SURGICAL TECHNIQUE OR TECHNOLOGY

Otospongiosis surgery. Calibrated stapedotomy, or "piston transplatinaire"

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Otospongiosis surgery involves certain technical requirements. The quality of the result depends on correct indication, assessment of surgical difficulties, surgical technique and adapted instrumentation to simplify the procedure.

The present article describes the essential stages of stapedotomy, described in 1966 by Henri Martin (JF ORL 1966, 15, 1717), first under the term "platinotomy" and later as "footplate piston" or "piston transplatinaire".

Patient preparation

Surgery is usually under local anesthesia with sedation, on an ambulatory basis or with a short-stay 48-hour admission. Local anesthesia is completed with the following protocol:

- premedication 1 hour before surgery, using 50 to 100 mg Atarax\textsuperscript{c} (hydroxyzine);
- 30 to 50 mg i.v. Diprivan\textsuperscript{d} (propofol) before injecting the local anesthetic.

Local anesthesia uses 2\% adrenalinated Xylocaine\textsuperscript{e}. One or 2 cm\textsuperscript{3} is injected in the posterior and posterosuperior part of the external auditory canal, then 0.5 cm\textsuperscript{3} in the inferior part, completed if needed by retroauricular infiltration.

The position of the patient on the table is important (Fig. 1). First, the head-rest is positioned at 15\degree toward the ground. A gelatin-filled support is positioned at the nape of the neck. The patient is installed in dorsal decubitus, with the shoulder of the side to be operated positioned in the axis of the body to facilitate access, and the head is bent toward the contralateral shoulder. Head positioning can be checked on otoscopy, which should find the malleus horizontal, perpendicular to the surgeon’s line of sight.

On the surgeon’s side, the head is held by a foam rubber support which also ensures forearm stability. A support is placed on the scrub nurse’s side, to facilitate assistance and hold the drapes up.

Other supports may be recommended. If the right ear is being operated, the right forearm can be laid on the patient’s shoulder, with the left elbow on the surgery table, and conversely if the left ear is being operated.

An otologic speculum is positioned (Fig. 2). The antireflection-coated speculum should be of the widest possible diameter so as to induce compression in the canal and facilitate hemostasis without the need for an articulated arm to support it. It should be noted that certain surgeons use an autostatic speculum, which they say makes it easier to use both hands.
Approach

The Rosen incision is intended to create a tympanomeatal flap with its tip 8 mm from the annulus (Fig. 3). Incision should be deep, seeking bone contact; a round knife or microraspatory and microscissors will be useful. The flap is pulled back (Fig. 4) to the limbus of the tympanic membrane, which is carefully released without tearing, using a cranked Plester retractor or round knife. The tympanic cord is to be conserved.

Bone resection and peroperative diagnosis

It is often necessary to enlarge the surrounding bone framework using a curette or 2 mm diamond burr, so as to visualize the lower half of the facial nerve and stapes pyramid and fully expose the footplate. The lenticular process is then separated from the stapes head using a micro-hook (Fig. 5).

Peroperative diagnosis of otospongiosis involves first visualizing and locating the affected site. Incus and malleus mobility are then checked by moving the malleus handle using a sickle knife or curved needle, then stapes head fixation is checked with the same instrument. Footplate
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mobility can also be assessed by direct pressure using a microaspirator. Absence of annular ligament movement and perceptible round-window reflection are investigated.

Stapes branch section

A KTP, argon or diode laser fiber at 1-2 Watts, carried by an endo-otoprobe, ensures hemostasis and vaporization of the posterior branch of the stapes against the footplate (Fig. 6), and then of the anterior branch. The latter may also be fractured by downward and forward rotation of the sectioned posterior branch using a micro-hook, if one is sure of the footplate fixation.

Other lasers, such as CO₂, may also be used in various modalities: short continuous-mode shots at 1 Watt, or single shot.

Although we are strong supporters of lasers, we would not criticize those who use other instruments (microtrephine, microdrill, etc.) for stapedotomy.

Choice of piston type, diameter and length

A wide variety of prostheses may be used, most of which are now produced in teflon or titanium. The diameter, generally ranging from 0.4 to 0.6 mm, should be adapted to the stapedotomy. The length is determined using a measurer from the inferior face of the long apophysis of the incus to the stapes (Fig. 7a) if the length of the piston as defined by the manufacturer starts from the inferior part of the loop (Fig. 7b), and from the superior part of the long apophysis to the footplate if the defined length is that of the entire prosthesis.

Intravestibular penetration should be less than 0.5 mm (e.g.: for a 4-mm distance measured from footplate to long apophysis, a 4.25–4.50 mm piston is required).
Introduction of prosthesis in speculum. [Figure 9]

Fitting prosthesis in stapedotomy orifice (rotating the hand helps introduction). [Figure 10]

Prosthesis in place (inferior part in stapedotomy orifice, superior part fitted into long apophysis of the incus). [Figure 11]

Closure

Filling around the piston stem uses conjunctive tissue. The mucosal flap is pulled back and dressed (e.g., with Mériogel® and a Pope-Oto-Wick®. The dressing is removed on day 8.

The role of prophylactic antibiotherapy (e.g., associating amoxicillin to clavulanic acid) is debatable; usually, no postoperative treatment is prescribed.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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