Aishah Rohani, Hospital Pakar Kanak-Kanak Universiti Kebangsaan Malaysia, 56000 Kuala Lumpur, Malaysia
[4] Department of Anaesthesiology, Hospital Tunku Ampuan Besar Aishah Rohani, Hospital Pakar Kanak-Kanak Universiti Kebangsaan Malaysia, 56000 Kuala Lumpur, Malaysia
[5] Audiology Unit, Department of Rehabilitation, Hospital Tunku Ampuan Besar Aishah Rohani, Hospital Pakar Kanak-Kanak, Universiti Kebangsaan Malaysia, 56000 Kuala Lumpur, Malaysia

ABSTRACT

Acute labyrinthitis is an inflammation of the labyrinth which leads to sudden vestibular and auditory function loss at affected side. It is an otologic emergency requiring prompt treatment, however there is limited data on management in paediatric population. We would like to present a case of acute labyrinthitis in a child, and highlight the management, particularly intratympanic steroid injection as a salvage treatment for sudden unilateral hearing loss.
Malaysian Journal of Medicine and Health Sciences (2025) 21(4): 402-404. doi:10.47836/mjmhs.21.4.51

Keywords: Labyrinthitis, Labyrinth diseases, Sudden hearing loss, Sensorineural hearing loss, Peripheral vertigo

Corresponding Author:
Farah Liana Lokman, Dr ORL HNS
Email: farahliana@hctm.ukm.edu.my
Tel: +60391456046

INTRODUCTION

Vertigo is not a common complaint among children and has been studied less extensively. The prevalence of vestibular disorders in paediatric population is 5.3 %, which is lower than adults (1). One of the etiologies of vertigo in children is acute labyrinthitis, which also causes sudden hearing loss. Similarly, there is paucity of data in literature on sudden sensorineural hearing loss (SSNHL) among paediatric population due to limited available series and also due to inability of children to express their loss of hearing. SSNHL is an otologic emergency, requiring prompt treatment to avoid permanent hearing loss. This is particularly important in paediatric population as hearing loss may affect speech and language development, as well as academic and social performance. Current treatment guidelines include systemic steroids and intratympanic injection, mainly emphasized in adults with limited literature data in paediatric group (2). We would like to present a case study of acute labyrinthitis in a child, the management and literature review.

CASE REPORT

An 11 year old girl, of Malay ethnicity, presented to the emergency department, with one day history of severe vomiting, more than 10 episodes per day. She had no complaints of abdominal pain or loose stool, and symptoms of meningitis, such as fever, neck stiffness or visual disturbances. The initial diagnosis for hospitalization was acute gastroenteritis with moderate dehydration and she was treated with intravenous fluid resuscitation. However, upon further history taking, the child complained of sudden onset giddiness which she described as spinning sensation which triggered her persistent vomiting. The vertigo was not aggravated by head rotation or change in body motion and did not relieve with rest. Apart from that, she also described decreased hearing over the right ear with subsequent non pulsatile tinnitus, which started concurrently with her vertigo. Otherwise, there was no significant past medical or surgical history.

On clinical examination, the patient demonstrated horizontal nystagmus with fast phase to left side (contralateral), large amplitude with high frequency, suggestive of peripheral disorder. Otoscopic examination was normal for both ears. Tuning fork test demonstrated a right sensorineural hearing loss. Other cranial nerves and cerebellar function tests were unremarkable. Pure tone

audiometry confirmed a right profound sensorineural hearing loss with normal hearing in left ear, whereas tympanogram was Type A bilaterally. She was treated with IV Dexamethasone 6mg BD (0.4mg/kg) and oral Acyclovir 800mg (5 times a day) for 5 days whereas oral Prochlorperazine 5mg TDS was given for one day as vestibular sedative. Magnetic resonance imaging was done to rule out presence of any intracranial pathologies and the findings showed no significant abnormalities. She was given 2 weeks steroid IV and oral.

With such aggressive management, the child's vestibular complaints resolved, however her right hearing remained unchanged. Given the persistent hearing loss, option regarding salvage intra-tympanic dexamethasone therapy was discussed. Following a thorough discussion with the patient and her family, and a careful consideration of the potential advantages and disadvantages, the decision to administer intratympanic injection of dexamethasone under general anaesthesia was thoughtfully chosen. Thus, she was subjected to periodical intratympanic (IT) steroid injection (once weekly for 3 sessions) as daycare procedure. Inhalational anesthesia with Sevoflurane was given as induction, then maintained with Sevoflurane MAC 0.9-1.0, while airway was maintained with mask holding technique. IV Fentanyl 1mcg/kg was given for analgesia. Right tympanic membrane was inspected with rigid endoscope (Storz,Germany, 2.7mm), then proceeded with intratympanic injection of Dexamethasone 2mg, using spinal needle 22G. The injection was given at the posteroinferior quadrant of the tympanic membrane. The procedure is repeated one week later with pure tone audiometry repeated prior. Pure tone audiometry repeated after 3 intratympanic injections yielded normal to severe down slopping sensorineural hearing loss, which showed partial recovery.

DISCUSSION

The prevalence of vertigo and imbalance is lower among children compared to adults. It is reported to range between 0.4% up to 5.3%. The relatively lower prevalence is thought to be due to difficulty among children to express their experience of vertigo to physician. There are differences between children and adults in expression of the symptoms, stages of development of their vestibular functions and etiologies of vertigo. Vestibular migraine and benign paroxysmal vertigo of childhood are the most common etiologies, comprising two-third of all cases. Labyrinthitis/vestibular neuronitis on the other hand, were rare (1).

Acute labyrinthitis is defined as an inflammation of the labyrinth which leads to sudden vestibular and auditory function loss at affected side. Similar to our patient, movement worsens the vertigo and generally hold themselves still to minimize exacerbation of vertigo. Acute labyrinthitis is known to cause sudden sensorineural hearing loss (SSNHL), however, it is difficult to conclude its true contribution because of limited literatures discussing paediatric SSNHL (2). Systematic review by Chau et al showed 71% cases of adult SSNHL are idiopathic, with known etiologies include infection, Meniere's disease, autoimmune, trauma, hematologic and neoplastic diseases. Pitaro et al showed similar distribution among paediatric population, however the etiologies differ: congenital CMV and EBV infection, enlarged vestibular aqueduct, Mondini dysplasia and syndrome of common cavity, ototoxicity, trauma, meningitis and parotitis (2).

Systemic steroids remain as mainstay treatment for SSNHL and IT steroid injection as salvage therapy. Though the current guideline is targeted at adult population, similar results are demonstrated in paediatric population as well. Chen et al described management of 14 paediatric SSNHL with oral steroids where 8 completely recovered and 5 had partial recovery (2). Dedhia et al also reported similar findings where 50% of patients treated with oral steroids showed improvement in hearing. IT steroid injection on the other hand, provides higher concentration of steroid in perilymph, thus avoiding the systemic adverse effects. Complications include otalgia, tympanic membrane perforation, vertigo, dysgeusia and infection (3). Pitaro et al is the first series that utilized IT steroid as salvage treatment, demonstrating 62% of children treated with IT steroid injection show hearing improvement (complete improvement 16%, partial improvement 47%). 3 divided doses of oral prednisone 1 mg/kg/day, or intravenous (IV) hydrocortisone 1 mg/kg/day over a period of 7 days were administered. In cases of poor improvement or contraindicated to systemic steroids, intratympanic injection of dexamethasone 1 mg 12 hourly via ventilation tube were given for 7 days. (2). A study by Gundogan et al also showed better response when combination of steroid and intratympanic injection used than either one alone, however no paediatric patients were recruited in his study. In this study, oral methylprednisolone 1mg/kg was given for 2 weeks, tapered 10mg every 3 days whereas intratympanic injection given using 0.4ml of 62.5mg/ml of methylprednisolone (4). In our case, dexamethasone was chosen in view of its higher potency and longer half-life. Despite prominent efficacy as salvage therapy, the procedure should be tailored to each patient. The advantages include the following: safe and less invasive, could be done as office procedure under local anaesthesia and it allows steroid to be administered to inner ear without significant systemic bioavailability (5). However, it is almost impossible to tolerate local anaesthesia among paediatric population, hence we opted for general anaesthesia. Since IT injection was done under general anaesthesia, there was better handling of instruments and maintenance of patient's position post injection. The setbacks of performing IT injection under general anaesthesia include higher cost of treatment and also exposing the child to multiple

anaesthetic procedure. Thus, careful evaluation of the advantages and disadvantages should be done and discussed with patient.

CONCLUSION

Paediatric acute labyrinthitis is an uncommon entity which is also an etiology for SSNHL. Diagnosing the disease is challenging due to children's inability to express their symptoms. Like adults, children also benefit from systemic and intratympanic steroid injection, as in our case which showed improvement in hearing. Despite favourable outcome, the treatment options are not well established in paediatric population. Further research is needed to standardise management pathways in children.

ACKNOWLEDGEMENT

We would like to thank the Department of Anaesthesiology and the Audiology Unit of Hospital Tunku Ampuan Besar Aishah Rohani, Hospital Pakar Kanak-Kanak, Universiti Kebangsaan Malaysia for their contribution.

REFERENCES

1. Lee JD, Kim CH, Hong SM, Kim SH, Suh MW, Kim MB, Shim DB, Chu H, Lee NH, Kim M, Hong SK. Prevalence of vestibular and balance disorders in children and adolescents according to age: a multi-center study. International Journal of Pediatric Otorhinolaryngology. 2017 Mar 1;94:36-9. doi:10.1016/j.ijporl.2017.01.012
2. Pitaro J, Bechor-Fellner A, Gavriel H, Marom T, Eviatar E. Sudden sensorineural hearing loss in children: Etiology, management, and outcome. International journal of pediatric otorhinolaryngology. 2016 Mar 1;82:34-7. doi:10.1016/j.ijporl.2015.12.022
3. Dedhia K, Chi DH. Pediatric sudden sensorineural hearing loss: etiology, diagnosis and treatment in 20 children. International Journal of Pediatric Otorhinolaryngology. 2016 Sep 1;88:208-12. doi:10.1016/j.ijporl.2016.07.003
4. Gundogan O, Pinar E, Imre A, Ozturkcan S, Cokmez O, Yigiter AC. Therapeutic efficacy of the combination of intratympanic methylprednisolone and oral steroid for idiopathic sudden deafness. Otolaryngology–Head and Neck Surgery. 2013 Nov;149(5):753-8. doi:10.1177/0194599813500754
5. Barrs DM. Intratympanic injections of dexamethasone for long-term control of vertigo. The Laryngoscope. 2004 Nov;114(11):1910-4. doi:10.1097/01.mlg.0000147919.89357.16