Recurrent Myofibrosarcoma of the Sinonasal Tract Treated with Postoperative Radiation Therapy

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ABSTRACT

Myofibrosarcomas (MFSs) of the sinonasal tract are exceedingly rare tumors in adults. The principle treatment of MFS of the head and neck is surgical. However, aggressive surgery is not only debilitating, functionally and cosmetically, but tumor free margins are often difficult to obtain because of the local anatomy, and recurrence following surgery is likely. Here we report on a 64-year-old female patient who had a recurrence of an MFS of the sinonasal tract, despite prior aggressive surgery. The recurrence was successfully treated with a partial tumor resection followed by radiation therapy. To our knowledge, this is the second reported case of an MFS originating from the sinonasal tract in an adult, and the first treated with postoperative radiation therapy. This case indicates that postoperative radiation therapy may be beneficial in local disease control in such patients. However, more experience is needed to determine the efficacy of this therapeutic approach.

Keywords: Myofibrosarcoma, Sinonasal tract, Recurrence, Radiation therapy

ÖZET

Postoperatif Radyoterapi ile Tedavi Edilmiş Sinonazal Reküren Myofibrosarkom

Sinonazal bölge miyofibrosarkomu erişkin yaşta oldukça nadir görülen bir tümör olup daha önce rapor edilmiş sadece bir vaka bulunmaktadır. Baş-boyun miyofibrosarkomlarının güncel tedavisi tümörün cerrahi olarak çıkarılmasıdır. Ancak, tümörün yerleşim yeri nedeniyle cerrahi bir yandan fonksiyonel ve kozmetik olarak ağır hasarlara sebebiyet verebilmekte, öte yandan negatif cerrahi sınır elde edilmesi oldukça zor olmakta ve dolayısıyla hastalık nüksüne sıklıkla rastlanmaktadır. Literatüre katkıda bulunabilmek amacıyla agresif cerrahi sonrası lokal nüks gösteren ve parsiyel cerrahiyi takiben radyoterapi uygulanan bir diğer primer sinonazal miyofibrosarkomu olgusu takdim edilmiştir. Bildiğimiz kadarıyla bu olgu erişkin yaşta tespit edilmiş ikinci sinonazal bölge miyofibrosarkomu olup aynı zamanda literatürde postoperatif radyoterapiyle başarılı bir şekilde tedavi edilmiş ilk olgudur. Bu sonuç postoperatif radyote-rapinin bu hastalık gurubunda lokal kontrolün sağlanmasında etkin bir yöntem olabileceğini işaret etmektedir.

Anahtar Kelimeler: Miyofibrosarkoma, Lokal nüks, Sinonazal bölge, Radyoterapi

INTRODUCTION

The first case of myofibrosarcoma (MFS) was identified by Eyden et al.[1] in 1992. MFS is more common in adults and has a predilection for the extremities, trunk, and abdominal/pelvic cavities. MFS of the head and neck region is exceedingly rare and preferentially involves deep soft tissues of the oral cavity; especially the tongue. Involvement of the sinonasal tract, including the paranasal sinuses and nasal cavity, is exceedingly rare, and to our best knowledge, only one case of adult MFS of this region has been reported in the literature.[2]

Aggressive surgery is the principle treatment modality of MFSs originating in the head and neck region. However, because of the complex anatomical structure of this region, it is extremely difficult to obtain tumor free margins, and local recurrences following surgery are almost unavoidable. Furthermore, aggressive surgery is frequently associated with severe functional and cosmetic drawbacks, which may cause physical and psychosocial detrimental effects in patients' lives. At that point, it appears that adjuvant treatment modalities are needed to increase the local-regional control. In childhood MFS, chemotherapy and radiation therapy (RT) were reported to be ineffective.[3] However, to our knowledge, no report has been published regarding the role of adjuvant RT in MFS of the head and neck region in adults. RT has been demonstrated, in a limited manner, to increase local control rates in mesenteric and lower extremity MFSs[4], suggesting a possible role for its use in the head and neck.

Here we report on a case of MFS involving the left nasal cavity, hard palate, left maxillary/sphenoid and cavernous sinuses, and orbital bone, which recurred despite prior aggressive surgery. The recurrence was successfully treated with partial tumor resection and curative local irradiation. To the best of our knowledge, this is the first report showing the effectiveness of RT in sinonasal tract MFSs.

CASE REPORT

A 64-year-old female was referred to our clinic in February 2004 with the complaint of a painful mass obstructing the left nasal cavity. Her medical history revealed a tumor excision with a lateral rhinotomy approach in September 2003. According to the surgical report, the tumor mass originated in the left nasal cavity and continued through and destroyed the medial portion of the left orbital bone and medial wall of the left maxillary sinus. The pathological report identified the tumor as an MFS originating from the left nasal cavity.

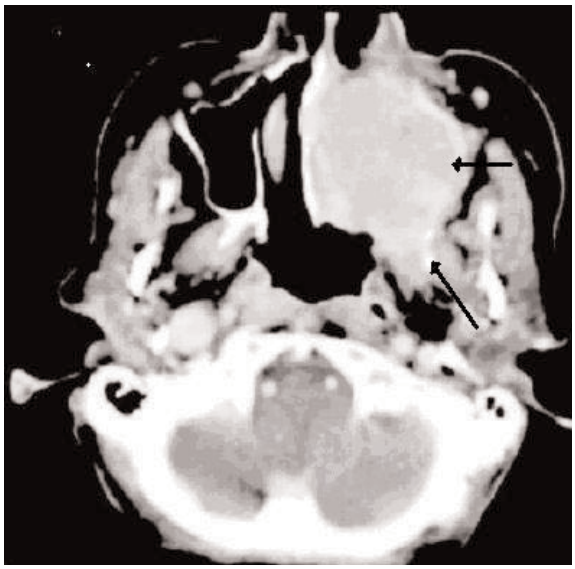

Figure 1. Solid tumor mass on computerized tomography encompassing left maxillary sinus and lower nasal cavity; the tumor invaded and destroyed the neighboring structures.

Upon referral, the patient reported that, following a 3-month period of relief of pain and obstructive symptoms, a painful mass occurred in her left nasal cavity and continued to grow over the past 2 months, leading to nasal obstruction with resultant breathing difficulty. On physical examination, there was a firm, hard, 3 x 3 cm mass protruding from the left naris that completely obstructed the left nasal passage. Computerized tomography revealed a contrast enhancing 6.5 x 5.5 cm tumor encompassing the left maxillary sinus and lower portion of the nasal cavity, and invading the hard palate and left sphenoid/cavernous sinuses superiorly. The tumor had destroyed the walls of the left maxillary sinus and nasal septum (Figure 1). Thus, partial tumor resection was performed by a lateral rhinotomy approach.

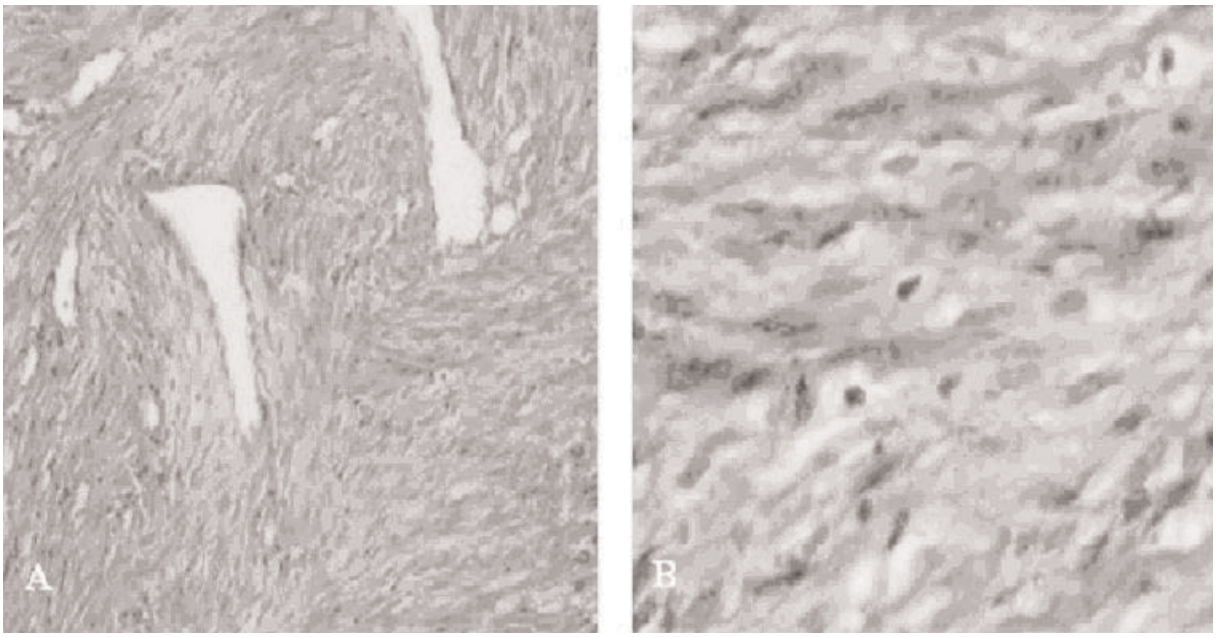

Figure 2. (A) Micrograph of the tumor showing atypical spindle shaped tumor cells forming a fascicular bundle pattern, and atypical, irregularly proliferated fibroblast-like spindle or satellite cells (hematoxylin and eosin, x40). **(B)** The same histologic features at a higher magnification (hematoxylin and eosin, x400).

The pathologic examination revealed atypical spindle cells showing a fascicular bundle growth pattern, and fibroblast-like spindle or satellite cells those proliferated in an irregular pattern. The tumor cells had fusiform pleomorphic nuclei and prominent nucleoli together with pale eosinophilic indistinct cell borders. Focal bone destruction and scattered foci of tumor necrosis were present (Figure 2). Ultrastructurally, the tumor cells showed abundant rough endoplasmic reticulum and subplasmalemmal actin microfilaments structured in parallel arrays with scattered dense bodies. Scattered pinocytic vesicles, intercellular gap junctions, and cell stromal attachments were apparent and thought to correspond to fibronexus, as defined by Singer et al5. Immunohistochemical examination revealed dense positivity for muscle-specific actin, vimentin, and fibronectin, but all cells were negatively stained with desmin and S100. All of these features were consistent with a diagnosis of MFS.

Considering the unfavorable factors, including its recurrent nature and aggressive growth pattern, the tumor was considered to have a high-risk for local recurrence. Thus, a total of 66 Gy adjuvant RT (2 Gy per fraction, 33 fractions, Monday to Friday) was administered to the patient. The planning target volume (PTV) was defined to encompass the gross tumor volume (GTV) with 2 cm margins at each side. Radiation therapy was applied by using 6MV high energy photons and double-wedge fields. Treatment was well tolerated without significant toxicity and no treatment delay was required. Her follow-up evaluations including physical examination and radiologic imaging revealed no evidence of recurrence, and the patient was free of disease progression 39 months after the contuniation of RT.

DISCUSSION

MFSs are a group of malignant soft tissue tumors predominantly composed of differentiated myofibroblasts. These tumors have been reported to occur in patients between 7 to 85 years of age with no gender preference.[4,5] Although MFSs of the head and neck region are rare, when they affect this area they show a predilection for the mandible, face, tonsils, scalp, mastoid, and thyroid regions6. Involvement of the sinonasal tract, including the parana-

sal sinuses and nasal cavity, is exceedingly rare, and, to our knowledge the present case is the second reported adult MFS of this region.

In a previous case reported by Kondo et al.[2], the tumor occupied the nasal cavity and nares, maxillary, sphenoid, and ethmoid sinuses in a 77-year-old female. In our patient, a larger area including the left nasal cavity, hard palate, left maxillary/sphenoid and cavernous sinuses, and left orbital bone were infiltrated by the tumor. Although our experience with these adult tumors is limited, evidence from childhood head and neck fibrosarcomas showed that MFSs of that region may present in various ways: as asymptomatic masses or firm, growing masses associated with painful swelling or other symptoms.[3,4,7] In the report by Kondo et al.[2] the patient's symptoms were not specified; however, in our patient, the tumor was painful and caused nasal obstruction and difficulty breathing.

On gross examination the head and neck MFSs are solid and gray to tan in color.[3] Morphologically, MFSs are composed of spindle shaped tumor cells with either tapered or plump ovoid nuclei and a small nucleolus and eosinophilic cytoplasm, often with uncertain cell boundaries.[5] Tumor cells are commonly separated by bundles of collagen fibrils. The characteristic, ultrasturctural features of cells of a myofibroblastic lineage include abundant rough endoplasmic reticulum and peripheral or subplasmalemmal actin microfilaments in parallel arrays with scattered dense bodies. Intercellular intermediate and gap junctions, cell-stroma attachments (fibronexus), and pinocytic vesicles are rarely reported and are incomplete or abnormally developed in neoplastic cells.[1,6,8] However, the concept of a sarcoma composed predominantly or exclusively of myofibroblasts is controversial[9,10]; furthermore, defining the exact cell type with certainty is often difficult or impossible, due to morphologic overlap with smooth muscle cells.[4] Given these limitations, immunohistochemical positivity for actins and desmin may indicate myofibroblastic differentiation4. However, these antigens may be found in other cell types, including smooth muscle cells, and some myofibroblasts may express only vimentin. Thus, to make a definitive diagnosis of MFS, on must consider the pathological, ultrastructural, immunohistochemical, and clinical features together. In our patient, the diagnosis of MFS was based on the morphological and ultrastructural features of the tumor cells, tumor microenvironment, and immunohistochemical positivity for muscle specific actin, vimentin and fibronectin. These features correlated with descriptions in the literature.

The principle treatment of MFS of the head and neck region is surgical. However, aggressive surgery is not only debilitating, functionally and cosmetically, but frequently tumor free margins are difficult to obtain because of the anatomy of the region. As a result, tumor recurrence following surgery is frequent. Thus adjunctive therapies are clearly needed to increase the local-regional control of the tumor. RT and chemotherapy are good candidates for this purpose, but unfortunately both modalities were reported to be ineffective in childhood MFSs.[3] To our knowledge, no reports have examined the role of RT in MFSs of the head and neck region. However, although the evidence was limited, RT was shown to be effective in locally controlling mesenteric and lower extremity MFSs[4], suggesting a possible role for RT in these tumors in the head and neck. In a report of Montgomery et al.[4], median local control rates following local excision and adjuvant RT for mesenteric and lower extremity MFSs were 11 and 144 months, respectively. In our patient, the tumor was recurrent, and complete resection with tumor free margins was not possible; thus, RT was administered as an adjunct to partial excision. Evidence of local control during the 43 months of follow-up suggests that RT may provide local tumor control in MFSs of the sinonasal tract.

In conclusion, we have presented a case of sinonasal tract MFS, a rare tumor on which published research is limited. To our knowledge, this is the second case of sinonasal tract MFS reported in the literature, and it demonstrates the highly aggressive local behavior of MFS in the head and neck region despite aggressive surgery. Although the treatment for this patients was not standard, the outcome, to date, suggests the possibility of disease control with RT. Thus, we believe that use of RT as an adjunct to surgery, with this fractionation and dosing schedule, may be useful in MFSs of the head and neck. However, more experience is needed to accurately assess the efficacy of this approach.

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