Surgical anatomy of the jugular foramen

P.-H. ROCHE1, P. MERCIER2, T. SAMESHIMA3, and H.-D. FOUNIER2

1 Service de Neurochirurgie, Hôpital Sainte Marguerite, CHU de Marseille, Marseille, France
2 Service de Neurochirurgie et Laboratoire d’anatomie de la faculté de Médecine d’Angers, France
3 Carolina Neuroscience Institute, Raleigh, NC, USA

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Abstract

The jugular foramen (JF) is a canal that makes communication between the posterior cranial fossa and the upper neck for one third of the cranial nerves and for the main venous channel of the brain. From a lateral view, the JF is protected by multiple layers of muscles and by the outer surface of the petrous bone. Surgical exposure of the JF is usually justified by the removal of benign tumors that grow in this region.

In the first part of the present study we describe the surgical anatomy of the JF. Then, we detail the relevant points of a stepwise surgical progression of three lateral skull base approaches with a gradual level of exposure and invasiveness. The infralabyrinthine transsigmoid transjugular-high cervical approach is a conservative procedure that associates a retrolabyrinthine approach to a lateral dissection of the upper neck, exposing the sinojugular axis without mobilization of the facial nerve. In the second step, the external auditory canal is transected and the intrapetrous facial nerve is mobilized, giving more exposure of the carotid canal and middle ear cavity. In the third step, a total petrosectomy is achieved with sacrifice of the cochlea, giving access to the petrous apex and to the whole course of the intrapetrous carotid artery.

Using the same dissection of the soft tissues from a lateral trajectory, these three approaches bring solutions to the radical removal of distinct tumor extensions. While the first step preserves the facial nerve and intrapetrous neuro-otologic structures, the third one offers a wide but more aggressive exposure of the JF and related structures.

Keywords: Glomus tumor; jugular foramen; lower cranial nerves; meningioma; skull base surgery.

Introduction

The jugular foramen (JF) is a deeply located region that makes a communication between the posterior fossa and the superior latero-cervical area. The JF is a complex area of the skull base through which important cranial nerves and vessels course in variable anatomic patterns [2, 23, 26, 28]. The pathology that