KEYHOLE COCHLEAR IMPLANTATION

BRISBANE 1997-
Site preparation, Lt. An adhesive drape is fixed around the site by close stapling to exclude hair from the site. A hair shave is unnecessary. A staple over the magnet site is optional.
Keyhole incision plan. The 2.5 cm base of the auricular flap is sited at the level of the round window by a preliminary trans-canal inspection.
The level of the round window is marked on the post-aural sulcus by the point of a sucker.
Level of the round window, indicated by the sucker mark and the line of ink. This forms the midline of the C-incision.
Plan of the C-incision, sited at the level of the round window for optimal access to this site during array insertion.
For access to the post-aural tissues, the overlying skin is undermined by sharp dissection in the avascular plane between skin and underlying periosteum, indicated by the interrupted line.
Initial skin incision.
The U-flap is raised off the auricle, then the surrounding skin is underlined to the interrupted line. The outline of the pinna-based flap is then cut on to bone.
Elevation of the pinna based flap which will cover the arrays upon completion of surgery. Extra length is gained by elevation off the conchal bowl forwards to the EAC.
Pinna-based flap and pocket creation. The flap is reflected forwards with a light retractor, exposing the upper mastoid and supra-meatal triangle, the site of the masotoidotomy.
Pocket creation. A skin staple is used to mark the magnet site. The inferior edge of the pocket entrance is bevelled using sharp dissection, to enhance CI insertion.
Final CI sitting in the pericranial pocket, with the pinna-based flap overlying the electrode arrays. A 3/0 soluble percutaneous suture around the neck of the implant (arrowed) stabilises the implant body in situ satisfactorily.
A CI template is used to gauge adequate pericranial pocket size. Care should be taken to avoid the creation of a false pocket superficial to the periocranium.
Use of the CI template to judge pocket size. Moistening the template/wound eases insertion which is achieved by the wound stretching to a linear shape.
Semi-complete insertion of the template. Tissue resistance at the lower edge of the pocket entrance is common, overcome by bevelling the edge with sharp dissection.
Full insertion of the template. The trailing edge should be just beyond the staple line (arrowed). 2/0 silk ties attached to the template facilitate its removal.
Wound exposure during mastoidotomy. A lightweight retractor is desirable to avoid distortion and to permit mobility. This modified Thudicum nasal speculum suffices.
Exposure of the supra-meatal triangle, Lt ear, preparatory to the mastoidotomy. Flap retracted forwards.
Mastoidotomy site. The bone defect needs to be only 20 mm diameter to permit exposure of the required landmarks, but wider in adult males, or if more complex surgery is likely.
Antral “stalagmites” Lt ear. The spicules lead the surgeon to the lateral semicircular canal which is the key landmark of the procedure. In stony mastoids, the dura is followed to the antral site to identify the LSCC.
Rear end of the LSCC, evident in the aditus, Lt ear. The posterior geniculate artery is seen as a blush at the postero-lateral-inferior corner of the lateral canal.
Initial posterior tympanotomy creation, just anterior to the line of the VII.
Completed posterior tympanotomy revealing the round window.
Initial cochleostomy creation, sited antero-inferiorly to the round window to avoid the basilar membrane. For hearing preservation cases a membrane incision may be used.
Completed cochleostomy, preparatory to array insertion.
Nucleus Freedom 24 model with reference and active electrode arrays.
Implant body insertion via the C-incision. As with the template, moistening the site aids insertion.
Semi-complete implant body insertion. The implant slides into the pocket with mild force on the electronic housing.
Completed implant body positioning. The lower edge of the electronics housing is sited at the staple line (arrowed), similar to the template positioning.
The implant body is stabilised using a snug pocket and a 3/0 soluble percutaneous suture (arrowed) around the arrays at their attachment to the body of the CI.
Insertion of a Cochlear Contour array. Initially, this has a slight curve. Grasping the array such that the curvature assists insertion is considerably advantageous during this delicate phase of implantation.
Removal of a Contour stylet to permit the pre-fashioned array curvature to adapt to the modiolus. A delicate to-and-fro insertion technique helps to avoid tip fold-over that may complicate an advance-off-the-stylet method.
Head bandage application after surgery helps to stabilise the implant during site healing, and minimises interference with a healing wound in paediatric cases.
In children, Neural Response Telemetry (NRT) is used to facilitate subsequent implant mapping during and after switch-on, done 1-2 weeks after surgery.
Earlier NRT using attachment to a PC (now miniaturised into a hand held remote device).
Post-operative wound site. The use of mono-filamentous soluble suture avoids the necessity to remove these in the case of a fractious child.
Long-term wound site appearance.