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Case Report

Radiation-Induced Low Grade Fibromyxoid Sarcoma of the Larynx: a Case Report and Literature Review

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Abstract

Low grade fibromyxoid sarcoma (LGFMS) is an uncommon variant of fibrosarcoma with high risk of local recurrence, immense metastatic potential and frequently protracted period between tumour presentation and metastasis. This unusual malignancy rarely affects the region of the head and neck which makes cases of laryngeal LGFMS extremely infrequent. To date, LGFMS of the larynx has been scatteredly mentioned in the literature. Neither incidence nor causes and risk factors for laryngeal LGFMS have been clarified so far. To the authors' knowledge, this is the first case report that discusses the clinical course, imaging diagnosis, histopathological evaluation and surgical approach to radiation-induced laryngeal LGFMS.

We present a case of a 70-year-old man who developed a LGFMS after previous radiotherapy (RT) for squamous cell carcinoma (SCC) of the larynx. The latency period between the time of radiation exposure and the diagnosis of LGFMS was twenty-seven months. After re-confirming the diagnosis with second biopsy and extensive imaging evaluation the patient was subjected to an open partial resection of the larynx. Owing to the rarity of the tumour, there is no established protocol with follow-up recommendations.

This case highlights the importance of considering the RT history of the patient in order to monitor radiotherapy-related complications, including the occurrence of LGFMS.

Keywords

rare, soft tissue, tumour

INTRODUCTION

Low grade fibromyxoid sarcoma (LGFMS) is a rare variant of fibrosarcoma. It is characterized by a high risk of local recurrence, an immense metastatic potential and protracted period between tumour presentation and metastasis.[1,2] LGFMS is a well-described but sporadically observed neoplasm which makes it easily misdiagnosed; hence it is with undetermined incidence rate.[3,4] Usually, middle aged adults are affected.[5,6] Laryngeal LGFMS cases have been scatteredly mentioned in the literature with only a few contributable to previous radiation therapy.[3,6-8] We present a case of radiation-induced LGFMS of the larynx. Imaging findings, surgical approach, histopathology and immunohistochemistry are discussed.

CASE REPORT

A 68-years-old man presented to the hospital with dysphonia. Histopathology following endoscopic cold-steel excision revealed moderately differentiated squamous cell carcinoma (SCC) with no signs of regional or distant spread (T1N0M0). After completion of cobalt RT with a total dose of 60 Gy, the patient was discharged. Twenty-seven months after the RT, the patient presented with dyspnea. Endoscopy and enhanced computed tomography (CT) detected an exophytic lesion measuring 2.1×2.3×3.4 cm in close proximity to the former SCC ***(Fig. 1)****. Following the endoscopic debulking of the tumour, the patient was soon discharged.*

Histopathology revealed lesions lined by keratinized stratified squamous epithelium surrounded by myxoid areas with curvilinear blood vessels ***(Fig. 2A, 2B)****, foci of necrosis and mitotic figures. Tumour cells were spindle shaped with irregular eosinophilic cytoplasm and elliptical pleomorphic nuclei* ***(Fig. 2C)****. Immunohistochemistry showed CD99* ***(Fig. 3A)****, Vimentin* ***(Fig. 3C)****, and Bcl-2 positive expression (****Fig. 3B****), while EMA was only focally expressed* ***(Fig. 3D)****. Immunoreactivity with MUC4 revealed a characteristic moderate-to-strong and diffuse granular cytoplasmic expression* ***(Figs 3E, 3F)****. AE1/AE3, CK 5/6, p63 expression remained negative.*

DISCUSSION

LGFMS is a rare tumour. Laryngeal involvement is even more rare.[1,6,10,11] Usually, middle-aged adults are affected[2], although pediatric and geriatric cases have been also reported[12,13]. According to Harish et al., this malignancy has a higher incidence rate among males.[5] It has been reported to be aggressive with local recurrence in 68%, metastasis in 41%, and death from disease in 18%.[1,3,6] Typically, LGFMS presents as a painless lesion with a pre-biopsy duration of over 5 years in 15% of patients.[10] However, head and neck LGFMS may have fast clinical presentation.[9,11] LGFMS is sporadically observed neoplasm; hence it is easily misdiagnosed.[3,4] Morphologically, it is characterized by a combination of myxoid and fibrous areas with whorled growth pattern. Tumour cells are small with poor eosinophilic cytoplasm, elliptical nuclei and absent nucleoli. Mitoses or necrosis are infrequent.[1,4,6,14] MUC4 has been shown to be a specific immunohistochemical marker for LGFMS. Still, MUC4-negative neoplasms have been also reported. Usually Vimentin, CD99, EMA and Bcl-2 show positive expression, while S100, desmin, caldesmon, cytokeratin, and CD117 remain negative.[4,6,12] In our case, MUC4, Vimentin, Bcl-2, and CD99 were strongly positive while EMA was only focally expressed. Epithelial markers, in particular AE1/AE3, CK 5/6, and p63 showed negative expression.

To date, the etiology of LGFMS has been little discussed. Some authors have linked this tumour with previous RT. Shibata et al., for instance, described a case of radiation-induced LGFMS of the chest wall in a patient with a history of RT for breast carcinoma 9 years earlier.[8] Marglani and colleagues reported a case of LGFMS of the sternocleidomastoid muscle, 30 years subsequent to RT to the cervical region for Hodgkin lymphoma.[7]

When presented as a RT-related complication in unusual location, LGFMS becomes a challenging issue. And what is challenging is neither the diagnostic procedure, nor the surgical approach. As the diagnosis of LGFMS is usually not difficult, a wide surgical resection is considered

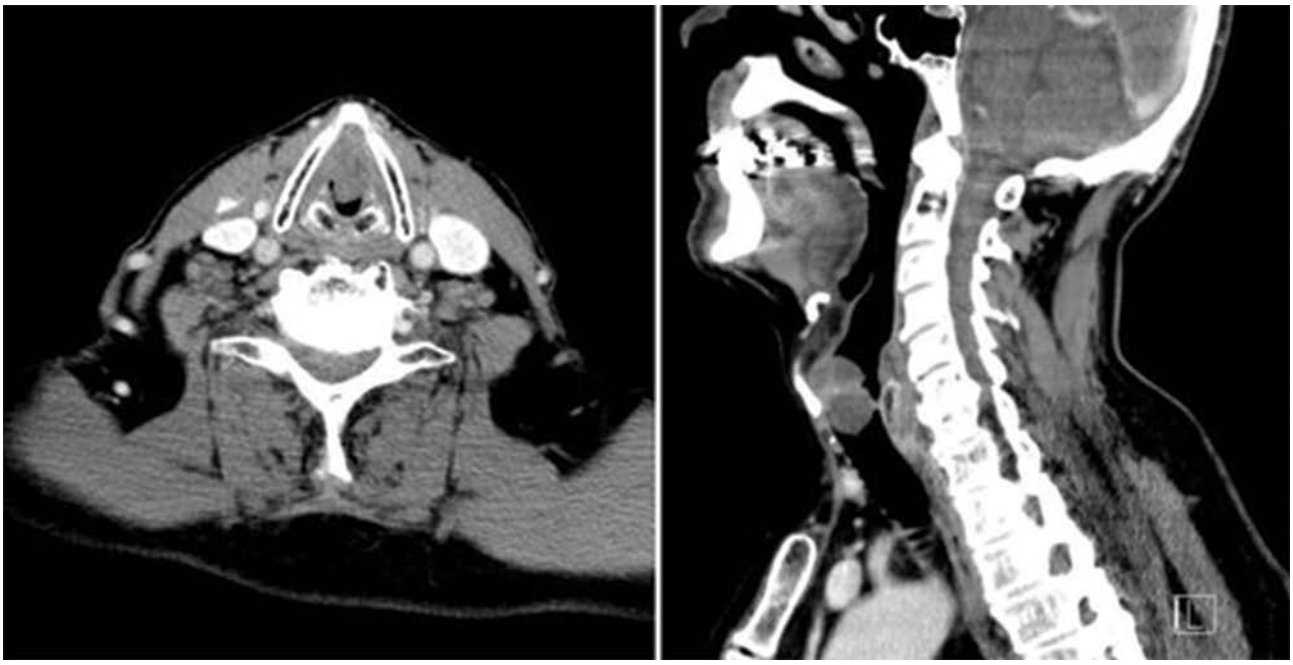

Figure 1. Axial and sagittal CT: well delineated tumour mass in the larynx and critical airway.

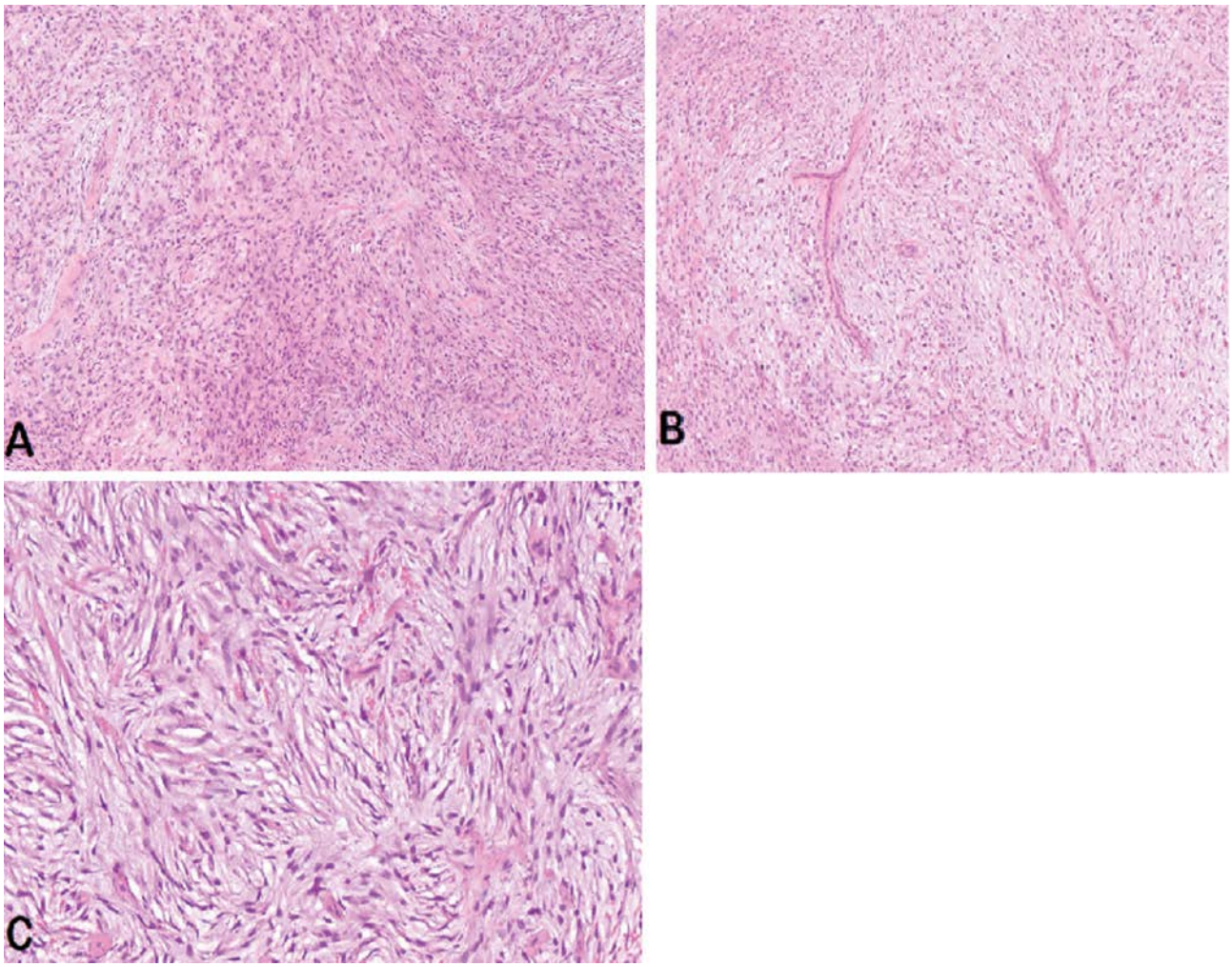

Figure 2. LGFMS with: **A**. Alternating fibrous and myxoid areas. HE stain (×100); **B**. Myxoid area with curvilinear vessels. HE stain (×100); **C**. Swirling and whorled pattern cell arrangement. HE stain (×200).

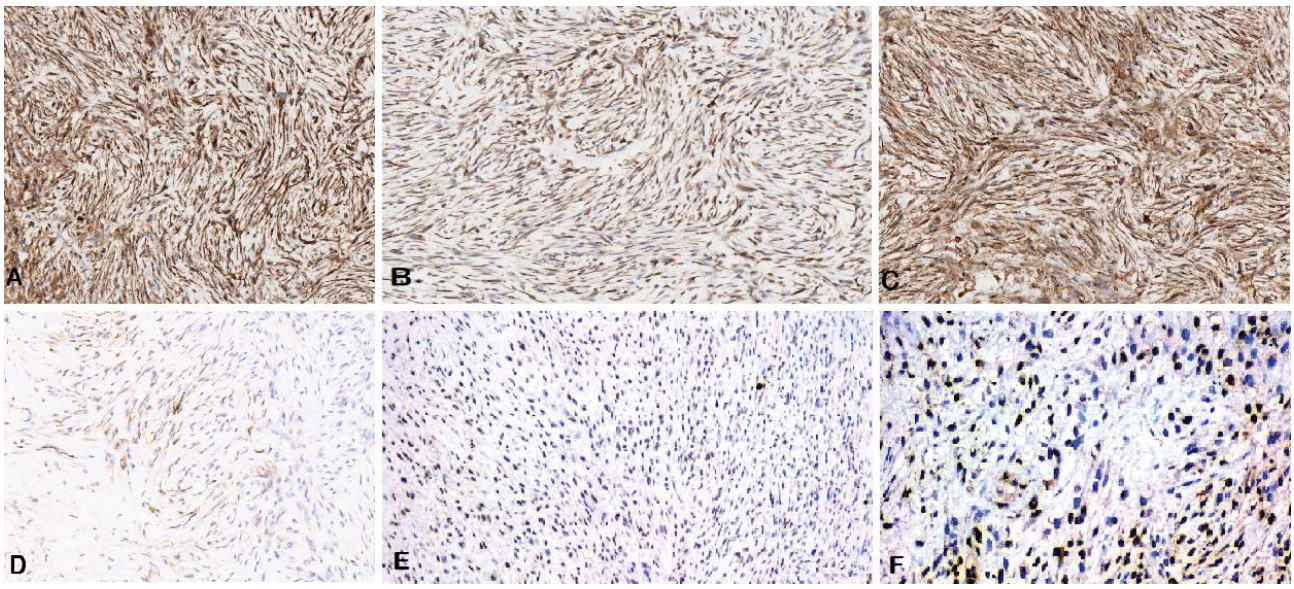

Figure 3. Immunohistochemistry with positive expression for: **A**. CD-99 ×200; **B**. Bcl-2 x 200; **C**. Vimentin ×200; **D**. EMA ×200; **E**. MUC4 ×100; **F.** MUC4 ×400.

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the most adequate treatment approach to LGFMS.[7,9] It is the long-established follow-up that becomes an issue due to protracted period between tumour presentation and metastasis.[1,15] In our case, 27 months after RT for SCC of the larynx, the patient presented with laryngeal LGFMS. **(Fig. 4)** The tumour originated from a region in close proximity to the former SCC. This unusual LGFMS behaviour raises a doubt whether surgery alone is sufficient therapy for this malignancy. And the insensitivity of the LGFMS to RT and CTX stresses the importance of a clinical follow-up performed for an extended period of time.[9,14]

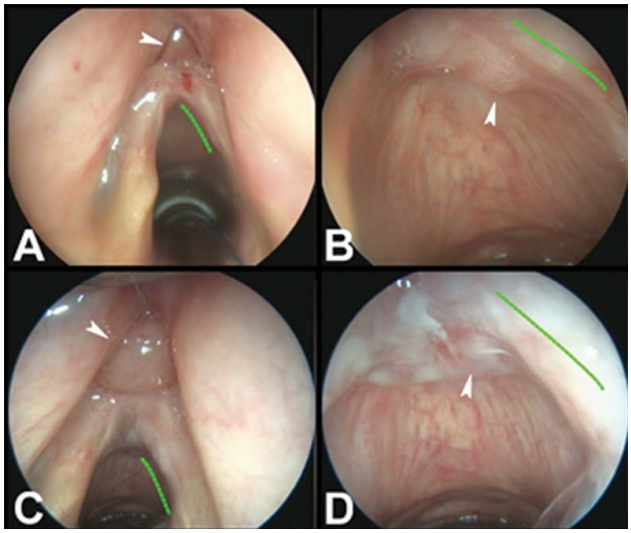

Figure 4. Control endoscopy 2 months after debulking (A&B) and endoscopy 45 days later immediately before frontolateral vertical laryngectomy (C&D). Two residual tumor lesions could be identified (arrows) above the anterior commissure (A&C) and in the subglottic space right from the midline (B&D). The lesions in A&B were excised to confirm their nature so C&D represent regrowth over 45 days. The scar after the initial endoscopic excision and radiotherapy of the initial SCC is marked with the green dotted line.

CONCLUSIONS

We report in detail one of the few cases of laryngeal LGFMS. It appears that it is attributable to a previous RT. To the authors' knowledge, this is the first case report that discusses the clinical course, imaging diagnosis, histopathological evaluation and surgical approach to radiation-induced laryngeal LGFMS. This case stresses the importance of considering the RT history of the patient in order to monitor RT-related complications, including the occurrence of LGFMS.

Potential competing interests

No potential conflict of interest relevant to this article was reported.

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Радиационно-индуцированная фибромиксоидная саркома гортани низкой степени злокачественности: клинический случай и обзор литературы

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Резюме

Фибромиксоидная саркома низкой степени злокачественности (ФМСНСЗ) – это редкий вариант фибросаркомы с высоким риском местного рецидива, огромным метастатическим потенциалом и часто длительным периодом между наличием опухоли и метастазированием. Это необычное злокачественное новообразование редко поражает область головы и шеи, что делает ФМСНСЗ гортани чрезвычайно редкими. На сегодняшний день ФМСНСЗ гортани упоминается в литературе редко. На сегодняшний день не выяснены ни частота, ни причины, ни факторы риска ФМСНСЗ гортани. Насколько известно авторам, это первый клинический случай, в котором обсуждаются клиническое течение, визуализация, гистопатологическая оценка и хирургический подход к ФМСНСЗ гортани, вызванной лучевой терапией.

Мы представляем случай 70-летнего мужчины, у которого развился ФМСНСЗ после предыдущей лучевой терапии (ЛТ) по поводу плоскоклеточного рака (ПКР) гортани. Латентный период между воздействием радиации и постановкой диагноза ФМСНСЗ составлял двадцать семь месяцев. После повторного подтверждения диагноза с помощью второй биопсии и оценки с помощью обширной визуализации пациенту была выполнена открытая частичная резекция гортани. Из-за редкости опухоли протокол для рекомендаций по контролю не разработан.

Этот случай подтверждает важность лучевой терапии в анамнезе пациента для отслеживания связанных с лучевой терапией осложнений, включая наличие ФМСНСЗ.

Ключевые слова

редкий, мягкие ткани, опухоль