Audiology Guidelines for Children 0 to 19 years of age with Meningitis
(in VCH Community)

Site Applicability

All VCH Community Audiology Clinics (Vancouver, Richmond, North Shore, Powell River, Squamish)

Practice Level

Clinical Audiologist: Basic Skill

Need to Know

Children with meningitis are at clear risk to develop hearing loss, however, there is currently no universally accepted, evidence-based audiological follow up schedule. This guideline was developed to identify children who are at the greatest risk of hearing loss and/or progression and recommends monitoring timelines and referrals dependent on the child's audiology outcomes.

There is a stronger evidence of permanent sensorineural hearing loss following bacterial meningitis, however, it cannot be ruled out as a sequelae to viral/aseptic and fungal meningitis. As a result, this guideline applies to all meningitis, irrespective of pathogen. The majority of hearing losses following bacterial meningitis occur early in the course of the illness and are stable. If normal hearing is found immediately post infection, it is highly unlikely to change. Any child with permanent hearing loss attributable to meningitis requires immediate repeat audiological evaluation and temporal bone imaging (due to the potential for rapid progression of cochlear ossification) within two weeks. Children with permanent hearing loss may require hearing aids (dispensed through VCH Public Health Audiology) or cochlear implants (obtained through BC Children's Hospital).

Equipment & Supplies

The following equipment is necessary to meet this CPD:

- Clinical audiometer
- Diagnostic otoacoustic equipment
- Diagnostic immittance equipment
- Otoscope
- Disposable, single-use insert earphones, ear tips, and probes for above equipment

Practice Guideline

1. Audiologists should test all children who have had meningitis, regardless of pathogen.
2. Children with meningitis should be tested as soon as possible after diagnosis.
3. Children with normal hearing on the first test should have a second test three months later, a third test six months after the first test, and then discharged if normal.
4. Children who have sensorineural hearing loss should be referred for urgent medical investigation by their Audiologist to their medical professional and re-tested within two weeks. Those who have stable results between those two tests should have reassessment every three months for the first year; every six months after that, until they are three years post-meningitis and annually thereafter.
5. Children who have fluctuating or worsening sensorineural hearing loss should be referred for urgent medical investigation by their Audiologist to the child's medical professional.
6. A diagnosis of bilateral severe to profound hearing loss regardless of imaging results, and those with imaging suggestive of ossification irrespective of the degree and laterality of the hearing loss, should improve prompt counseling regarding communication opportunities.

Meningitis Care Path:

(1) Initial hearing assessment within one month of meningitis diagnosis
(2) Age appropriate testing is always used. This can be auditory brainstem response (ABR) or behavioural testing including visual reinforcement, play, or standard audiometry. Ear specific information is required

Results	Minimum Clinical Standards	Referrals	Monitoring Schedule
Normal	▪ Results at 25 dBHL / dBeHL at 500, 2000, and 4000 Hz bilaterally ▪ ABR measured in dBeHL, behavioural testing in dBHL ▪ Soundfield results must show present DPOAEs from 2000-6000 Hz with an attempt at 6000 Hz bilaterally	▪ Not applicable	▪ Retest in 3 and 6 months ▪ If ABR / behavioural testing is not possible at time of the 3 month audiological assessment, the presence of OAEs 2-4 kHz with an attempt at 6 kHz bilaterally is the minimum data required ▪ If normal at both assessments then discharge at 6 months post-initial ax
SNHL	▪ Elevated air and bone conduction thresholds	▪ Immediate medical referral ▪ Immediate referral to BC EHP Intervention if diagnosis is prior to 3.5 years of age (Intervention Coordinator available for diagnoses prior to 2 years of age) ▪ Consideration of communication opportunities and treatment options	▪ Repeat audiology reassessment within 2 weeks ▪ Every 3 months for first year post meningitis ▪ Every 6 months for second and third year post meningitis ▪ Annual evaluation thereafter
CHL	▪ Elevated air conduction thresholds	▪ Optional medical referral (to Family Physician / Otolaryngologist)	▪ Retest at 3 and 6 months ▪ Ongoing monitoring until resolution of CHL
Unable to Test	▪ Unable to obtain reliable and replicated results	▪ Maximum of two assessment attempts with unknown hearing status, then consultation with BC EHP Clinical Audiologist. ▪ If any test does not yield information to determine if hearing loss is fluctuating or stable, consider immediate sedated ABR referral	▪ Dependant on assessment results

Legend:

Acronym	Full Name	Acronym	Full Name
ABR	Auditory Brainstem Response	DPOAE	Distortion Product Otoacoustic Emission
BC EHP	BC Early Hearing Program	OAE	Otoacoustic Emission
CHL	Conductive Hearing Loss	SNHL	Sensorineural Hearing Loss
dB HL	Decibel Hearing Level	VRA	Visual Reinforcement Audiometry
dBeHL	Decibel Estimated Hearing Level		

Expected Patient Outcomes

Consistent audiological care and follow up across VCH for patients with meningitis. This guideline will reduce the current length of serial monitoring assessments for children with normal hearing, which can cause significant family stress.

Documentation

All attempted and/or completed audiology assessment in VCH must be documented as an Audiology Assessment in PARIS. Patients enrolled in the BC EHP must have their EHP number entered into the PARIS Audiology Assessment. PARIS automatically sends EHP assessments to BEST daily. If meningitis occurs prior to one year of age, this risk factor must be manually added to BEST. All results are entered in BEST for children under 3.5 years of age.

References

Adapted from BC Children's Hospital Meningitis Clinical Practice Guideline for Audiology and Meningitis Care Path.

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VCH: *(Regional SharePoint 2nd Reading)*

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