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Surgical Strategies for Selectively Opening the Sylvian Fissure by Target

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Introduction

The sylvian fissure (SF) is the most identifiable landmark on the superolateral brain surface and provides passage to the middle cerebral artery (MCA) and its branches. Although the SF represents the most common microneurosurgical gateway for lesions involving the anterior portion of the cerebral hemisphere, basal cisterns, insula, and skull base, there are few studies that describe the targeted strategies for selective minimally invasive opening of the sylvian fissure based on the target structure. We describe several surgical strategies for sequentially opening selected segments of the sylvian fissure based on the intracranial target, and we correlate microsurgical landmarks with the branches of the MCA, in order to help facilitate safe and targeted surgical opening of the sylvian fissure.

Methods

Using 3 formalin fixed adult cadaveric specimens (6 sides), targeted segmental transsylvian approaches were performed through mini-pterional, pterional, and orbitozygomatic osteotomies to reach surgical targets at varying depths, including the MCA, basal cisterns, insula, and middle skull base.

Results

The sylvian fissure was divided into 4 anatomical segments based on depth, cortical/convexity (SF1), sulcular (SF2), insular (SF3), and basal (SF4) and tailored surgical strategies for safe and progressive or alternating opening of each segments, based on intended surgical target depth, was described while highlighting safe management the MCA.

Conclusions

Progressive and tailored opening of the SF based on the depth of the surgical target allows for maximal surgical exposure while minimizing cortical retraction. Three-dimensional knowledge of the relationship between the sylvian fissure, the branches of the MCA, and the surgical anatomy in each described segment can help provide a simple roadmap to deeper intracranial structures through the sylvian fissure.

Learning Objectives

By the conclusion of this session, participants should be able to describe a tailored approach to opening of the sylvian fissure.