EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 5
Issue: 7
291-295
Year: 2018

REVIEW OF SPINDLE CELL LESIONS OF THE ORAL CAVITY PART I

[1]*Dr. Praveena Kulkarni and [2]Dr. Venkatesh Kulkarni

[1]Assistant Professor, Department of Oral Pathology & Microbiology Bharati Vidyapeeth Deemed to be University Dental College & Hospital, Pune.
[2]Professor, Department of Oral Pathology & Microbiology, Bharati Vidyapeeth Deemed to be University Dental College & Hospital, Pune.

***Corresponding Author: Dr. Praveena Kulkarni**
Assistant Professor, Department of Oral Pathology & Microbiology Bharati Vidyapeeth Deemed to be University Dental College & Hospital, Pune.

Article Received on 15/05/2018 **Article Revised on 05/06/2018** **Article Accepted on 25/06/2018**

ABSTRACT
Spindle cell lesions are lesions that consist of spindle-shaped cells in the histopathology. Due to complex nature of the oral cavity, presence of neural tissue, and varied type of lesions occurring in oral cavity, Spindle cell lesions are seen the oral cavity. Even though the spindle cell lesions of oral cavity are rare finding. In the oral cavity, the spindle cell lesions are diverse and diagnostically challenging. The origin of the spindle cell lesions may be due to epithelial, mesenchymal and odontogenic components. This article aims to review the spindle cell lesions of the oral cavity with emphasis on histopathology and immunohistochemical findings.

KEYWORDS: Epithelial, mesenchymal and odontogenic components.

INTRODUCTION

Spindle cell lesions rarely but can encounter in the oral cavity. It is often very difficult for the oral pathologists to differentiate it from other similar microscopic simulates.[1] Some spindle cell lesions are highly malignant while others are benign or just reactive lesion. In the oral cavity, the origin of the spindle cell lesion may be epithelial, mesenchymal and odontogenic components. The simple working type classification of the spindle cell neoplasm was proposed.[2] This classification was based on the predominance of spindle cells in the histopathology of the lesions of the oral cavity.[2] Such classification contain almost all the spindle cell lesions occurring in the oral and maxillofacial areas.

Neural tumors
Neurofibroma,
Neurilemmoma (schwannoma)
Palisaded encapsulated neuroma
Traumatic neuroma (amputation neuroma)
Malignant peripheral nerve sheath tumor

Myofibroblastic tumors
Myofibroma
Inflammatory myofibroblastic tumor
Low-grade myofibrosarcoma

Muscle tumors
Leiomyoma
Vascular leiomyoma
Leiomyosarcoma
Rhabdomyoma
Rhabdomyosarcoma

Fibroblastic tumors
Solitary fibrous tumor
Fibromatosis
Nodular fasciitis
Fibrosarcoma
Desmoplastic fibroma

Vascular tumors
Hemangiopericytoma
Kaposi sarcoma
Spindle cell hemangioma

Epithelial tumors
Spindle cell carcinoma
Malignant melanoma
Pleomorphic adenoma

Odontogenic tumors
Ameloblastic fibroma
Ameloblastic fibrosarcoma
Central odontogenic fibroma
Desmoplastic ameloblastoma

Miscellaneous tumors
Benign fibrous histiocytoma
Malignant fibrous histiocytoma
Synovial sarcoma
Ossifying fibromyxoid tumor

Giant cell angiofibroma
Blue nevus

Neural Lesions
Tumors arising from neural tissue are encountered the oral cavity, majority of the times arising from nerve sheath. This category includes neurofibroma, neurilemmoma (schwannoma), palisaded encapsulated neuroma, traumatic neuroma (amputation neuroma) and malignant peripheral nerve sheath tumor.

Neurofibroma
Neurofibroma is tumor composed of Schwann cells, perineurial cells and endoneurial fibroblasts. Histopathologically, the tumor is composed of interlacing bundles of spindle cells with wavy nuclei. Depending upon the ground substance, tumors can be categorised into myxoid and plexiform varieties.[3]

Immunohistochemically, the tumor cells show a scattered positive reaction for S-100 protein, signifying that they originate from neural crest derived tissue.[4]

Traumatic Neuroma
Traumatic neuroma involves simultaneous nerve repair and defensive mechanisms. That is reactive proliferation of perineurial cells following a trauma episode.[6]

Histopathologically, it consists of a haphazard proliferation of nerve fascicles, including axons, schwann cells and fibroblasts embedded in the background of collagen and sometimes associated with chronic inflammation.[6] Immunohistochemically, axon filaments will take silver stains.[7]

Neurilemmoma
Neurilemmoma is a circumscribed encapsulated slow growing benign tumor composed of schwann cells.[8] Histopathologic identification of Antoni A and B areas, nuclear palisading, whorling of cells, and Verocay bodies along with strong and diffuse staining with S-100 stain will pathologically confirm the diagnosis of schwannoma.[9]

Palisaded Encapsulated Neuroma
Palisaded encapsulated neuroma is a benign neural tumor, which occurs primarily on the facial skin of middle-aged adults, and in the oral cavity, it is more prevalent in the masticatory mucosa.[10]

Histopathologically, the tumors are characterized by a moderately cellular, fascicular proliferation of spindle cells showing areas of nuclear palisading and whorling of cells.[11]

Immunohistochemical stains will reveal S-100 protein-positive Schwann cells and peripheral nerve axons will take positive neurofilament staining. The fibrous capsule of the lesions will show positive staining for epithelial membrane antigen, indicative of perineurium.[11]

Malignant Peripheral Nerve Sheath Tumor
The term "malignant peripheral nerve sheath tumor" refers to all the spindle cell sarcomas arising from the peripheral nerve or neurofibroma or showing nerve sheath differentiation.[12]

Histopathologically, the tumor is composed of hyperchromatic spindle cells growing in a fascicular pattern with alternating hypocellular and hypercellular areas with increased mitotic activity. Immunohistochemically, neuronspecific enolase is confirmatory for the neurogenic origin of this tumor.[13]

Myofibroblastic Tumors
Myofibroblastic tumors include tumors of myofibroblasts (i.e., cells with both smooth muscle and fibroblastic features). This category includes myofibroma, inflammatory myofibroblastic tumor and low-grade myofibrosarcoma.

Myofibroma
Myofibroma is an uncommon spindle cell neoplasm rarely found in oral cavity. Microscopically, a typical biphasic pattern is observed with elongated spindle cells with eosinophilic cytoplasm in the borders, polygonal cells arranged in a palisading pattern, with hyperchromatic nuclei in the central portions.[14] With the special stain such as Masson trichrome stain, myofibromas shows more collagenous stroma intermixed with the spindle cells and thick fibrous bundles with random, irregularly intersecting angles.[15]

Immunohistochemically, the tumor cells will be positive for vimentin and α actine smooth muscle antibodies and negative for keratin, S-100, EMA (Epithelial Membrane Antigen) antibodies.[16]

Inflammatory myofibroblastic tumor
Inflammatory myofibroblastic tumor is a rare tumor found in oral cavity composed of myofibroblastic cells accompanied by an inflammatory infiltration of plasma cells, lymphocytes, macrophages and eosinophils intermingled within collagen fibers.[17] Histologically three basic patterns can be recognized i.e.,a) myxoid or vascular pattern with spindle or stellate myofibroblasts in an abundant myxoid stroma with an inflammatory component resembling granulation tissue or nodular fasciitis; b) compact spindle cells that may adopt a storiform pattern intermingled with inflammatory cells resembling fibrous histiocytoma and c) dense plate-like collagen with low cell density and rare inflammatory cell stroma, resembling a desmoids. Immunohistochemically, the tumor cells will be positive for vimentin, desmin, muscle-specific actin, smooth-muscle-actin and activin receptor-like kinase 1 (ALK-1).[18]

Low Grade Myofibrosarcoma
Low-grade myofibrosarcoma is a rare entity in the oral cavity composed of myofibroblasts with more predilections in tongue followed by mandible and

gingival.[19] Histologically, the lesion will show hypercellular areas of neoplastic cells, which are spindle, shaped showing elongated, atypical nuclei with prominent nucleoli and eosinophilic cytoplasm. Immunohistochemically, the tumor cells will be diffusely positive for vimentin, smooth muscle actin and desmin and negative for cytokeratin, CD34 and CD21.[20]

Muscle tumors

Muscle tumors include tumors of muscle tissue origin. This category includes leiomyoma, vascular leiomyoma, leiomyosarcoma, rhabdomyoma and rhabdomyosarcoma.

Leiomyoma

Leiomyoma is a benign smooth muscle tumour that is usually seen in the uterine myometrium gastrointestinal tract, skin and lower extremities of middle-aged women.[21]

According to WHO, leiomyomas are classified into three histological groups:
(a) vascular (angioleiomyoma),
(b) solid
(c) epithelioid (leiomyoblastomas).

Histologically, solid leiomyoma consists of interlacing bundles of spindle-shaped or stellate smooth muscle cells with elongated, blunt-ended, palestaining nuclei. Immunohistochemically, the tumor cells will be positive for alpha smooth muscle actin and vimentin and negative for S-100 protein and desmin.[22]

Leiomyosarcoma

Leiomyosarcoma is a malignant lesion that exhibits smooth muscle differentiation and arises from undifferentiated pluripotential undifferentiated mesenchymal cells. Histopathologically, the tumor is characterized by sheets of sweeping, alternating bundles and fascicles of densely packed spindle cells with abundant fibrillar eosinophilic cytoplasm and indistinct cytoplasmic borders, aligned in a palisade pattern.[23] The tumor cells will show marked cellular pleomorphism with irregular shaped large hyperchromatic bizarre nuclei. Immunohistochemically, the tumor cells will be positive for smooth muscle actin, muscle specific actin and vimentin and negative for S-100 protein, cytokeratin and desmin.[24]

Rhabdomyoma

Rhabdomyoma is a benign tumor originating from striated muscle cells. Rhabdomyoma can be classified into adult and fetal categories depending upon the age. Histopathologically in the adult category, the tumor is characterized by round and polygonal cells with abundant granular eosinophilic cytoplasm (spider web appearance).[25] Fetal category will demonstrate spindle shaped muscle cells with marked cellularity and mild pleomorphism in a myxoid stroma.[26] Immunohistochemically, the tumor cells will be positive for desmin, myoglobin and alpha-smooth muscle actin and negative for vimentin.[27]

Rhabdomyosarcoma

Rhabdomyosarcoma is a malignant tumor originating from striated muscle cells. Histopathologically, the tumor cells shows marked nuclear and cellular pleomorphism, nuclear hyperchromatism, prominent nucleoli, loss of cohesion between the cells, abundant abnormal mitotic figures and occasional spindle cell morphology. Immunohistochemically, the tumor cells will be positive for myo D1, desmin and actin.[28]

IV. Fibroblastic tumors

Fibroblastic tumors include tumors of fibroblasts. This category includes solitary fibrous tumor, fibromatoses, nodular fasciitis, desmoplastic fibroma and fibrosarcoma.

Solitary fibrous tumor

Solitary fibrous tumor is a rare spindle cell neoplasm. Histopathologically, round to ovoid or bland spindle cells with vesicular nuclei and sparse cytoplasm with thick hyalinised collagen interspersed between tumour cells showing patternless pattern with alternating hypo and hypercellular areas. Immunohistochemically, the tumor cells will be positive for CD34.[29]

Fibromatosis

Fibromatosis are proliferations of highly differentiated fibrous tissue. In the oral cavity, fibromatosis is presenting as aggressive type. Histopathologically, the lesion is characterized by cellular proliferation of streaming fascicles of spindle shaped cells showing moderate anisonucleosis with variable amount of collagen.[30]

Nodular fasciitis

Nodular fasciitis is a benign reactive proliferation of fibroblasts that is thought to be a response of tissue to injury.[31] Microscopically, the lesion will display a well-delineated but not encapsulated proliferation of spindle cells with a nodular growth pattern. Immunohistochemical analysis will reveal positivity of the spindle cells for the antibodies against smooth muscle actin and muscle-specific actin (HHF-35).[32]

Desmoplastic Fibroma

Desmoplastic fibroblastoma is a distinctive uncommon fibrous soft tissue tumor. Microscopically, the tumor is composed of stellate or spindle-shaped cells embedded in hypovascular fibrous stroma with focal entrapment of fat. The cells do not exhibit mitotic figures and tumor necrosis. Immunohistochemically, the tumor cells are immunopositive for vimentin, and alpha-smooth muscle actin.[33]

Fibrosarcoma

Fibrosarcoma is a malignant mesenchymal neoplasm of the fibroblasts. Microscopically, the tumor can be graded

as low and high grade of malignancy. Low-grade fibrosarcoma shows spindle cells arranged in fascicles with low to moderate cellularity and a herringbone appearance. There is a mild degree of nuclear pleomorphism and rare mitosis, with a collagenous stroma. High-grade lesions show an intense nuclear pleomorphism, greater cellularity and atypical mitosis. The nuclei can be spindle shaped, oval or round. The positive immunostaining for vimentin, along with negativity for muscular immunomarkers, helps in diagnosing the fibrosarcoma.[34]

V. Vascular Tumors

Vascular tumors include tumors of vascular tissue origin. This category includes hemangiopericytoma, Kaposi sarcoma and spindle cell hemangioma.

Hemangiopericytoma

Hemangiopericytoma is a rare tumor that is presumably derived from Zimmerman's pericytes (small pericapillary spindle-shaped cells). The tumor usually exhibits tightly packed spindle, round to ovoid cells that surround endothelium lined vascular channels. Histologically, the tumour will demonstrate staghorn-like vasculature and immunohistochemically the tumor cells will be positive for CD34 and negative for calponin, CD68 KP1, AE1-AE3, smooth muscle actin, P63 and S-100.[35]

Kaposi Sarcoma

Kaposi's sarcoma is an angioproliferative tumour rarely found in the oral cavity. Microscopically the tumor shows spindle cells and poorly defined vascular slits with scattered hemosiderin and extravasation of red blood cells.[36]

Spindle Cell Hemangioma

Spindle cell hemangioma is an uncommon benign vascular tumor of the oral cavity. Microscopically, the tumor shows well-circumscribed vascular proliferation of spindled to epithelioid endothelial cells with intracytoplasmic vascular lumens. Immunohistochemically, the tumor is positive for CD31 and CD34.[37]

Due to extensive content related to various lesions it is not possible to cover lesion in the single review article. Hence further lesions related with spindle cell lesions are explained in the consequent article with same topic name.

REFERENCE

1. Lewis JS. Spindle cell lesions--neoplastic or nonneoplastic?: spindle cell carcinoma and other atypical spindle cell lesions of the head and neck. Head Neck Pathol, 2008; 2(2): 103-10.
2. Shamim T. A simple working type classification proposed for the spindle cell neoplasms of the oral cavity. J Cytol, 2013; 30(1): 85.
3. Gómez-Oliveira G, Fernández-Alba Luengo J, Martín- Sastre R, Patiño Seijas B, López-Cedrún-Cembranos JL. Plexiform neurofibroma of the cheek mucosa. A case report. Med Oral, 2004; 9(3): 263-67.
4. do Nascimento GJ, de Albuquerque Pires Rocha D, Galvão HC, de Lisboa Lopes Costa A, de Souza LB. A 38-year review of oral schwannomas and neurofibromas in a Brazilian population: clinical, histopathological and immunohistochemical study. Clin Oral Investig, 2011; 15(3): 329-35.
5. Foltán R, Klíma K, Spacková J, Sedý J. Mechanism of traumatic neuroma development. Med Hypotheses, 2008; 71(4): 572-576.
6. Chrysomali E, Papanicolaou SI, Dekker NP, Regezi JA. Benign neural tumors of the oral cavity: a comparative immunohistochemical study. Oral Surg Oral Med Oral Pathol Oral Radiol Endod, 1997; 84(4): 381-90.
7. Handschel J, Heikaus S, Depprich R, Kübler NR, Yekta SS, Smeets R et al. Intraoral schwannoma: review of the literature and presentation of a rare case. Cranio, 2012; 30(2): 150-3.
8. Lukšić I, Müller D, Virag M, Manojlović S, Ostović KT.Schwannoma of the tongue in a child. J Craniomaxillofac Surg, 2011; 39(6): 441-4.
9. Koutlas IG, Scheithauer BW. Palisaded encapsulated ("solitary circumscribed") neuroma of the oral cavity: a review of 55 cases. Head Neck Pathol, 2010; 4(1): 15-26.
10. Magnusson B.Palisaded encapsulated neuroma (solitary circumscribed neuroma) of the oral mucosa. Oral Surg Oral Med Oral Pathol Oral Radiol Endod, 1996; 82(3): 302-4.
11. Janardhanan M, Rakesh S, Vinod Kumar R. Intraoral presentation of multiple malignant peripheral nerve sheath tumors associated with neurofibromatosis-1. J Oral Maxillofac Pathol, 2011; 15(1): 46-51.
12. Ashraf MJ, Azarpira N, Khademi B, Maghbul M. Malignant peripheral nerve sheath tumor of the tongue. Indian J Pathol Microbiol, 2010; 53(4): 906-7.
13. Brasileiro BF, Martins-Filho PR, Piva MR, da Silva LC, Nonaka CF, Miguel MC. Myofibroma of the oral cavity. A rare spindle cell neoplasm. Med Oral Patol Oral Cir Bucal, 2010; 15(4): e596-600.
14. Cargini P, Fidanza F, Facente MV, Sgolastra F, Gatto R, Cutilli T. Gingival Myofibroma. A case report. Eur J Paediatr Dent., 2012; 13(1): 81-3.
15. Chang JY, Kessler HP. Masson trichrome stain helps differentiate myofibroma from smooth muscle lesions in the head and neck region. J Formos Med Assoc., 2008; 107(10): 767-73.
16. Lourenço SV, Boggio P, Simonsen Nico MM. Inflammatory myofibroblastic tumor of the tongue: report of an unusual case in a teenage patient. Dermatol Online J., 2012; 18(5): 6.
17. Zhang Y, Dong ZJ, Zhi XY, Liu L, Hu M. Inflammatory myofibroblastic tumor in lung with osteopulmonary arthropathy. Chin Med J (Engl), 2009; 122(24): 3094-96.

18. Jay A, Piper K, Farthing PM, Carter J, Diwakar A. Low-grade myofibroblastic sarcoma of the tongue. Oral Surg Oral Med Oral Pathol Oral Radiol Endod, 2007; 104(5): e52-8.
19. Montebugnoli L, Venturi M, Gissi DB, Flamminio F, Foschini MP. Low-grade myofibroblastic sarcoma of the gingiva. BMJ Case Rep., 2010; 23: pii: bcr0720103166.
20. Ren MS, Zhong M, Wang ZY. Leiomyoma of tongue: a case report. Shanghai Kou Qiang Yi Xue, 2012; 21(3): 359-60.
21. Reddy B, Rani BS, Anuradha Ch, Chandrasekhar P, Shamala R, Lingamaneni K. Leiomyoma of the mandible in a child. J Oral Maxillofac Pathol, 2011; 15(1): 101-4.
22. Yadav R, Bharathan S. Leiomyosarcoma of the buccal mucosa: a case report with immunohistochemistry findings. J Oral Sci., 2008; 50(2): 215-18.
23. Yan B, Li Y, Pan J, Xia H, Li LJ. Primary oral leiomyosarcoma: a retrospective clinical analysis of 20 cases. Oral Dis., 2010; 16(2): 198-203.
24. Vera-Sirera B, Vera-Sempere F. Adult rhabdomyoma with oncocytic changes affecting the floor of the mouth: optical, immunohistochemical, and ultrastructural study. J Craniofac Surg, 2012; 23(5): e412-5.
25. Zhang GZ, Zhang GQ, Xiu JM, Wang XM. Intraoral multifocal and multinodular adult rhabdomyoma: report of a case. J Oral Maxillofac Surg, 2012; 70(10): 2480-5.
26. Betlach J, Nozicka Z, Spacek J.Fetal rhabdomyoma of the mucosa of the lip (case report). Cesk Patol, 2000; 36(1): 21-5.
27. Arya K, Vij H, Vij R, Rao NN. Rhabdomyosarcoma of mandible: A diagnostic predicament. J Oral Maxillofac Pathol, 2011; 15(3): 320-5.
28. O'Regan EM, Vanguri V, Allen CM, Eversole LR, Wright JM, Woo SB. Solitary fibrous tumor of the oral cavity: clinicopathologic and immunohistochemical study of 21 cases. Head Neck Pathol, 2009; 3(2): 106-15.
29. Rao S, Dinesh BS. Aggressive fibromatosis of the oral cavity. Indian J Dent Res., 2012; 23(3): 435.
30. Ren SX, Zhang Y. Nodular fasciitis in the orofacial region: a report of three cases. Chin J Dent Res., 2012; 15(1): 55-9.
31. de Carli ML, Sá Fernandes K, Dos Santos Pinto D Jr, Witzel AL, Martins MT. Nodular fasciitis of the oral cavity with partial spontaneous regression (nodular fasciitis). Head Neck Pathol, 2013; 7(1): 69-72.
32. Bhagalia S, Jain M, Pardhe N, Sireesha SK.Collagenous fibroma (desmoplastic fibroblastoma) of the oral cavity. J Oral Maxillofac Pathol, 2012; 16(2): 277-79.
33. Wadhwan V, Chaudhary MS, Gawande M. Fibrosarcoma of the oral cavity. Indian J Dent Res., 2010; 21(2): 295-98.
34. Angiero F, Signore A, Benedicenti S.Hem-angiopericytoma/ Solitary fibrous tumor of the oral cavity. Anticancer Res., 2011; 31(2): 719-23.
35. da Silva LC, Martins-Filho PR, Piva MR, Rocha NS, Soares WE, de Santana Santos T.A rare case of iatrogenic gingival Kaposi's sarcoma. J Craniomaxillofac Surg, 2012; 40(5): 456-8.
36. Sheehan M, Roumpf SO, Summerlin DJ, Billings SD. Spindle cell hemangioma: report of a case presenting in the oral cavity. J Cutan Pathol, 2007; 34(10): 797-800.