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Minimally Invasive Approach for Anterior Cranial Base Renal Metastases

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Abstract

Metastases to the paranasal sinuses and anterior cranial base are rarely found; among them, Renal Cell Carcinoma (RCC) is the most common cancer to metastasize to this region with almost 21 cases of ethmoid metastases reported. We present a 63-year-old female patient with a previous history of right nephrectomy for clear cell renal carcinoma 9 years ago and surgery for thyroid metastases 3 years ago. She suffered a 9-month history of a nasal obstruction and recurrent massive spontaneous epistaxis. Computed Tomography (CT) revealed a well-circumscribed 5.2 × 4.9 cm isodense tumor with avid contrast enhancement and some necrotic zones in the right ethmoid and maxillary sinuses, extended in to the orbital apex and anterior cranial base invasion. A left external carotid ligature was performed in order to reduce the blood flow of the lesion and them an endonasal endoscopic approach extended to the anterior cranial base and right orbit was performed. Histological findings confirmed a clear cell renal carcinoma metastases. Unless anterior cranial base RCC metastases are unusual might be considered in any vascularized tumor of the region with severe epistaxis, with or without history of renal cancer. Preoperative ligature/embolization of external carotid/maxillary artery can diminish the blood flow and facilitate the tumor resection. Endonasal endoscopic surgery constitutes a good option with minimal morbidity and faster recovery facilitating early adjuvant treatment.

Keywords: Metástasis, Renal cell carcinoma, Anterior cranial base, Minimally invasive surgery.

Introduction

Metastases to the paranasal sinuses and anterior cranial base are rarely found; among them, RCC is the most common cancer to metastasize to this region (49%) followed by lung, breast and gastrointestinal tract [1]. Due their chemo-radioresistence, surgery has a predominant role in most of the patients with RCC metastases [2]. During the last decades minimally invasive approach has been described for most of the primary malignant anterior crania base neoplasm, but there are only few reports of this technic in anterior cranial base metastases [3].

We present the case of a patient with a metachronous ethmoid RCC metastases extended to the anterior cranial base, maxillary sinus and orbital apex (extraconal), operated by means endonasal endoscopic surgery.

Case Report

A 63-year-old female patient was referred to our institution with a

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previous history of right nephrectomy for clear cell renal carcinoma 9 years ago and surgery for thyroid metastases 3 years ago. Interferon-alpha was initiated as adjuvant treatment. She suffered a 9-month history of a nasal obstruction and recurrent massive spontaneous epistaxis.

At admission, nasoendoscopy revealed a hyperemic polipoid mass occupied the middle meatus easy bleeding on touch (Figure 1A). Neurological and ophthalmological exam were negative. There were not cervical lymph nodes associated. Preoperative local biopsy was not performed due to the history of severe epistaxis and the high risk of massive bleeding during the procedure.

The initial laboratory findings showed low hemoglobin level of 9 g/dl without other hematological alterations. With medical treatment (Iron and C-vitamin) before surgery hemoglobin level improve to 11 g/dl.

CT revealed a well-circumscribed 5.2 × 4.9 cm isodense tumor with avid contrast enhancement and some necrotic zones in the right ethmoid and maxillary sinuses, extended in to the orbital apex and anterior cranial base invasion (Figure 2 A-D). Vascular reconstruction revealed a high-vascularized lesion that receives supply from right sphenopalatine artery and both anterior and posterior ipsilateral ethmoidal arteries (Figure 1B).

The patient underwent surgery. First, a left external carotid ligature was performed in order to reduce the blood flow of the lesion (Figure 3A). An endonasal endoscopic approach extended to the anterior cranial base and right orbit was performed. During nasal step a right vascularized nasoseptal flap was performed take account the integrity of nasal septum (Figure 3B). Them, a wide septostomy (posterior two thirds of nasal septum) was perform in other to facilitated a binarial approach using four hands two surgeon's technic as previously reported [4]. Then, centripetal removal of the lesion was carried out until both choanas and sphenoidal rostrum were visible (Figure 3C). After that, a wide sphenoidotomy was performing in order to expose the posteroinferior margin of the dissection and to use both optocarotid recess as landmarks (Figure 3D).

The frontal sinus was approached by Draf type III sinusotomy that represents the anterosuperior margin of the dissection (Figure 3E). After that, a sub-periosteal dissection of the naso-ethmoidal-sphenoidal complex was performed bilaterally to expose the lateral margins. Endoscopic medial left maxillectomy type III was performed to remove the maxillary component of the tumor and obtain good control of the whole maxillary sinus. During this step, the residual tumor was avascular (Figure 3F and G). The anterior two thirds of orbital floor and left lamina papyracea were included in the dissection. The periorbita limited the tumor extension and have been removed in order to obtain better oncological margins. The crista galli was carefully detached from the dura mater and removed with blunt instruments. Then, the dura mater was incised and circumferentially cutting with a falciform scalpel at a safe distance from the suspected area of tumor spread. The falx cerebri was sectioned in an anterior posterior way at the level of the spheno-ethmoidal planum (Figure 3H). Fortunately, there was not brain invasion. The surgical margins were checked by frozen section.

The resulting skull base defect was reconstructed by the endoscopic endonasal multilayer technique using autologous underlay fat, inlay fascia and nasoseptal flap (Figure 3I). A Foley catheter balloon maintained the nasoseptal flap until the fifth day postoperative when it was removed. The flap was observed well attached, viable and there were not postoperative fistulae.

Surgical bleeding was 1500 ml and surgical time was 290 minutes. Patient requires blood transfusion during transoperative and postoperative period due the low hemoglobin levels (7 g/dl). There were not transoperative or postoperative complications (except anemia). The patient was extubated in the operating room and passes the first 24 hours in Intensive Care Unit. The 24 hours CT scan showed minor frontal pneumoencephalus without hematoma or other complications and confirm the total removal of the lesion (Figure 2E-H). The hospital stay was 7 days.

Trans-operative pathology report suggested typical epithelial tissue and clear- cytoplasm cells. Definitive histological exam revealed polygonal cells with typical clear cytoplasm's corresponding with clear cell renal cell carcinoma metastases.

Metastatic workup doesn't found other possible metastases. The patient was immediately discussed in our staff and referred to immunotherapy and treatment with sunitinib. After the surgery, the recurrence of the nasal mass was not observed and the patient continued with sunitinib (30 mg daily). On the 36th month of follow-up, recurrence has not been found in the nasal cavity, orbit or anterior cranial base.

Discussion

RCC is termed as the "internist's tumor" because of its multiple unusual signs and symptoms mimicking the local tissue pathology [5]. Between 20 and 30 % of patients will present with metastatic disease at initial diagnosis, and as high as 40 % will show metastasis following primary surgical treatment [6]. Frequent metastatic sites include lungs (75%), regional lymphatic nodes (65%), bone (40%), liver (40%) and brain (5%) [7]; and unusual sites are thyroid, pancreas, skeletal muscle, skin and a soft tissue. Otherwise, metastasis to the head and neck region represent for almost 15% of the cases, affecting in order of frequency the paranasal

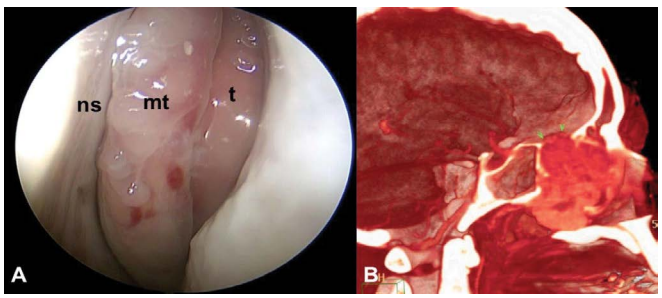

Figure 1: A: endoscopic view of the tumor situated laterally of middle turbinate occupying middle meatus. B: 3D CT scan reconstruction showed the markedly vascularized tumor and the limited anterior cranial base invasion (green arrows). mt: middle turbinate; ns: nasal septum; t: tumor.

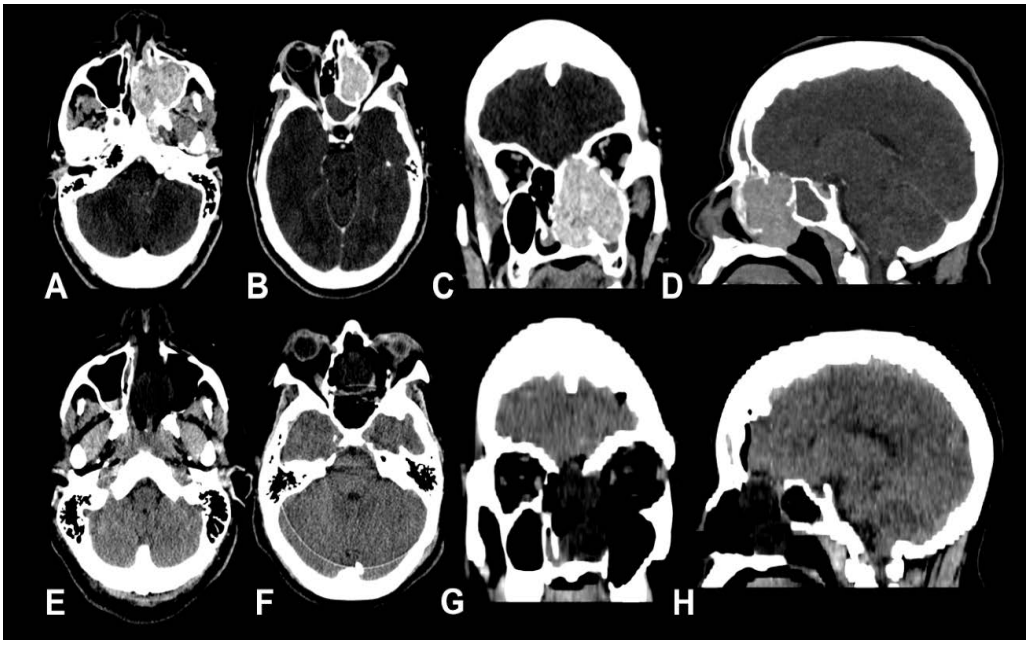

Figure 2: Pre-and postoperative post-contrast CT scans. A: axial preoperative CT scan showed the maxilar sinus extension. B: axial preoperative CT scan showed the extraconal orbital apex extension. C: preoperative coronal reconstruction showed the anterior cranial base erosion. D: sagittal preoperative reconstruction showed the anterior cranial base inclusion and the spared frontal and sphenoid sinuses. E, F, G, H: postoperative images exhibited the completely resection of the lesion including safe oncological margins (anterior cranial base, papiracea, nasal septum and ethmoid box).

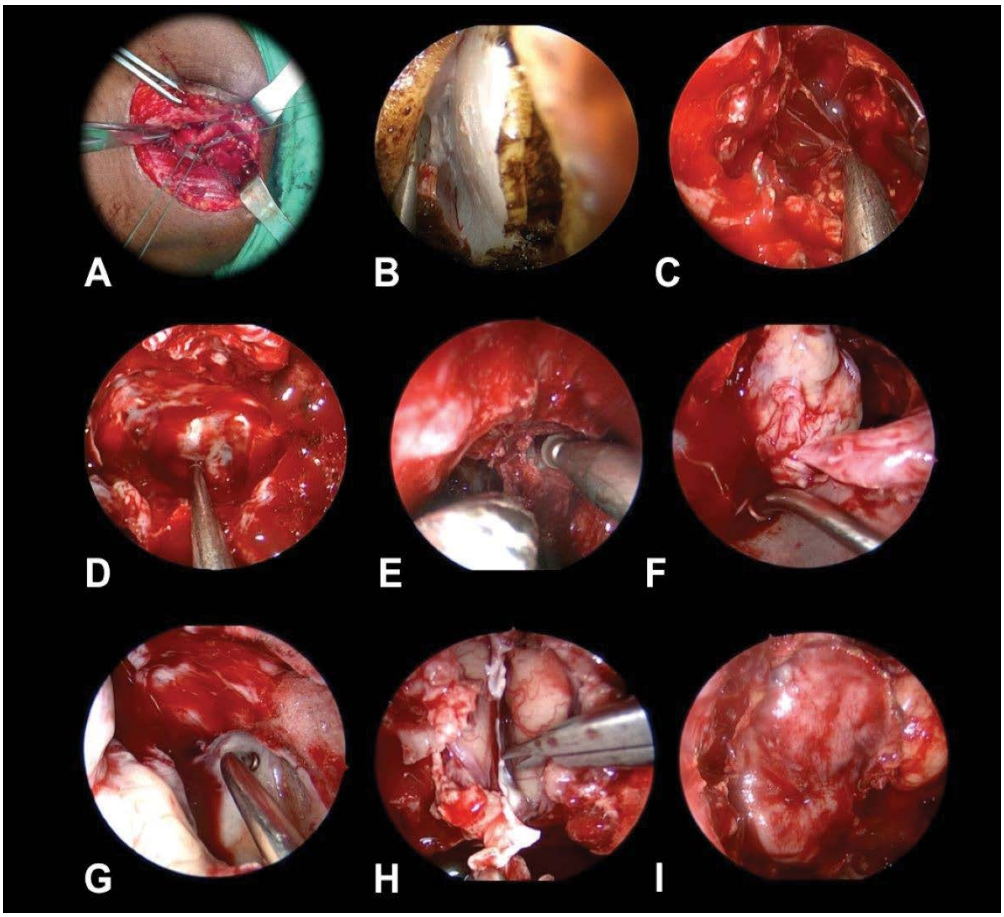

Figure 3: Different surgical steps. A: during the external carotid artery ligation. B-H: endoscopic views. B: performing a pediculate vascularized nasoseptal flap. C: during the centrifugal debulking of the tumor. In spite of external carotid ligature tumor was markedly bleeding due the ethmoidal arteries feeding. D: execution of a wide sphenoidotomy. E: performing a Draft III procedure (Lothrop modificated). F: Once ethmoidal arteries were coagulated the residual tumor was avascular. G: removing tumor (left) from the maxillary sinus (right). H: resecting the anterior cranial base dura. I: nasoseptal flap covering entering the cranial base defect.

sinuses, the larynx, jaws, temporal bones, thyroid, and parotid glands [8]. Other authors report thyroid metastases as the most common RCC metastases of head and neck region [9-10]. On the other hand, RCC is the most common infra-clavicular primary neoplasm that metastatizes to the nasosinusal region [1]. Up to present, almost 105 cases of maxillary metastases and 21 cases of ethmoid metastases from RCC have been reported [1]. Interesting, patient had two metastases situated in head and neck region: thyroid and ethmoid.

Clinical manifestations of RCC can anticipated the primary site manifestations. In this case, differential diagnosis with other vascularized or malignant neoplasm of the region should be done. Although extremely rare, is important take in count the possibility of primary nasosinusal clear cell carcinoma, with the help of special stains, immune-histochemical testing and radiological evaluations [11]. On the other hand, presentations can be synchronous or metachronous. There are reports of late metastases after years or decades of potentially curative surgical excision of the primary tumor [12-14]. Metachronous metastatic disease has been reported to develop in 50% of patients with RCC, in those who have undergone a curative radical nephrectomy as seen with this patient [15]. The interval between nephrectomy and the development of metastases is considered to be a prognostic indicator [16].

There are two potential hematogenous routs for RCC tumor cells spread to the nasosinusal region: (1) arterial way bypassing pulmonary capillary filtration and; (2) venous way through extensive anastomosis between the Batson avalvular vertebral venous plexus and the intracranial venous plexus [17]. The tumor cells spread on the first way thru the classical pathway across the inferior vena cava, lungs, heart, aorta, common carotid, external carotid and maxillary arteries; in these cases, concurrent lung or brain metastases might be present. On the other hand, second route include vertebral plexus, the intracranial venous plexus, and the cavernous venous plexus through venous anastomoses, to reach the maxillary sinus or the ethmoidal box. In these cases, the nasosinusal region may be the only site of metastasis [18]. In this case, arterial route is more probable due the presence of previous thyroid metastases.

RCC metastases of nasosinusal and anterior cranial base region have similar radiological appearances to the primary malignant lesions. The enhancement, destruction and lack of tumor calcification should suggest metastatic hypernephroma [19]. Like this case report, other authors described the absence of destruction of the surrounding bone structures [14].

Metastatic RCC is resistant to chemotherapy and radiotherapy been surgery the first therapeutic option [20]. Removal of the primary tumor and the excision of metastatic lesions have demonstrated favorable outcomes in mostly retrospective studies during the immunotherapy period [2,21].

Otherwise, due the fact that any metastatic tumors of renal origin develop in multiples, such as in the lung or liver, but most metastatic tumors in the nasosinusal region are single, furthermost of the patients with a single, resectable, metastatic RCC in the sinonasal cavity should be treated aggressively with metastasectomy in order to extended survival before further disease progression [16].

Surgical management of RCC nasosinusal metastases offers the best chance for long-term survival, local control [2,14] and reduces pain, epistaxis, and disfigurement from the expanding tumor. However, it represent a challenge like other vascularized nasosinusal tumors like hemangiopericytoma, hemangioma, or angiofibroma [22] due the fact that the most common histologic subtype of RCC is clear cell representing an 85% and this subtype is associated with loss of function of the con Hippel-Lindau gene, which regulates hypoxia-induced factor (HIF), increasing the function of vascular endothelial growth factor (VEGF) and subsequently increases the angiogenesis and vascularity of the tumor [18]. Consequently, sinonasal metastastasis are prone to severe epistaxis or trans operative blood loss.

During the last decades, minimally invasive approach has been described for most of the primary malignant anterior cranial base neoplasm, but there are only few reports of this technic in anterior cranial base metastases, most of them limited to nasosinusal region 3 and not to the orbit or anterior cranial base extension [23]. On the other hand, those reports are circumscribed only for a limited number of patients. This case shows the feasibility of endonasal endoscopic surgery in those cases.

Several agents targeting VEGF and non-VEGFR pathways have been proposed during the last decade for the management of advanced RCC [24,25].

Whereas these tumors are primarily described as radio-resistant, some authors reported good radiation responses (palliative response in 86% of treated patients) 26. The patient does not refer to radiotherapy because of the macroscopically total removal with oncological margins of the lesion.

The prognosis of patients with metastatic RCC is poor with a median survival of 7-11 months. However, excision of solitary metastatic lesion of renal cell carcinoma following nephrectomy results in a 41% survival at 2 years and 13% survival at 5 years [26,27]. Unfortunately, patients with multiple RCC metastases have a 5-year survival rate less than 7% [28].

Conclusion

Unless anterior cranial base RCC metastases are unusual might be considered in any vascularized tumor of the region with severe epistaxis, with or without history of renal cancer. Preoperative ligature/embolization of external carotid/maxillary artery can diminish the blood flow and facilitate the tumor resection. Endonasal endoscopic surgery constitutes a good option with minimal morbidity and faster recovery facilitating early adjuvant treatment.

Competing Interests

The authors declare that they have no competing interests.

References

1. Prescher A, Brors D (2001) Metastases to the paranasal sinuses: case report and review of the literature. Laryng Rhino Otolol 80: 583-594.
2. Kim DY, Karam JA, Wood CG (2014) Role of metastasectomy for metastatic renal cell carcinoma in the era of targeted therapy. World J Urol 32: 631-642.
3. Heo SJ, Kwon TG, Kim JS (2016) Metastatic Renal Cell Carcinoma in the Paranasal Sinus: A Case Report and Literature Review. Korean J Otorhinolaryngol-Head Neck Surg 59: 877-881.
4. Castelnuovo P, Pistochini A, Locatelli D (2006) Different surgical approaches to the sellar region: focusing on the "two nostrils four hands technique." Rhinology 44: 2-7.
5. Weiss RH, Lin PY (2006) Kidney cancer: Identification of novel targets for therapy. Kidney Int 69: 224-232.
6. Russo P (2011) The role of surgery in the management of early- stage renal cancer. Hematol Oncol clin North Am 25: 737-752.
7. Flanigan RC, Campbell SC, Clark JI (2003) Metastatic renal cell carcinoma. Curr Treat Options Oncol 4: 385-390.
8. Rally M, Altissimi G, Turchetta R, Rigante M (2017) Metastatic Renal Cell Carcinoma Presenting as a Paranasal Sinus Mass: The Importance of Differential Diagnosis. Case Reports in Otolaryngol Article ID 9242374: 5.
9. Gottlieb MD, Roland JT Jr (1998) Paradoxical spread of renal cell carcinoma to the head and neck. Laryngoscope 108: 1301-1305.
10. Heo SJ, Kwon TG, Kim JS (2016) Metastatic Renal Cell Carcinoma in the Paranasal Sinus: A Case Report and Literature Review. Korean J Otorhinolaryngol-Head Neck Surg 59: 877-881.
11. Stasia Teo D, Lim L, Razak Ahmad A, Rao Ramanna V, Esa N (2015) Primary Sinonasal Clear Cell Carcinoma: Case Report. Med J Malaysia 70: 112-113.
12. Park YH, Baik KD, Lee YJ, Ku JH, Kim HH, *et al*. (2012) Late recurrence of renal cell carcinoma >5 years after surgery: clinicopathological characteristics and prognosis. BJU Int 110: E553-E558.
13. Ziari M, Shen S, Amato RJ (2006) Metastatic renal cell carcinoma to the nose and ethmoid sinus. Urology 67: 199e21-199e23.
14. Kovačić M, Krvavica A, Rudić M (2015) Renal cell carcinoma metastasis to the sinonasal cavity: case report. Acta Clin Croat 54: 223-226.
15. Arai Y, Ito K, Tachi K, Koga A, Shinchi Y, *et al*. (2016) Metastatic Renal Cell Carcinoma in Paranasal Sinus for which Periodic Drug Withdrawal Schedule of Axitinib was Effective: A Case Report. Hinyokika Kiyo 62: 465-471.
16. Hemlata D, Prassana KS, Monali PM, Mahesh CS, Rabindra NP, *et al*. (2015) A Case Report on Nasal Metastasis of Renal Cell Carcinoma. Adv. Biores 6: 149-151.
17. Boles R, Cerny J (1971) Head and neck metastases from renal carcinomas. Mich Med 70: 616-618.
18. Lee SM, Kim YM, Kim BM (2016) Epistaxis as the First Manifestation of Silent Renal Cell Carcinoma: A Case Report with Relevant Literature Review. Iran J Radiol 13: e31208.
19. Simo R, Hargreaves SP, Axon PR, Slevin NJ (2000) Metastatic renal cell carcinoma to the nose and paranasal sinuses. Head and Neck 7:722-727.
20. Ather MH, Masood N, Siddiqui T (2010) Current management of advanced and metastatic renal cell carcinoma. Urol J 7: 1-9.
21. Krishnamurthi V, Novick AC, Bukowski RM (1998) Efficacy of multimodality therapy in advanced renal cell carcinoma. Urology 51: 933-937.
22. Snyderman CH, Pant H (2016) Endoscopic Management of Vascular Sinonasal Tumors, Including Angiofibroma. Otolaryng Clin N Am 49: 791-807.
23. Zacharia BE, Romero FR, Rapoport SK, Raza SM, Anad VK, *et al*. (2015) Endoscopic Endonasal Management of Metastatic Lesions of the Anterior Skull Base: Case Series and Literature Review. World Neurosurg 84: 1267-1277.
24. Rini BI, Melichar B, Ueda T, Grünwald V, Fishman MN, *et al*. (2013) Axitinib with or without dose titration for first-line metastatic renal-cell carcinoma: a randomised double-blind phase 2 trial. Lancet Oncol 14: 1233-1242.
25. Escudier B, Pluzanska A, Koralewski P, Ravaud A, Bracarda S, *et al*. (2007) Bevacizumab plus interferon alfa-2a for treatment of metastatic renal cell carcinoma: a randomized, double-blind phase III trial. The Lancet 370: 2103-2111.
26. Terada T (2012) Renal cell carcinoma metastatic to the nasal cavity. Int J Clin Exp Pathol 5: 588-591.
27. Dineen MK, Pastore RD, Emrich LJ, Huben RP (1998) Results of surgical treatment of renal cell carcinoma with solitary metástasis. J Urology 140: 277-279.
28. Cheng ET, Greene D, Koch RJ (2000) Metastatic renal cell carcinoma to the nose. Otolaryng Head Neck 122: 464.

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