

The one case of the middle fossa approach was performed with the collaboration of the neurosurgeon who helped with the previous 2 cases. The tumour was intrapetrous, and there was no useful hearing; therefore the tedious and difficult exposure of the internal auditory canal by following the course of the facial nerve from the geniculate ganglion was not attempted. A large parietal osteoplastic flap was fashioned and turned down; the middle fossa dura was widely elevated, which gave an excellent exposure of the whole of the superior surface of the petrous temporal bone. The tumour was exposed by drilling the bone medial to the arcuate eminence and enlarging the opening with bone punches. The tumour was completely removed, also the facial nerve. In this operation the internal carotid artery was exposed, the tumour having eroded the wall of the carotid canal. Indeed, this modification of House's middle fossa exposure of the internal auditory meatus has been suggested for operations upon the internal carotid artery or the eustachian tube.

I have no experience of the transsigmoid exposure for acoustic neuromas, and as I have already said, the neurosurgeons with whom I work have not yet accepted it.

The complications of these operations are: facial palsy, cerebrospinal fluid leak through the middle ear, hydrocephalus, meningitis, cerebral oedema, infarction of the brain stem and hæmorrhage. The majority of fatalities have been due to the last two complications.

One must not give the impression that otologists should operate on all acoustic neuromas; simply that in collaboration with neurosurgeons they could well operate on the smaller tumours.

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Combined Translabyrinthine-Transtentorial Approach to Acoustic Nerve Tumours

The translabyrinthine approach to acoustic neurinomas gives inadequate exposure of tumours of the size likely to be referred to a neurosurgical department, and needs extension to deal with these formidable lesions. The labyrinthine bone dissection is limited behind by the sigmoid sinus,

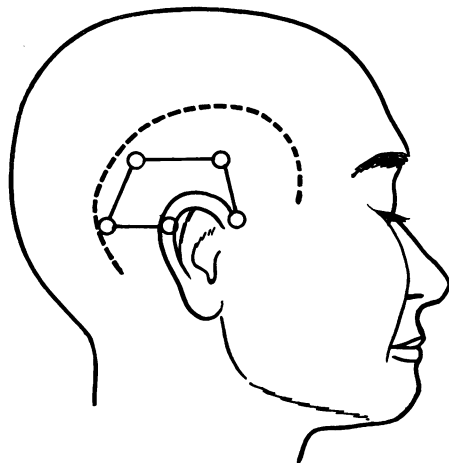


Fig 1 *Outline of scalp and bone flap used*

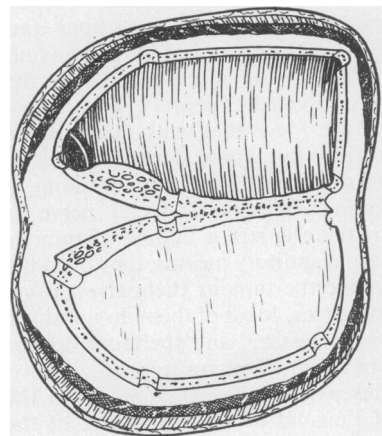


Fig 2 *Bone flap turned down and dura of temporal lobe and sigmoid sinus exposed*

above by the superior petrosal sinus, below by the jugular bulb and in front by the facial nerve. No further room can be obtained anteriorly or inferiorly, but extension may be gained posteriorly by division of the sigmoid sinus and the performance of suboccipital craniectomy, so that the translabyrinthine exposure is linked to the standard neurosurgical approach, a combined approach foreseen by Cushing (1917) and utilized by Hitselberger & House (1966).

This paper presents some experience of an alternative method of exposure, whereby more room is obtained by extending the dural opening superiorly, through the superior petrosal sinus, tentorium and dura of the middle fossa. I am indebted to Mr J K Henderson, of the Neurosurgical Department of St Vincent's Hospital, Melbourne, for this approach, which I have used

in conjunction with Mr A W Morrison of the ENT Department of the London Hospital.

The patient is placed supine, with a pillow beneath the shoulder and the head turned towards the opposite side. A spinal drain, intravenous mannitol and magnification vision through a binocular loupe magnifying 3.5 times have been valuable aids. Small temporal scalp (Fig 1) and bone flaps are turned down and the lower margin of the bone flap placed as low as possible. Bone is then rongeuired away from the skull at the lower margin of the dural exposure until the floor of the middle fossa and the sigmoid sinus are reached (Fig 2). The microscope is then used and the petrous bone dissection carried out, so that the internal auditory meatus, the adjacent dura of the posterior fossa, the superior petrosal sinus and the dura of the middle fossa floor in front of the superior petrosal sinus are exposed. The dura is opened over the lateral aspect of the temporal lobe, a small superiorly hinged flap being turned upwards. From the lower margin of the dural opening thus made, an incision is extended downwards to run across the exposed dura of the floor of the middle fossa to meet the superior petrosal sinus, some distance medial to its point of entry into the sigmoid sinus (Fig 3). The superior petrosal sinus is ligated and divided. From this point onwards the incision bifurcates, one limb carrying on through the tentorium medially, roughly parallel with the posterior margin of the petrous temporal bone, until it enters the tentorial hiatus. The other limb runs a short course downwards through the posterior fossa dura, and is joined to an incision along the dura of the internal auditory canal. By gentle retraction of the temporal lobe, an excellent view of the upper part of the tumour is obtained and the brain stem and the trigeminal nerve at this level are very well exposed. The lower part of the tumour is adequately exposed, though not so well as with the standard sub-

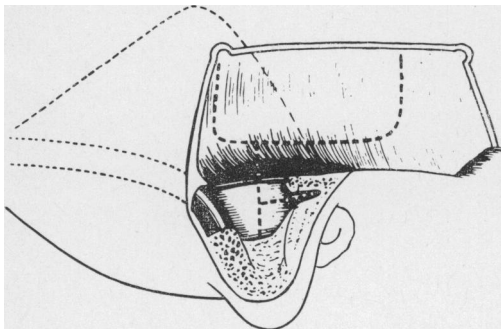


Fig 3 Labyrinthine dissection completed, exposing internal auditory canal, dura of posterior fossa and superior petrosal sinus. The dural incisions are outlined by heavy dotted lines

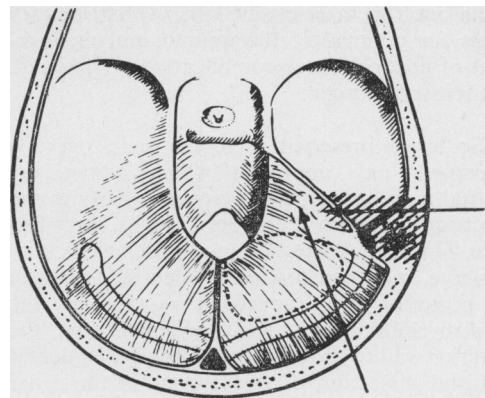


Fig 4 To indicate the direction of approach to the cerebellopontine angle, as compared with suboccipital approach

occipital approach. Very little retraction of the cerebellum has been found necessary. The tumour is approached from considerably farther forwards, and also from higher up, than in the standard suboccipital approach (Fig 4).

Our experience of the translabyrinthine exposure is a modest one, consisting of one combined translabyrinthine and suboccipital approach with division of the sigmoid sinus, and 3 translabyrinthine-transtentorial approaches. In addition, I have used the latter technique for exploring other cerebellopontine angle or pre-brain stem tumours, including one large meningioma in the cerebellopontine angle.

We abandoned the translabyrinthine suboccipital approach after one case, due to concern at the risk of dividing the sigmoid sinus. The 3 cases of acoustic neurinoma and the one case of cerebellopontine angle meningioma in which the above technique has been used have done well from the neurological point of view. Total removal of the acoustic nerve tumours was obtained and in all cases the post-operative status at periods varying from 3 to 15 months has been satisfactory. The patients have all been notably free from ataxia and are leading normal lives, but in no case was it possible to preserve the facial nerve. The reason for this is related, I believe, not to the exposure but to the size of the tumour; this will be discussed later.

From these few cases it has been possible to form a tentative view of the value of the modified approach for large tumours, as compared with the standard operation. Hitselberger & House (1966) have discussed the surgical approaches to acoustic nerve tumours and enunciated four principles of effective exposure: (1) Avoidance of further cranial nerve damage. (2) Adequate decompression of the posterior fossa. (3) Avoidance of injury

to the brain stem or cerebellum. (4) Satisfactory access for removal of the tumour and management of post-operative complications. These will be discussed in order:

(1) So far as preservation of the facial nerve is concerned, any approach which allows the internal auditory canal to be opened early in the operation will permit the nerve to be identified there. This is the easiest point at which to pick up the nerve, and it can be as easily identified through the posterior fossa approach as through the translabyrinthine approach, provided that the posterior wall of the canal is removed by a dental drill and dissection of the tumour in the canal begun in the canal apex.

In the case of small tumours, it would seem that the same end could be obtained adequately by either approach. In the case of large tumours the real problem arises in the continued dissection of the nerve as it is stretched around the medial side of the capsule, where its identification from tumour capsule and its preservation, without leaving fragments of attached tumour from which recurrence may take place, offer the greatest difficulties and explain the failure in our cases to preserve it. I would conclude, therefore, that for preservation of the facial nerve in cases of large tumours this approach has no special advantage.

(2) The present approach provides no real decompression of the posterior fossa, except perhaps that offered by division of the tentorium. However, the dura has been left open over the temporal lobe to allow for swelling of this post-operatively.

(3 & 4) The real advantage of this combined approach lies in the excellent access provided to

the upper part of the tumour and brain stem, and in the minimal interference with the cerebellum. The latter may explain the fact that the lack of posterior fossa decompression has not so far occasioned post-operative difficulties, and we have not had to carry out reopening for cerebellar swelling or hæmatoma in the operative cavity. All patients were notably free of brain stem disturbance in the early post-operative phase.

The special complications to which this technique is subject are two: (a) Interference with the venous drainage of the temporal lobe, through tearing of the vein of Labbé. If this occurs on the side of the dominant hemisphere post-operative dysphasia may result; this has, however, cleared completely in our case. (b) A CSF leak from the ear may occur and its avoidance requires careful closure of the mastoid antrum by fascia.

Summary

A combined translabyrinthine and transtentorial approach to large acoustic neurinomas has provided excellent access for the performance of total removal. Such an approach does not have any special advantage, so far as preservation of the facial nerve is concerned, over the standard approach.

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Meeting November 7 1969

Mr W H Bradbeer delivered his Presidential Address, entitled **Otology in the South-West**.