Acute acoustic trauma (AAT) and hearing loss after a major incident

Symptoms common to acute acoustic trauma include hearing loss, tinnitus, earache or vertigo. The ear is highly susceptible to injury after blast, and this is often missed as the trauma teams manage life threatening injuries first. Patients may self present days later, to the ED or GPs.

- Patients with abnormal audiograms should be referred and reviewed urgently and if appropriate, steroids given.
- **If hearing tests are normal, no immediate action is required.**
- **If tinnitus persists, then other therapies may be useful at a later stage.**

"I was near the blast and my hearing has been affected. I think I need a hearing test"

Do not wait!
Use phone app or urgently arrange non-hospital audiogram to confirm hearing loss

Hearing loss diagnosed.
Phone GP urgently for hospital audiology referral for further assessment

GPs/Other non-hospital audiology providers.
- → Request formal audiogram with Regional Co-ordinating Audiology Department (RCAD) (Other providers may be commissioned/authorised depending on surge demand)
  This is a clinical priority treatment options are severely time limited
- MI audit - Report all cases of hearing loss/abnormality to RCAD

Your regional coordinating ENT resource

Please include
- Patients contact details
- Clinical examination
- Contraindications to high dose steroids
- NHS number if known

PRE HOSPITAL
IN HOSPITAL

RCAD audiogram confirms hearing loss.
URGENT referral to Regional Co-ordinating ENT Department (RCENTD)

Regional Co-ordinating ENT Department (RCENTD).
Consultant Otologist - 'Paper' review of audiogram, endoscopic images if available and other clinical information. (Documentation to include NHS number and advice given)

→ **Triage patients to Outpatient appointments**
→ **If necessary repeat Pure Tone Audiogram and Tympanometry**
(plus TM Endoscopic photography if resource available)

Case not appropriate for steroids. Monitor patient as per local policy and provide Hearing Aids if appropriate

Pure conductive loss

Sensorineural or mixed loss

Adult and Paediatric follow up by ENT at local hospital (or Regional co-ordinating ENT Department) (Priority 2)

***AAT and steroid use**
See overleaf before prescribing

ADULTS (Priority 1)
- Check contraindications for steroids
- Discuss intratympanic and/or oral steriods
- Recommendation for oral regime: Prednisolone 1mg/kg to a max of 60mg OD for 7 days, after appropriate consent
- Gastric cover with PPI and Gaviscon Advance
- Ensure patient has ENT follow up after 7 days. If oral steroids only selected, intratympanic steroid injection (ITSI) should be reconsidered

PAEDIATRIC <16 (Priority 1)
If hearing loss is suitable for management with steroids
- All cases must be managed with paediatric consultant input
- Discussion with parents re: contraindications of steroid use in a young patient
- Consider oral steroids and ITSI (particularly if patient has GA/Sedated for any other reason)
- Titrate dose by weight (Prednisolone 1mg/kg PO OD 7 days to a maximum dose as per local policy)
- Discuss use of gastric cover if appropriate

- If persistent sensorineural loss after 7 days of oral steroids, consider intratympanic steroids (ITSI)
- If persistent mixed loss, where conductive element is related to a perforated ear drum, consider topical steroids

SO/1 → Updated: 18/12/2019 → v2.0

Acute acoustic trauma (AAT) and hearing loss after a major incident

Acute Hearing Injury

There are many reasons for patients to perceive a reduction in the quality of their hearing following trauma. **The flowchart overleaf is designed to streamline the management of hearing injury without associated temporal bone fracture**, in the mass casualty situation. The evidence on which these protocols are based, is rapidly maturing and a pragmatic approach has been taken as evidence related to the rescue of sensorineural hearing loss (SNHL) associated with noise and blast exposure evolves.

Treatment options are severely time limited. For adults and children, with symptoms or proven hearing loss, hearing tests should be performed by the Regional Coordinating Audiology Department (RCAD).

- In the presence of a severe hearing loss however, early assessment and treatment is imperative and it is perfectly appropriate to test earlier.
- For children, tests need to be age appropriate, however, standard 'adult' Pure Tone Audiometry can often be performed with children above the age of five. This should be considered if the numbers injured place pressure on paediatric audiology services or the location dictates and there is a wish to keep parents and children together.

If hearing tests are normal, no immediate action is required. If tinnitus persists, then other therapies may be indicated, as per local ENT guidance.

If abnormalities are detected, results should be passed on **URGENTLY** to the Regional Coordinating ENT Department (RCENTD) for assessment.

If the loss is purely conductive which may be due to;

- blood in the external auditory canal
- tympanic membrane perforation
- ossicular discontinuity

✔ No immediate action is needed.
✔ Keep the ear dry.
✔ Patients can be followed up routinely in outpatients at an interval appropriate to their pathology.

If hearing loss is mixed or purely sensorineural steroids may be beneficial.
In the mass casualty scenario, where resources available to deliver intra tympanic membrane injections (ITSI) may be compromised:

- Patients can be prescribed oral Prednisolone, 1mg per Kg to a max of 60mgs OD, for 7 days with PPI cover for 14 days, after appropriate consideration of contraindications and consent.
- After one week if there is no improvement in the sensorineural component of the loss intratympanic steroids should be considered as there is evidence of superiority when compared to oral steroids for hearing salvage.

In the presence of associated polytrauma, oral/IV steroids may be contraindicated, however, intratympanic steroids may be considered particularly if the patient is having operative procedures during which the intratympanic steroids can be also be concurrently administered.

For children, oral Prednisolone should be considered in the absence of contraindications and after a joint paediatric/ENT consultation (to ensure all are aware of possible side effects).

For both adults and children gastric protection should be considered and usually given.

Updated Advice (2017)

FOR YOUNG PEOPLE AND CHILDREN - remember to

- TITRATE STEROID DOSES to weight.
- Be meticulous to explain the possible side effects. The information given on this, and other treatment options, must be documented for all patients.
- Have a joint consultation if possible, ENT with a paeds consultant present is the ideal.
- Intra tympanic injection of steroid may give good effect, reducing the relative risk of complications associated with systemic steroid use. This should be considered if a patient, especially a child, is sedated or has a GA for any reason.

OTHER CONSIDERATIONS

- Patients who have a conductive hearing loss can be helped in the immediate period with a bone conduction aid e.g. in order to complete informed consent, or simply to reduce the injured patients' sense of isolation.
  Your audiologist may have some ideas such as;
  - "Alice band" secured aids (used pre BAHA).
  - Bone conduction aids that stick to the mastoid.

***AAT and steroid use**

- *Intratympanic steroids should be considered as an alternative to oral steroids at first presentation or as salvage after one week of oral steroids.*
- *If a mixed loss persists to treat the sensorineural part in the presence of a perforated ear drum topical steroids given regularly rather than an ITSI may be appropriate.*
- *Consider steroid use (ITSI or topical drops if perforation present) if there is a strong suspicion patient has sensorineural loss but unable to subjectively test e.g. intubated patient with severe scalp burns.*
- *In severe trauma, where objective evidence of SNHL or high suspicion exists but relative contraindications to systemic steroids are present, ITSI should be considered. If vision is lost, this consideration should be given a high priority.*