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ORIGINAL ARTICLE

Intrasphenoid septations inserted into the internal carotid arteries: a frequent and risky relationship in transsphenoidal surgeries[☆]

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KEYWORDS

Sphenoid sinus;
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Expanded endonasal
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Abstract

Introduction: When an expanded endonasal transsphenoidal surgical approach is performed, intrasphenoid septations must be completely resected. If these structures are close to the internal carotid artery (ICA), then their manipulation might cause vascular injury.

Objective: The objective of this study is to describe the frequency of intrasphenoid septations in the internal carotid artery protuberance (ICAp).

Methods: Computed tomography (CT) scans of 421 patients were analysed. Intrasphenoid septations (classified as intersphenoid or accessory) and their relationship to the ICAp were described. Additionally, a sphenoid sinus classification was performed based on their degree of pneumatization to determine whether a difference exists in the frequency of intrasphenoid septations inserted into ICAp with regard to sinus type.

Results: The patient mean age was 39 ± 21.4 years. Overall, 219 patients (52%) had septations in the ICAp; 359 patients (85.3%) had intersphenoid septations; of the latter, 135 (37.6%) had septations in the ICAp. This frequency was higher among patients with sphenoid sinus type 4 or 5 (44.7% and 43.5%, respectively). Accessory septations were found in 255 patients (60.6%); 140 of these septations (54.9%) were in the ICAp. Among 351 patients with types 3, 4 or 5 sphenoid

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sinuses (i.e., only well-pneumatized sphenoid sinuses), 219 (62.4%) had septations in the ICAp. These frequencies are higher than those reported in most previous studies.

Conclusion: The frequency of intrasphenoid septations in the ICAp found is considerable. It is higher among patients with more pneumatized sinuses. This finding justifies an appropriate pre-operative study, and careful attention must be paid during transsphenoidal surgery.

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PALAVRAS-CHAVE

Seio esfenoidal;
Septações
esfenoidais;
Base do crânio;
Cirurgia
transesfenoidal;
Abordagem endonasal
ampliada

Septações intraesfenoidais inseridas nas artérias carótidas internas: uma relação frequente e arriscada nas cirurgias transesfenoidais

Resumo

Introdução: Quando uma abordagem cirúrgica transesfenoidal endonasal ampliada é realizada, septações intraesfenoidais devem ser completamente ressecadas. Se estas estruturas estiverem próximas à artéria carótida interna (ACI), a manipulação pode causar lesão vascular.

Objetivo: O objetivo deste estudo foi descrever a frequência de septações intraesfenoidais na protuberância da artéria carótida interna (pACI).

Método: Exames de tomografia computadorizada (TC) de 421 pacientes foram analisados. As septações intraesfenoidais (classificadas como interesfenoidais ou acessórias) e sua relação com a pACI foram descritas. Além disso, uma classificação do seio esfenoidal foi realizada com base no seu grau de pneumatização para determinar se existe uma diferença na frequência de septações intraesfenoidais inseridas em pACI em relação ao tipo de seio.

Resultados: Pacientes com idade média de $39 \pm 21,4$ anos foram incluídos. No geral, 219 pacientes (52%) apresentavam septações na pACI; 359 (85,3%) tinham septações interesfenoidais; 135 (37,6%) com septações na pACI. Esta frequência foi maior entre os pacientes com seio esfenoidal tipo 4 ou 5 (44,7 e 43,5%, respectivamente). As septações acessórias foram encontradas em 255 doentes (60,6%); 140 dessas septações (54,9%) estavam na pACI. Entre 351 pacientes com seios esfenoidais tipos 3, 4 ou 5 (isto é, apenas seios esfenoidais bem-pneumatizados), 219 (62,4%) tinham septações na pACI. Estas frequências são superiores às relatadas na maioria dos estudos.

Conclusão: A frequência de septações intraesfenoidais na pACI encontrada é considerável, sendo maior entre pacientes com seios mais pneumatizados. Este achado justifica um estudo pré-operatório adequado e uma atenção especial deve ser dada durante a cirurgia transesfenoidal.

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Introduction

Transnasal transsphenoidal surgery has developed significantly over recent decades. The cooperative work between neurosurgeons and ear, neck and throat surgeons has been essential for this development. The introduction of the endoscope was another landmark. Compared with the microscope, the endoscope enabled additional expansion of this surgical technique, thereby increasing the possibility of resecting lesions not otherwise eligible for transnasal transsphenoidal surgery.¹ With the emergence of the endoscopic expanded endonasal approach, areas such as the clivus, the petrous bone, the middle cranial fossa and the infratemporal fossa became accessible.² An extensive sphenoidotomy with septation resection is necessary to create an adequate surgical corridor.³

Intrasphenoid septations are bony structures found in the sphenoid sinus with several anatomical conformations. Because they are located in the sinus walls, they are often adjacent to surrounding structures, especially the internal carotid artery (ICA), which can increase the risk of expanded transsphenoidal surgeries during septation resection (Fig. 1).

ICA injury is one of the most dramatic intraoperative complications. This injury can lead to a challenging surgical scenario featuring rapid blood loss that can result in patient exsanguination.⁴ An appropriate pre-operative radiologic evaluation of the sphenoid sinus and its septations is necessary to prevent this complication.

Previous articles have described the frequency of intrasphenoid septations in the ICA protuberance (ICAp).¹⁻⁵ The majority of these articles have found fewer intrasphenoid septations than our surgical and pre-operative findings. The

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