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Caloric stimulation

Caloric stimulation is a test that uses differences in temperature to diagnose damage to the acoustic nerve. This is the nerve that is involved in hearing and balance. The test also checks for damage to the brain stem.

How the Test is Performed

This test stimulates your acoustic nerve by delivering cold or warm water or air into your ear canal. When cold water or air enters your ear and the inner ear changes temperature, it should cause fast, side-to-side eye movements called nystagmus. The test is done in the following way:

- Before the test, your ear, especially the eardrum, will be checked. This is to make sure it is normal.
- One ear is tested at a time.
- A small amount of cold water or air is gently delivered into one of your ears. Your eyes should show an involuntary movement called nystagmus. Then they should turn away from that ear and slowly back. If water is used, it is allowed to drain out of the ear canal.
- Next, a small amount of warm water or air is gently delivered into the same ear. Again, your eyes should show nystagmus. Then they should turn toward that ear and slowly back.
- Your other ear is tested in the same way.

During the test, the health care provider may observe your eyes directly. Most often, this test is done as part of another test called electronystagmography.

How to Prepare for the Test

Do not eat a heavy meal before the test. Avoid the following at least 24 hours before the test, because they can affect the results:

- Alcohol
- Allergy medicines
- Caffeine
- Sedatives

Do not stop taking your regular medicines without first talking to your provider.

How the Test will Feel

You may find the cold water or air in the ear uncomfortable. You may feel your eyes scanning back and forth during nystagmus. You may have vertigo, and sometimes, you may also have nausea. This lasts only a very short time. Vomiting is rare.

Why the Test is Performed

This test may be used to find the cause of:

- Dizziness or vertigo
- Hearing loss that may be due to certain antibiotics or other drugs

It may also be done to look for brain damage in people who are in a coma.

Normal Results

Rapid, side-to-side eye movements should occur when cold or warm water is placed into the ear. The eye movements should be similar on both sides.

What Abnormal Results Mean

If the rapid, side-to-side eye movements do not occur even after ice cold water is given, there may be damage to the:

- Nerve of the inner ear
- Balance sensors of the inner ear
- Brain

Abnormal results may be due to:

- Poor blood supply to the ear
- Bleeding (hemorrhage)
- Blood clot
- Brain or brain stem damage
- Cholesteatoma (a type of skin cyst in the middle ear and mastoid bone in the skull)
- Birth defects of the ear structure or brain
- Damage to the ear nerves (from infections such as rubella or from medicines)
- Poisoning
- Stroke
- Trauma

The test may also be done to diagnose or rule out:

- Acoustic neuroma (tumor of the acoustic nerve)

- Benign positional vertigo (a type of dizziness)
- Labyrinthitis (irritation and swelling of the inner ear)
- Meniere disease (inner ear disorder that affects balance and hearing)

Risks

Too much water pressure can injure an already damaged eardrum. This rarely occurs because the amount of water to be used is measured.

Water caloric stimulation should not be done if the eardrum is torn (perforated). This is because it can cause an ear infection. It also should not be done during an episode of vertigo because it can make symptoms worse.

Alternative Names

Caloric test; Bithermal caloric testing; Cold water calorics; Warm water calorics; Air caloric testing

References

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Updated by: Joseph V. Campellone, MD, Department of Neurology, Cooper Medical School of Rowan University, Camden, NJ. Review provided by VeriMed Healthcare Network. Also reviewed by David C. Dugdale, MD, Medical Director, Brenda Conaway, Editorial Director, and the A.D.A.M. Editorial team.