Case Report

Adult spindle cell/ sclerosing rhabdomyosarcoma of the buccal maxillary gingiva: Unique entity, a rare case report

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ABSTRACT

Rhabdomyosarcoma is a malignant neoplasm of mesenchymal cells, which shows varying degrees of striated muscle cell differentiation. It predominantly occurs in children while rarely found in adults. Involvement of the oral cavity accounts for only 10-12% of all head and neck cases. Herewith, we report a rare case of oral spindle cell / sclerosing rhabdomyosarcoma in a 47-year-old male presented with a small mass involving the gingiva of right upper incisor. The mass was excised with a preoperative diagnosis of gingival epulis and subjected to histopathological and immunohistochemical examination which confirmed it to be spindle cell / sclerosing rhabdomyosarcoma. Data regarding its clinical course, genetic abnormalities and prognosis as a combined subtype is scant.

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Article history:
Received 23-04-2021
Accepted 26-05-2021
Available online 16-09-2021

Keywords:
Adult spindle
cell/sclerosing rhabdomyosarcoma
(SScRMS) Oral Cavity
Rhabdomyosarcoma
Maxillary Gingiva
Immunohistochemistry

1. Introduction

Rhabdomyosarcoma (RMS) is the most common childhood soft tissue sarcoma in children under 15 years of age and accounts for an estimated 4.5% of all childhood cancers. It is rare in person older than 45 year and accounts for an estimated 2-5 % of all adult sarcomas.¹ According to WHO (2013), It is subtyped into an embryonal RMS, an alveolar RMS; a pleomorphic RMS and more recently, spindle cell and sclerosing RMS (S-ScRMS).² The spindle cell variant was originally proposed in 1992 by Cavazzana, and was initially considered as a variant of an embryonal RMS, while sclerosing variant was first described in 2000 by Mentzel & Katenkamp and was identified as another distinctive variant of a RMS.² ³ Several studies had described a relationship between spindle cell and sclerosing RMS that lately have emerged together as a distinct subtype of a RMS.⁴ ⁵ ⁶ ⁷ ⁸ Spindle cell/ sclerosing rhabdomyosarcoma is an uncommon subtype, accounting for 5-10% of all cases of RMS. It affects both children and adults, with a male to female ratio of up to 6:1.² Due to the rarity of the cases in the literature and recent reclassification of S-ScRMS, every case report is valuable to the literature. Hence, the present case report holds a value.

2. Case Report

A 47-year-old male presented with a complaint of swelling over gingiva of right upper incisor since one month. The patient had history of oral injury 6 month back. Clinical examination revealed 1x1cm, soft, abscess like, non-tender, non-fluctuating mass on maxillary gingiva. X-ray demonstrated no bony changes. As the clinical findings suggested a tumorous lesion, a provisional diagnosis of gingival epulis was made. An incisional biopsy under local anesthesia was performed and sent for histopathological examination.
On microscopy, it revealed well defined tumor in superepithelium which was raising and stretching the epithelium. Tumor was composed of interlacing bundles of uniform oval to short spindle cells separated by thin septae. The cells showed mild to moderate pleomorphic, fusiform nuclei, dispersed chromatin, definite visible nucleoli and ill-defined eosinophilic cytoplasm. Many mitotic figures were seen. No necrosis. Opinion was given as spindle cell tumor (Figure 1a).

Immunohistochemistry revealed cells were positive for vimentin and strongly positive for desmin (Figure 1b). Hence suggested mesenchymal origin of tumor. Further confirmation was made by application of markers like MyoD1, CK, Ki-67. Results were positive in nuclei for MyoD1 in majority of tumor cells (Figure 1c), weak positive in aberrant pattern for CytoKeratin (Figure 1d) and 30% for Ki-67. The tumor cells were negative for SMA, Myogenin, EMA, S-100, CD34, P-63, HMB-45 & Melan-A.

Histopathology and immunohistochemistry findings were consistent with diagnosis of spindle cell/ sclerosing rhabdomyosarcoma (FNCLCC Grade 1).

After Surgery, the patient is well & there is no evidence of recurrence till now.

3. Discussion

Rhabdomyosarcoma (RMS) is malignant neoplasm of mesenchymal cells. It is most common soft tissue sarcoma in children. On the contrary, it is very rare to see RMS in adults.

Spindle cell/sclerosing rhabdomyosarcoma is a rare skeletal-muscle tumor with distinctive clinicopathologic characteristics and is designated in the WHO classification (2013) as a separate fourth broad category under RMS.

Spindle cell RMS (SRMS) was first reported by Cavazzana et al. Lesion with spindle cell morphology are commonly identified in the paratesticular region of pediatric patients, while in adults >50% of cases affect the deep soft tissues in the head and neck. Lesion with sclerosing morphology in both age groups are most common in the limbs.

Histologically these tumours are characterized by predominant population of spindle neoplastic cells. Nuclear atypia, hyperchromasia and mitotic figures are common. Occasionally RMS with spindle cell morphology may show stromal hyalinization with tumor cells imparting a pseudovascular appearance, and characterizing the sclerosing variant of RMS.

We described a case of oral spindle/sclerosing rhabdomyosarcoma in a 47-year-old male. Comparative studies of similar cases in literature has been summarized ,please refer to Table 1.

SRMS provides a diagnostic challenge due to its similarity to other spindle cell neoplasms. Therefore, immunohistochemistry plays a pivotal role in the diagnosis of SRMS/ScRMS. The immunohistochemistry markers to rule out other differential diagnosis of spindle cell tumours is summarized (refer to Table 2).

According to WHO (2013) spindle cell RMS shows diffuse expression of desmin and positivity for SMA and myogenin. Sclerosing RMS shows limited expression of desmin and myogenin, but strongly positive for MyoD1. The diffuse and strong positivity for MyoD1 supports our diagnosis, as Myo-D1 has been shown to be a more sensitive marker for sclerosing variant of RMS.

Patients with S-ScRMS demonstrate heterogenic genetic alterations that may have particular importance on prognosis. Recent studies focusing on SRMS-ScRMS shows a variable prognosis based on their age at diagnosis & genetic abnormalities. SRMS in infants exhibit recurrent NCOA2 and VGLL2 related fusions and are associated with a favorable outcome & long-term survival. In contrast, SRMS-ScRMS with MYOD1 mutations follow an aggressive clinical behavior and poor prognosis, irrespective of the patient’s age.

Most RMS are treated with conventional surgery, chemotherapy and radiotherapy. Despite efforts at various treatment techniques, prognosis of S-ScRMS in adults is significantly worse, with a rate of recurrence and metastasis of approximately 40-50%. 

Fig. 1: (a): Interlacing bundles of uniform oval to short spindle cells separated by thin septae. (On H & E, 40x); (b): Immunohistochemistry revealed strong positivity for Desmin (40x); (c): Immunohistochemistry revealed nuclear positivity for MyoD1 in majority of tumor cells. (40x); (d): Immunohistochemistry revealed cells positive in aberrant pattern for CytoKeratin. (40x)
### Table 1: Comparative studies of cases of rhabdomyosarcoma in literature

| Authors            | Number of cases | Year of Study | Age / Sex of Patient | Location of swelling | Provisional diagnosis before Biopsy | Diagnosis after Biopsy | IHC Marker | Definite Diagnosis |
|--------------------|-----------------|---------------|----------------------|----------------------|--------------------------------------|------------------------|------------|-------------------|
| Mina et al.⁹       | 1               | 2018          | 32y/ F               | Maxillary gingiva    | Nonspecific inflammatory lesion      | Spindle cell sarcoma   | Positive for Desmin, Myogenin, MyoD1 Ki 67 >10% | Pleomorphic RMS due to less spindle-shaped cells with more remarkable nuclear pleomorphism and bizarre tumor cells. |
| Smith MH et al.¹⁰  | 3               | 2017          | i) 24y/M ii) 39y/M iii) 28y/M | i) mass of the right hard palate/posterior maxillary alveolar gingiva ii) left buccal mucosa. iii) swelling in left mandibular area, anterior maxillary gingiva. | i) soft tissue tumor ii) K/C/O spindle cell variant of RMS iii) soft tissue tumor | i) Spindle cell sarcoma ii) Recurrent RMS iii) Spindle cell variant with sclerosis | Not available | iii) positivity to desmin, smooth muscle actin, myogenin, and Myo-D1 |
| Chi et al.¹¹       | 1               | 2007          | 33y/ F               | Maxillary gingiva    | Soft tissue tumor                    | Spindle cell tumor     | Positive for desmin, myogenin, (MyoD1). | Embryonal RMS |
| Joy T et al.¹²     | 1               | 2018          | 52y/ M               | Mandibular gingiva   | Soft tissue tumor                    | Spindle cell variant of squamous cell carcinoma | Strongly & diffusely positive for desmin, focally positive for MyoD1 and myogenin | Spindle cell RMS |
| Robinson JC et al.¹³| 1              | 2012          | 40y/ M               | Mandibular gingiva and buccal mucosa | Nonspecific inflammatory lesion | high-grade pleomorphic undifferentiated sarcoma | Vimentin (+) Increased Ki-67 (>60%) , diffusely positive for desmin, myogenin, focally positive for CD99 and WT-1 | Sclerosing RMS |
| Hartmann, S et al.¹⁴| 1              | 2014          | 41y/ M               | Below tongue soft tissue tumor | soft tissue tumor | myofibrosarcoma | Positive for Desmin, Myogenin, Myo D1, Negative for Caldesmon | Spindle cell RMS |

**Abbreviations:** RMS - Rhabdomyosarcoma, SMA - smooth muscle actin, MyoD1 – Myogenic differentiation antigen 1
Table 2: Differential Diagnosis of Spindle Cell Tumors with Immunohistochemistry Markers

| Tumor                      | Desmin | Myogenin | SMA | keratin | S100 protein | CD34 | Other Markers                                                                 |
|----------------------------|--------|----------|-----|---------|--------------|------|--------------------------------------------------------------------------------|
| Synovial Sarcoma           | -      | -        | -   | +++     | +/-          | -    | CD 56, Calretinin                                                              |
| Leiomyosarcoma             | +/-    | -        | +++ | -       | -            | -    | Caldesmon (+)                                                                  |
| PEComa                     | +/-    | -        | +++ | -       | -            | -    | HMB-45, Melan-A                                                                 |
| Spindle Cell Melanoma      | -      | -        | -   | +++     | +/-          | -    | Desmin expression seen in rhabdomyoblastic elements (malignant triton tumor)   |
| Malignant peripheral       | -      | -        | -   | -       | +            | +/-  | SOX 10 (+)                                                                     |
| Nerve Sheath Tumor         | -      | -        | -   | -       | +            | +/-  | Sclerosing RMS                                                                  |
| Neurofibroma               | -      | -        | -   | -       | +++          | +++  | EMA/Claudin (+)                                                                 |
| Nodular Fasciitis          | -      | -        | +++ | -       | -            | -    | Rare focals desmin (+)                                                         |
| Spindle cell RMS           | Diffuse| +        | +/- | -       | -            | -    | Myo D1 (+), Strong Myo D1 positivity in Sclerosing RMS                          |
| Spindle cell lipoma        | -      | -        | -   | -       | +++          | ++   | Loss of nuclear Rb protein expression                                           |
| Perineurioma               | -      | -        | -   | -       | -            | -    | EMA (+), Claudin-1 (+)                                                         |

Abbreviation s: SMA, smooth muscle actin; + positive, +++ strongly positive, - Negative, +/- occasionally positive

4. Conclusion

Oral rhabdomyosarcoma can develop insidiously and due to variable clinical presentations and histopathological appearances, early lesions may be mistaken for inflammatory, benign neoplastic or infectious processes. Furthermore, due to the rarity of the cases in adults & recent reclassification of S-ScRMS, misdiagnosis is common. Hence, immunohistochemistry plays an important role in identification of this lesion.

5. Conflict of Interest

The authors declare that there are no conflicts of interest in this paper.

6. Source of Funding

None.

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Cite this article: Chopra S, Jindal R, Joseph M, Gupta B, Lakhiani L, Kaur K. Adult spindle cell/ sclerosing rhabdomyosarcoma of the buccal maxillary gingiva: Unique entity, a rare case report. IP Arch Cytol Histopathology Res 2021;6(3):217-221.