CLINICAL PRACTICE GUIDELINE: Emergency Department

Malignant Otitis Externa

Disclaimer: This Clinical Practice Guideline ('CPG') was written for use in The Royal Victorian Eye and Ear Hospital Emergency Department. It should be used under the guidance of an Ophthalmology or ENT registrar. If clinical advice is required, please contact the Eye and Ear Admitting Officer for assistance: EYE: +61 3 9929 8033; ENT: +61 3 9929 8032. Links to internal Eye and Ear documents cannot be accessed from the website CPG.

See also: necrotising otitis externa, skull base osteomyelitis

Description:

An invasive, potentially fatal, infection of the external ear canal and skull base that typically occurs in elderly patients with diabetes mellitus or immune compromise.

There are no firm diagnostic criteria for malignant otitis externa. The diagnosis is reached after consideration of the clinical presentation and imaging studies. Occasionally, a trial of therapy will be commenced in uncertain cases.

Red Flags:

- Cranial nerve palsy suggests poor prognosis
- Altered level of consciousness
- Children (consider underlying malignancy)

How to Assess:

History:

- Deep otalgia
- Aural discharge/exudate
- No improvement with local therapy
- Facial droop
- Diabetes
- Immune suppression (HIV, transplant patients, long term steroids, leukemia)

Examination:

- Oedema of the ear canal
- Granulation at bony cartilaginous junction of ear canal inferiorly
- Cranial nerve palsy (most commonly ipsilateral facial palsy)

Investigations:

- Ear canal swab
    - Must be taken before commencing any treatment.
    - Only swabs with transport medium should be used to maximize sensitivity of culture results.
    - Swabs should be sent for standard M/C/S and be labeled "external auditory canal – malignant otitis externa."
- Bloods for FBE, renal function, HbA1c, ESR and CRP.
    - These results are important for adjusting and monitoring therapy.
- Biopsy of EAC granulation tissue
    - Tissue samples have a higher yield for invasive pathogens than swabs and are also useful to investigate for malignancy (sent fresh for m/c/s and histopathology)
    - Indication for biopsy of granulation tissue:
        - If there is no resolution of granulation
        - Ongoing concern of malignancy (refer to 'Consideration of surgical intervention' section)
        - Where empiric antibiotics are to be commenced prior to swab culture results (to ensure pathogen identification prior to sterilization by antibiotic therapy)
        - Where no pathogen has been isolated on swab cultures
- Initial imaging studies
    - CT of the temporal bones (to assess middle ear cleft aeration and evidence of bony erosion)
    - MRI scan with gadolinium for assessment of soft tissue
    - Nuclear Medicine scans (Tc^{99} or Ga^{67} scans)

Acute Management:

Admission to The Royal Victorian Eye and Ear Hospital ('Eye and Ear') under the Otology Unit with inpatient review by Otology consultant and consult with St Vincent's Infectious Disease (ID) registrar (in-hours) or consultant (after-hours) through St Vincent's switchboard 9231 1111.

Medically unstable patients or those with complicated comorbidities should be transferred to St Vincent's Hospital via the ID unit.

- Aural toilet daily during admission. Consider topical therapy after cultures have been collected. Use of topical antibiotics will compromise the interpretation of culture results if the initial ear swab does not reveal a pathogen.
- Topical ciprofloxacin drops should not be used when MOE is suspected as use may result in the development of fluoroquinolone-resistant organisms.

Analgesia:

- Paracetamol
- Ibuprofen or diclofenac (depending on renal function and comorbidities)
- Opioids

Empiric intravenous antibiotics:

- There is no urgency in commencing antibiotic therapy for malignant otitis externa until initial culture results are available unless the patient is systemically unwell or has neurological complications.
- Where the clinical presentation and initial test results support the diagnosis of Gram-negative bacterial infection, use piperacillin-tazobactam 4.5g IV q6h. This agent requires dosing interval adjustment for renal function as described in Table 2.33 in the *Therapeutic Guidelines: Antibiotic*.
- Patients with a non-immediate hypersensitivity reaction to penicillins should receive ceftazidime 2g IV q8h. This agent requires dosing adjustment for renal function as described in Table 2.33 in the *Therapeutic Guidelines: Antibiotic*.
- Patients with a history of an immediate hypersensitivity reaction to penicillins should receive meropenem 1g IV q8h. This agent requires dosing interval adjustment for renal function as described in Table 2.33 in the *Therapeutic Guidelines: Antibiotic*.
- Where initial culture results do not support Gram-negative bacteria as the aetiological organism, empiric treatment should be directed by the SVHM ID unit.

Directed therapy:

- Patients with established malignant otitis externa will receive a minimum of 6 weeks of IV antibiotic therapy.
- Disease due to *Pseudomonas aeruginosa* will in general be treated with a period of intravenous antipseudomonal beta-lactams prior to a switch to oral ciprofloxacin if the isolate is sensitive. This duration will vary depending on the extent of initial disease.
- PICC line insertion will be required for many patients to allow outpatient antibiotic therapy. This should be at the direction of the SVHM ID unit.

Consideration of surgical intervention:

- Granulation tissue that remains after 6 weeks of therapy should be biopsied to exclude malignancy.
- Where there is uncertainty regarding the diagnosis or microbiology, strong consideration should be given to surgical intervention to obtain tissue samples for histology and culture with samples sent fresh for m/c/s and histopathology (only in rare cases should this require cortical mastoidectomy).
- Additional tests such as mycobacterial studies and flow cytometry may also be required in selected cases.

- Patients with temporomandibular joint involvement (from anterior extension of infection) will require prompt arthrotomy and washout via the Oro-maxillo-facial Surgery unit at SVHM. Referrals can be made via SVHM switchboard 9231 1111.
- Surgical debridement of involved tissue should be considered in patients who deteriorate despite maximal medical management. Decisions regarding such salvage efforts should be made after discussion between the treating ENT surgeon and the ID consultant involved.

Follow up:

- Regular otology clinic for aural toilet
- SVHM Infectious Diseases clinic to monitor for complications and review duration of therapy.
    - The first appointment should be booked for one week after hospital discharge via faxed referral to 9231 2910.
- Minimum 6 month follow up (Eye and Ear Otology Clinic) after discontinuing treatment
- Regular correspondence should occur between ENT and ID regarding the patient's progress.
    - Eye and Ear clinic notes and letters can be faxed to 9231 2785 for scanning into the SVHM electronic record.
    - SVHM clinic notes and letters can be faxed to 9929 8228 for scanning into the Eye and Ear electronic record.

Imaging:

- A repeat Gallium scan and MRI scan should be used to confirm resolution

Evidence Table

Author(s)	Title	Source	Level of Evidence (I – VII)
Cohen D, Friedman P	The diagnostic criteria of malignant external otitis	J Laryngol Otol 101:216-221 (1987)	VII
Courson AM, Vikram HR, Barrs DM	What are the criteria for terminating treatment for necrotizing (malignant) otitis externa?	Laryngoscope 124:361-2 (2013)	V
Hobson CE, Moy JD, Byers KE, Raz Y, Hirsch BE, McCall AA	Malignant otitis externa: evolving pathogens and implications for diagnosis and treatment	Otolaryngol – Head & Neck Surg 151:112-116 (2014)	VI
Grandis J, Branstetter B, Yu V	The changing face of malignant (necrotising) external otitis: clinical, radiological, and anatomic correlations	Lancet Infect Dis 4:34-39 (2004)	V
Jacobson L, Antonelli P	Errors in the diagnosis and management of necrotising otitis externa.	Otolaryngol – Head & Neck Surg 143:506-509 (2010)	VI

The Hierarchy of Evidence

The Hierarchy of evidence is based on summaries from the National Health and Medical Research Council (2009), the Oxford Centre for Evidence-based Medicine Levels of Evidence (2011) and Melynk and Fineout-Overholt (2011).

I) Evidence obtained from a systematic review of all relevant randomised control trials.

II) Evidence obtained from at least one well designed randomised control trial.

III) Evidence obtained from well-designed controlled trials without randomisation.

IV) Evidence obtained from well-designed cohort studies, case control studies, interrupted time series with a control group, historically controlled studies, interrupted time series without a control group or with case series.

V) Evidence obtained from systematic reviews of descriptive and qualitative studies.

VI) Evidence obtained from single descriptive and qualitative studies.

VII) Expert opinion from clinician, authorities and/or reports of expert committees or based on physiology.

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