



Early treatment with hyperbaric oxygen therapy and corticosteroids in acute acoustic trauma

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Introduction

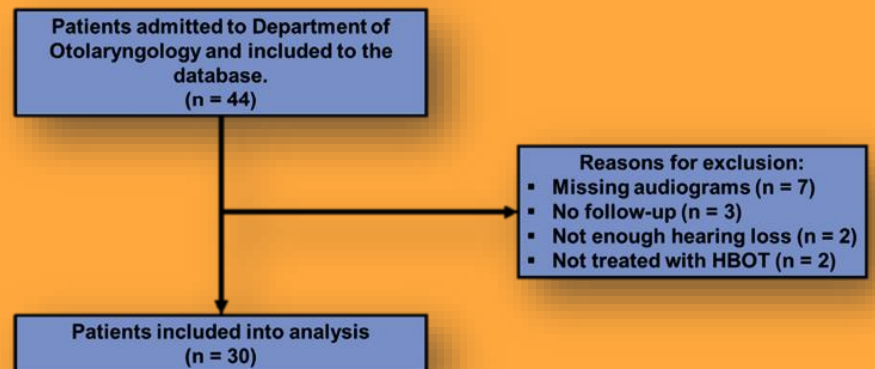
- Acute acoustic trauma (AAT) is an acute hearing impairment caused by intense noise-impact.¹
- Routine exposure to blasts or firearm discharge during training and/or combat makes hearing loss one of the most prevalent disabilities in the military.¹
- The current management strategy for AAT within the Dutch military is the combination therapy with corticosteroids and hyperbaric oxygen therapy (HBOT).^{2,3}
- The aim of this study was to investigate the difference in hearing outcome between patients in whom combination therapy was started within two days, versus after more than two days.

Methods

- A retrospective analysis was performed on military patients diagnosed with AAT with substantial hearing loss who presented between February 2018 and March 2020.
- Absolute and relative hearing improvement between first and last audiograms were calculated for all affected frequencies (defined as loss of ≥ 20 dB on initial audiogram). In addition, speech discrimination tests were performed.

Results

- In this analysis, 30 male patients (49 ears) with AAT were included. The median age was 24.5 years (IQR 23-29).
- Mean absolute and relative hearing gains were 18.8 dB (SD 14.6) and 46.8% (SD 31.3) on all affected frequencies (see Table 1).



Conclusion

- In this study, significant improvements were found in absolute and relative hearing gains when HBOT was started in ≤ 2 days, compared to > 2 days.

Future perspectives

- A randomized superiority trial (HOXACAT) is being initiated in the Netherlands that compares two different treatment protocols of HBOT for the treatment of AAT.⁴
- The HOXACAT trial⁴ will be conducted by the Central Military Hospital in collaboration with the Amsterdam UMC, location AMC and Hypercare Sneek.

References

- Ahmed MM, Allard RJ, Esquivel CR. Noise-Induced Hearing Loss Treatment: Systematic Review and Meta-analysis. *Mil Med.* 2021 Jan
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- <https://www.trialregister.nl/trial/9123>

Table 1

Outcomes of early treatment of HBOT and corticosteroids combination therapy. Note: in none of the patients hearing was affected at 250, 500, or 1000 Hz and therefore these frequencies are not reported.

	Initial audiogram (dB)	Last audiogram (dB)	Absolute hearing gain (dB)	Relative hearing gain (%)
Audiometry				
2000 Hz (n = 16)	31.9 ± 11.9	11.3 ± 8.7	20.6 ± 16.8	57.3 ± 38.4
3000 Hz (n = 28)	42.7 ± 15.2	18.2 ± 12.9	24.5 ± 18.5	52.3 ± 35.3
4000 Hz (n = 30)	44.7 ± 16.5	23.3 ± 16.5	21.3 ± 17.2	46.8 ± 33.3
6000 Hz (n = 40)	41.6 ± 16.8	22.9 ± 16.6	18.8 ± 16.0	44.4 ± 34.1
8000 Hz (n = 39)	40.6 ± 16.4	20.6 ± 14.3	20.0 ± 16.5	46.6 ± 30.6
All frequencies (n = 49)	38.2 ± 12.2	19.4 ± 12.7	18.8 ± 14.6	46.8 ± 31.3
Speech recognition test (n = 45)	64.0 dB ± 13.5 at 100%	51.7 dB ± 6.6 at 100%	12.3 dB ± 14.1	–
Timing of HBOT initiation				
≤ two days (n = 31)	38.7 ± 12.9	15.9 ± 9.8	22.9 ± 14.1	56.3 ± 28.0
> two days (n = 18)	37.2 ± 11.3	24.3 ± 15.6	11.6 ± 12.9	30.6 ± 30.6
P-value	0.66	0.02	0.007	0.004