8.1 Introduction

The goal of presigmoid approaches is to expose the posterior cranial fossa via partial or complete petrosectomy and division of the tentorium. The presigmoid approaches are an anterior extension of the common suboccipital lateral approach, and provide excellent exposure of cerebellopontine angle and pons. We generally distinguish three types of presigmoid approaches, namely the retrolabyrinthine, the translabyrinthine and the transcochlear, that represent three progressive steps of the petrosectomy.

In particular, the retrolabyrinthine approach involves a presigmoid partial mastoidectomy that preserves the structures of the inner ear. Its major benefits are that hearing and facial nerve function are preserved and only minimal brain retraction is required. Combined with middle fossa exposure (combined petrosal approach) [1–5], this approach is very useful for lesions involving the petroclival junction, including petroclival meningiomas, trigeminal schwannomas, epidermoids, and large chondrosarcomas or chordomas with intradural components [1–7].

In order to carry out this approach, a detailed knowledge of mastoid anatomy is mandatory. Skull-base surgeons have to be able to perform a mastoidectomy via several presigmoid exposures:
1. Retrolabyrinthine
2. Translabyrinthine
3. Transcochlear
4. Combined petrosal (combination with middle fossa approach)
5. ELITE (extreme lateral infrajugular transcondylar-transtubercular exposure)

8.2 Transpetrosal Approaches

According to Ammirati and Samii [6]:

The presigmoid sinus approaches to the petroclival region shortens the distance to the clivus, permits a multiangled exposure of this difficult surgical area, minimizes the amount of temporal lobe retraction, preserves the integrity of the transverse sinus, and allows for better preservation of the neurovascular structures. These factors translate into a high percentage of total tumor removal and a low incidence of permanent morbidity.

The retrolabyrinthine, translabyrinthine, and transcochlear approaches, which constitute the three major transpetrosal approaches, are typically used to treat lesions located in front of the brainstem, such as tumors or midbasilar aneurysms, following the principle of removing bone rather than retracting neural tissue. The difference between these approaches is the gradually increasing amount of resection of the mastoid process. Progressive drilling of the petrous bone, and removing the labyrinth and the cochlea exposes the anterior aspect of the brainstem, minimizing retraction and leaving the surgeon closer to the target, but causes permanent loss of hearing [1–7].

Owing to the need for a wide exposure of the sigmoid and transverse sinuses, cerebral angiography with venous phase and/or an angio-MRI scan is always advisable before surgery [1–7].
The translabyrinthine and transcochlear exposures are dependent on and are a progression of the retrolabyrinthine approach. They are described in more detail in Chapter 12.

8.2.1 Retrolabyrinthine Approach: Surgical Technique and “Tricks”

Retrolabyrinthine mastoid drilling was designed for the treatment of vestibular neurectomies (for which the retrolabyrinthine approach was developed); its application in other settings is limited [1–7]. Among transpetrosal approaches, the retrolabyrinthine approach involves the smallest amount of bone resection.

For the position of the patient on the operating table we suggest the Fukushima’ lateral position (Fig. 8.1) [3, 4]. The table is positioned in 15–20° reverse Trendelenburg position. The body of the patient should lie in an oblique line, with the upper arm at 45° and the lower one at 90°. Silicone pads are positioned in the lower axilla and between the legs. The leg on the table is flexed more than the other. The shoulder ipsilateral to the operative field should be the more external part of the body, in line with the limit of the table [3, 4]. The head is held in a three-pin Mayfield device. A soft roll is placed under the ipsilateral shoulder to facilitate rotation. The head should be: (1) flexed slightly on the neck, (2) declined with the vertex down, and (3) rotated toward the floor. The shoulder is taped caudally to increase the surgeon’s working room. If the position is

Fig. 8.1 Fukushima’s lateral position. a Surgical position. b Artistic drawing