

# How to differentiate inner ear decompression sickness from inner ear barotrauma

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## Background

Inner ear barotrauma (IEBT) and inner ear decompression sickness (IEDCS) may present as diagnostic challenge because both diseases share similar symptoms in divers. However, treatment is quite different.

## Clinical history

A 37 year-old diver is brought to a regional hospital complaining of vertigo, nausea, a sense of ear fullness and right hearing loss.

He was transferred to Sacré-Cœur Hospital with a presumption of decompression sickness (DCS).

Symptoms appeared after a dive at 120 feet about 30 minutes after surfacing.

Patient denies skin rash or pain. Physical exam was normal except for the inability to perform tandem. Otoscopic examination was unremarkable.

There was no violation of decompression table and the diver didn't have any problems or symptoms during descent.

Diagnosis of IEDCS was highly suspected.

Patient recovered completely after one hyperbaric oxygen treatment (HBOT) despite a five hours delay (due to transportation).

### Diagnosis

#### Clinical history

#### Inner ear barotrauma (IEBT)

- Recent cold
- Eustachian tube dysfunction
- Hearing loss, tinnitus, ear fullness or pain, nausea, vertigo

#### Diving history

- Difficulty with middle ear equalization upon descent
- Symptoms during descent
- No deep dive

#### Signs

- Liquid in middle ear
- Tympanic hemorrhage or rupture
- Nystagmus
- Ataxia

#### Treatment

- Rest, head elevation, avoid valsalva
- Surgery if symptoms persist

#### Inner ear decompression sickness (IEDCS)

- Risks factors for DCS
- Previous DCS
- Systemic symptoms of DCS
- Vertigo, hearing loss, tinnitus, ear fullness, nausea

- No middle ear equalization difficulty
- Symptoms in ascent or after diving
- Violation of decompression schedule
- Mixed gas diving
- Diving in deep water

- Normal otoscopy
- Nystagmus
- Ataxia

- HBOT

## Conclusion

Key elements to establish diagnosis between IEBT and IEDCS rely on diving history, timing of symptoms and physical examination.

In 20% of IEDCS there is no violation of decompression schedule.

Physical examination is mandatory with attention to otoscopic findings for signs of middle ear barotrauma that will often be present with IEBT but not in IEDCS.

HBOT is the treatment of choice for decompression illness to prevent long-term sequelae.

Even with early therapy, more than three quarter of patients have cochleovestibular dysfunction.

When the diagnosis remains unclear, it is suggested to proceed with bilateral myringotomy prior to HBOT.

## References

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