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Sinonasal bone destruction caused by frontal meningioma invasion related to respiratory tract infection incident: A case report



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ABSTRACT

Introduction: Meningioma is uncommonly found in extracranial. Extracranial meningioma can be an extension of primary intracranial tumors that accompany osteolytic changes in the skull or causes bone destruction. In this article, we reported intracranial meningioma in the frontal region that extends to the sinonasal bone causing bone destruction and being a predisposing factor for respiratory tract infection.

Case presentation: A 47-years old female was brought to the emergency department due to dyspnea and fever since one week before and there was found a lump in the frontal region. During the surgical procedure, there was an invasion of the tumor which caused sinonasal bone destruction. The endotracheal tube (ETT) can be seen from the surgical field.

Conclusion: In this case, the patient has been treated for pneumonia infection which can be related to sinonasal bone destruction caused by the invasion of meningioma to extracranial. The importance that must be informed to the patient is the possibility of recurrent respiratory tract infection.

Keywords: bone destruction, case report, meningioma, respiratory tract infection, sinonasal.

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INTRODUCTION

Meningioma is one of the major subgroups of intracranial neoplasms that account for around 36% of all primary brain tumors.¹ Meningioma is uncommonly found in extracranial. Extracranial meningioma can be an extension of primary intracranial tumors that accompany osteolytic changes in the skull or causes bone destruction.² In this article, we reported intracranial meningioma in the frontal region that extends to the sinonasal bone causing bone destruction and being a predisposing factor for respiratory tract infection.

CASE PRESENTATION

A 47-years old female was brought to the emergency department due to dyspnea and fever since one week before. Based on the physical examination on the primary and secondary survey, the patient was initially diagnosed with pneumonia and suspected due to COVID-19. On the secondary survey examination, there was a lump in the frontal region. The lump was fixed and

solid with a diameter of approximately 5 x 5 cm.

After stabilization of the primary condition, the patient was planned for a frontal meningioma examination. Based on the head computed tomography (CT) scan, there was a large soft-tissue mass in the frontal with extracranial extension into areas that included the frontal sinus, the anterior wall of the ethmoid sinus, sphenoid sinus, and the nasal cavity (Fig.

1). After the patient was in stable condition, a surgical plan for treating the tumor was planned. A frontal craniotomy with a coronal incision was performed with the aim of removing the tumor. Subsequent to opening a skin flap, the tumor was found to invade through the frontal bone and extend to the ethmoid and sphenoid sinus (Fig. 2A and 2B). The extracranial lesion was resected as widely

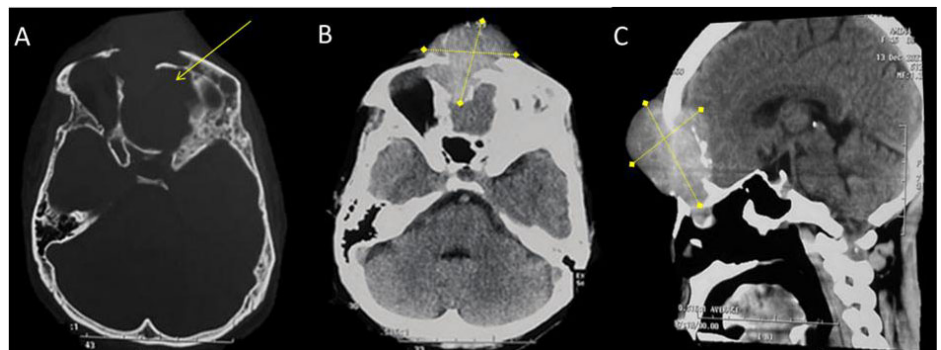


Figure 1. Head computed tomography scan. **A.** Axial view of the bone window showed sinonasal bone destruction. **B.** Axial view of brain window showed invasion of the tumor to the sinonasal. **C.** Sagittal view of brain window showed large tumor coming from intracranial.

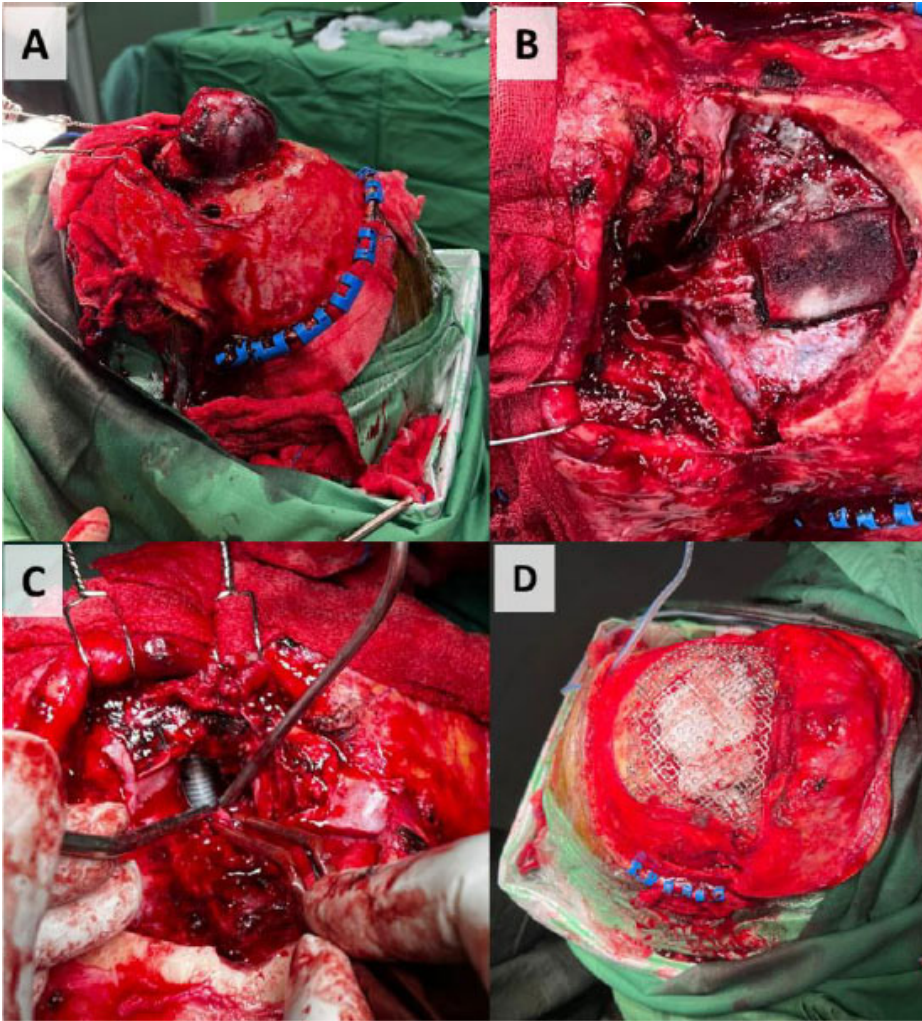


Figure 2. Intraoperative view. A. Extracranial mass in the frontal region. B. Destruction of the frontal sinus, C. Exposure of the endotracheal tube during surgery D. Reconstruction of cranial bone using titanium mesh.

as possible and the erosion of the frontal bone was extended into the normal bone by resection to remove a section of 6 x 6 cm in size. The frontal base was opened to the ethmoid sinus and sphenoid sinus for drainage to the nasal cavity. During the surgical procedure, the endotracheal tube can be seen due to the invasiveness of the tumor (Fig. 2C). The defect was closed using a combination of skin, lipid, and muscle. The frontal skull base was reconstructed with a titanium mesh (Fig. 2D).

DISCUSSION

Extracranial meningioma is an uncommon type of meningioma and there is only less than 2 % of all meningiomas arise at a primary ectopic site (primary extracranial meningioma).^{3,4} Extracranial meningioma

is commonly found in the orbital cavity area and is mostly associated with intracranial mass as the primary tumor.⁵ Extracranial meningiomas have also been rarely found in the ear, nose, paranasal sinuses, parotid, neck, pharynx, mandible, and skin.⁶⁻⁸

In this case report, we found meningioma that has extension manifestation extracranial into the sinonasal and causes sinonasal bone destruction. In some literature, extracranial meningioma can be the extension of primary intracranial tumors that accompany osteolytic changes in the skull or causes bone destruction.² The mechanism of the sinonasal tract as an extension of meningioma has not been cleared in the literature.⁹⁻¹¹ However, there are two possible mechanisms that might cause meningiomas to spread

into the sinonasal tract in this case. The first mechanism is meningiomas is not originated intracranially, but they may have originated in an extracranial site and spread secondarily into the cranial cavity. The second mechanism is the meningioma may have originated inside the cranial cavity and ruptured through the foramina and crevices, resulting in extracranial (sinonasal tract) augmentations as the primary expression of the intracranial tumor.¹¹

The extension of meningioma into the sinonasal cavity can affect the others disease. Physiologically, the nasal cavity is the portal's route for entry of external air into the lungs that have hair (vibrissae) for trapping unwanted airborne contaminants.¹² It is provided by the epithelium pseudostratified columnar type with intercalated ciliated and goblet cells and contributes to the mucociliary function. The normal mucociliary clearance of the nasal and paranasal sinus mucosa is important for preventing infection by clearing bacterial pathogens. The sinonasal bone destruction causes the physiological change of the sinonasal cavity, especially for the primary defense mechanism of the respiratory system.¹³

CONCLUSION

In this case, the patient has been treated for pneumonia infection, which can be related to a complication of sinonasal bone destruction caused by invasion of meningioma to extracranial. The clinical importance that must be informed to the patient is the possibility of recurrent respiratory tract infection.

CONFLICT OF INTEREST

There is no conflict of interest related to the materials or methods used in this study.

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AUTHOR'S CONTRIBUTION

The authors took part in the design of the study, contributed to data collection, and

participated in writing the manuscript and all agree to accept equal responsibility for the accuracy of the contents of this article.

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