

High-grade Spindle Cell Squamous Carcinoma of the Supraglottic Larynx Treated with Definitive Curative Radiation Therapy- A Rare Case Report

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Abstract

Spindle cell carcinoma or sarcomatoid carcinoma is a highly malignant form of squamous cell carcinoma with a low incidence of 2-3% in the larynx. Considering the poor prognosis, early diagnosis and treatment are imperative. This case report describes a high-grade spindle cell carcinoma of the supraglottic larynx treated with definitive radiation therapy.

Keywords: Spindle cell carcinoma; Supraglottic larynx; Radiation therapy; Laryngoscopy.

Introduction

Spindle cell or sarcomatoid carcinoma of the larynx, a highly malignant variant of squamous cell carcinoma is rare and comprises only 2-3% of laryngeal malignancies [1]. It is a biphasic tumor comprising both squamous and spindle cell carcinoma with a sarcomatous-like appearance [2]. Recently, spindle cell carcinoma is considered to be of monoclonal origin evolving from conventional squamous carcinoma with sarcomatoid differentiation [3]. Early diagnosis is imperative for a better prognosis. A rare case of high-grade spindle cell squamous carcinoma of the supraglottic larynx treated with definitive radiation therapy is presented.

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Received Date: 03-30-2023

Accepted Date: 04-06-2023

Published Date: 04-13-2023

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Case report

A 74-year-old female reported progressive hoarseness of voice of 3 weeks duration. The patient was a non-smoker, non-alcoholic, and had no history of radiation exposure to the neck. The patient was a known case of chronic kidney disease, hypertension, and hyperlipidemia and was on medications. On examination with elective micro laryngoscopy under general anesthesia, vocal cords were mobile, and a polyp in the left false vocal cord of the supraglottic larynx was noted (Figure 1). An excision biopsy of the

polyp was performed and the histopathologic examination revealed surface ulceration associated with the presence of a spindle cell proliferation within the submucosa. The spindle cells showed overt pleomorphism, hyperchromasia, and an increase in mitotic activity. Focal surface epithelial atypia was also noted. No Perineural or Lymphovascular Invasion was seen and margins were not involved. The findings were suggestive of squamous cell carcinoma with sarcomatoid differentiation (Spindle cell carcinoma; Figure 2).



Figure 1: Laryngoscopic examination showing polyp in the left false vocal cord of the supraglottic larynx.

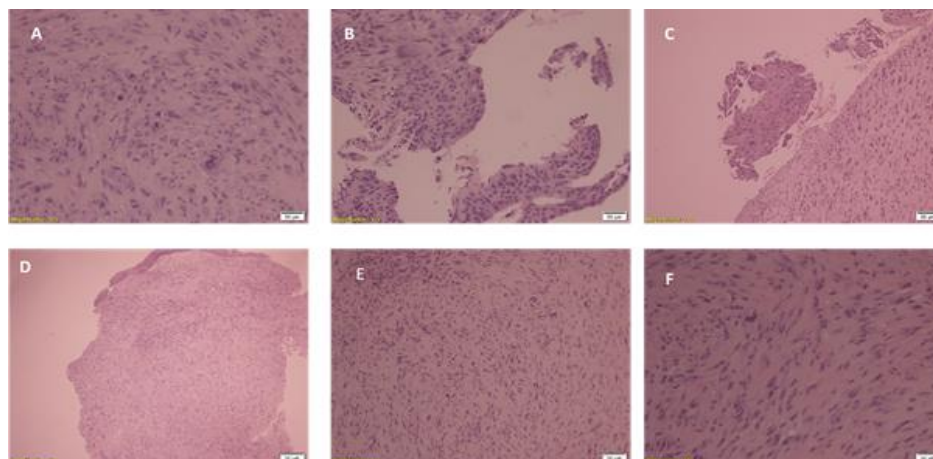


Figure 2: Haematoxylin and eosin stain showing (A) Atypical mitotic cells in spindle cell stroma; (B, C) Dysplastic squamous epithelium; (D) Epithelium with tumor and; (E, F) Malignant spindle cell neoplasm.

Chandrashekara TK | Volume 1; Issue 2 (2023) | Mapsci-JCRTP-1(2)-009 | Case Report

Citation: Shivashankara Y, Aljasem NMK, Chandrashekara TK, Tampy C. High-grade Spindle Cell Squamous Carcinoma of the Supraglottic Larynx Treated with Definitive Curative Radiation Therapy- A Rare Case Report. J Cancer Res Treat Prev. 2023;1(2):113-118.

DOI: [https://doi.org/10.37191/Mapsci-JCRTP-1\(2\)-009](https://doi.org/10.37191/Mapsci-JCRTP-1(2)-009)

Immunohistochemical stains of neoplasm showed very focal positivity for CK AE1/AE3, positive SMA. Negative for CD34, CD117, Desmin, high molecular weight cytokeratin, CK5/6, CD99, EMA, P40, ALK and P63. Ki67 was about 20% (Figure 3). Diagnosis of the inflammatory myofibroblastic tumor was ruled out based on the presence of significant atypia and lack of architectural changes. Despite the absence of P63/P40 reactivity, the presence of surface atypia, and the location of the tumor within the larynx, a mucosal-based malignant neoplasm was more consistent, and a final diagnosis of high-grade spindle cell squamous carcinoma was made. Considering the rarity of the pathology and the challenges involved in diagnosis, Histopathology slides, blocks, and immunohistochemistry was reviewed by a second expert pathologist at another certified pathology laboratory and the second opinion was consistent with high-grade spindle cell squamous carcinoma. Magnetic resonance imaging of the neck showed slight thickening and irregularity of the left side false vocal cord suggestive of the residual lesion. No significant enlargement of cervical lymphadenopathy was noted (Figure 4).

Whole body 18 FDG PET CT scan following excision of the polyp showed asymmetric increased FDG uptake in the left false vocal cord (SUVmax 5.5), suggestive of postsurgical inflammation/residual lesion. The small-volume disease could not be excluded. There was no suspicious lymphadenopathy and no evidence of FDG-avid nodal or distant metastasis. Based on the findings, the patient was diagnosed with spindle cell squamous carcinoma of supraglottic larynx T1N0Mo,

stage I. Following a multidisciplinary tumor board meeting, definitive radiation therapy with radical curative intent for stage I supraglottic larynx cancer was considered an optimal treatment in order to preserve the anatomy and function of the larynx and for a better quality of life (Figure 5). The patient received definitive radiotherapy using 6 MV photons simultaneous integrated boost volumetric modulated Arc radiotherapy technique (SIB-VMAT) to a dose of 7000 cGray in 35 fractions to the high-risk volume covering gross tumor in the left false vocal cord, 6000 cGray in 35 fractions to the intermediate risk volume covering the entire larynx and 5400 cGray in 35 fractions to low-risk volume covering uninvolved bilateral neck level II to level IV cervical lymph node region on a True beam Varian linear accelerator machine treated 5 fractions per week Monday to Friday. The definitive radiotherapy was well tolerated by the patient.

Discussion

Squamous cell carcinoma is one of the most common types of laryngeal cancer. Sarcomatoid carcinoma is the highly malignant variant of SCC with a reported incidence of 2-3% of laryngeal cancers [1]. This biphasic tumor is composed of both invasive or in situ squamous cell carcinoma and spindle cell carcinoma with a sarcomatous appearance. However, recently it is thought to be monoclonal in origin in which the squamous cells undergo sarcomatoid differentiation [2,3].

History of cigarette smoking, alcohol abuse, and previous history of radiation exposure are

considered risk factors for spindle cell carcinoma. It occurs more commonly in males than females with a ratio of 13:1 and incidence increase with advanced age [4]. Glottis is the most commonly affected area of laryngeal spindle cell carcinoma with corresponding symptoms including hoarseness of voice, dyspnoea, cough, and

dysphagia developed within a short span. Approximately 99% of the tumors are polypoid or pedunculated measuring less than 2cm [5]. Complaint of hoarseness of voice over 3 months and polyp present in the false vocal cord of the supraglottic region is similar to the overall description of spindle cell carcinoma.

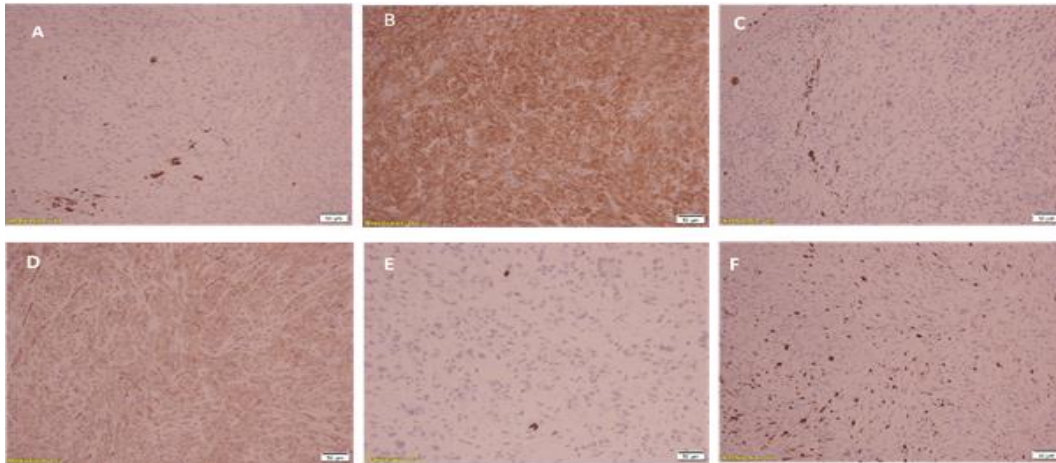


Figure 3: Immunohistochemistry showing (A)very focal positivity for CK AE1/AE3 Panck; (B) SMA Diffuse positivity; (C) Focal positivity for CK5 and CK6; (D) Diffuse CD99 faint membrane staining; (E) Presence of P63 in very scanty nuclei and; (F) Ki67 positivity (20%).

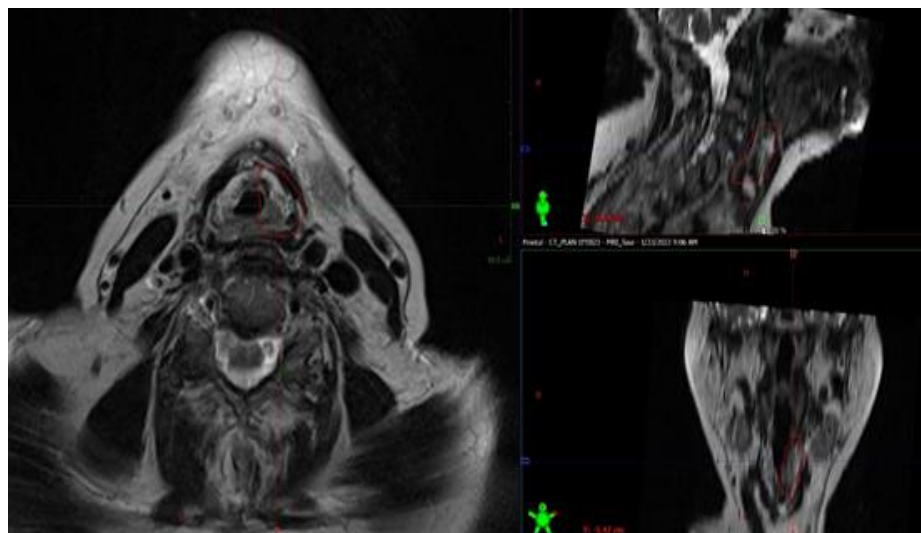


Figure 4: MRI scan of the neck showing slight thickening and irregularity of left side false vocal cord suggestive of the residual lesion with no significant enlarged cervical lymphadenopathy.

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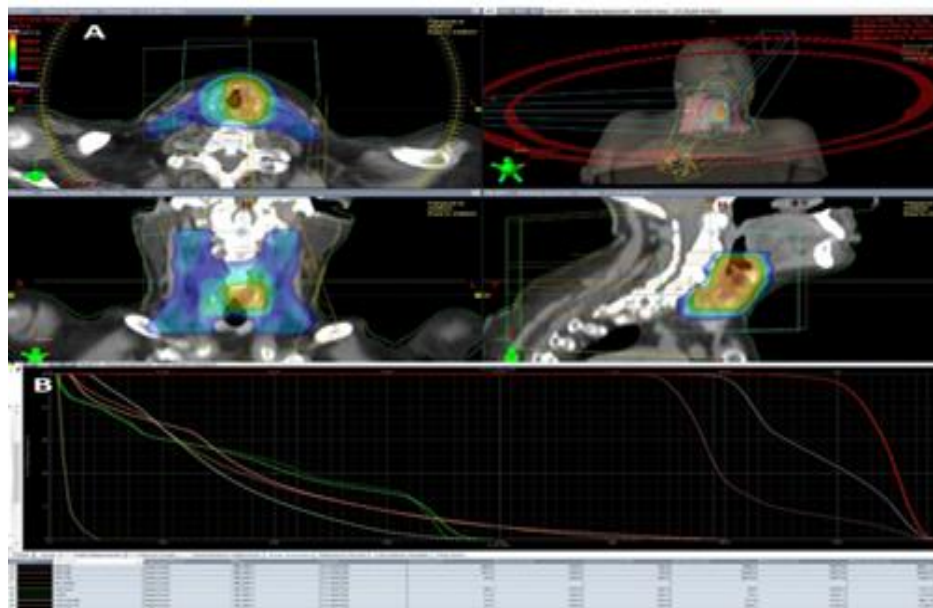


Figure 5: (A) Shows the definitive radiotherapy plan using 6 MV photons simultaneous integrated boost volumetric modulated Arc radiotherapy technique (SIB-VMAT) to a dose of 7000 cGray in 35 fractions to the high-risk volume covering gross tumor in the left false vocal cord, 6000 cGray in 35 fractions to the intermediate risk volume covering the entire larynx and 5400 cGray in 35 fractions to low-risk volume covering uninvolved bilateral neck level II to level IV cervical lymph node region on a True beam Varian Leneer accelerator machine; (B) The figure shows a favorable Dose Volume Histogram of the radiotherapy plan with good target volume coverage and better sparing of all surrounding organs at risk to reduce radiation-induced toxicity.

The definitive diagnosis is made with the histological examination which shows squamous cell carcinoma appearance at the surface with a blend of spindle cells in the deeper regions having storiform, solid and fascicular appearance [6]. Additionally, immunohistochemistry of the spindle cell carcinoma is positive for epithelial markers including keratin, epithelial membrane antigens, Ki1 and Ki8 as well as mesenchymal markers such as vimentin, desmin, S-100, Osteopontin, and BMP (2,4). Moreover, the transcription factor, p53 is a particularly useful marker for spindle cell carcinoma of the head and neck region [5,6]. In this case, histopathologic examination of the excised

polyp revealed surface ulceration associated with the presence of a spindle cell proliferation within the submucosa, and immunohistochemical stains of neoplasm showed very focal positivity for CK AE1/AE3, positive SMA suggestive of spindle cell carcinoma. Management of laryngeal tumors is influenced by factors such as location and stage of the tumor, tumor metastasis, preservation of the larynx, vocal cord mobility, good voice control, and lower complications including recurrent nerve injury. Due to the polypoid or pedunculated nature causing hoarseness of voice, most laryngeal tumors are detected at an earlier stage and have a better prognosis.

Treatment ranges from polypectomy, limited field irradiation to local excision, partial laryngectomy, and total laryngectomy with or without lymph node dissection followed by radiation therapy and chemotherapy [7,8]. In this case, considering the location of the tumor and diagnosis from excision biopsy definitive radiotherapy was planned on a True beam linear accelerator machine with high-definition multileaf collimators. This allowed better target volume dose coverage to attain the best cure and spare all the surrounding organs at risk from high-dose radiation thereby reducing radiation-induced toxicity.

Conclusion

Early diagnosis of the highly malignant spindle cell squamous carcinoma of the larynx is essential for a better prognosis. Polypectomy along with Definitive radiotherapy allows better target volume dose coverage and limits radiation exposure to adjacent normal tissues thereby achieving the best cure, least radiation-induced toxicity, and better quality of life.

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