Case Report

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Intravascular papillary endothelial hyperplasia in the mandible: a case report

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Abstract

Intravascular papillary endothelial hyperplasia (IPEH) is histopathologically characterized by papillary proliferation of vascular endothelial cells. IPEH in the mandible is very rare, such that only four affected patients have been described in the English-language medical literature. Thus, there is a poor understanding of the pathogenesis and clinical features of IPEH in the mandible. This case report describes a patient with IPEH in the mandible who had a history of repeated trauma involving the mandible due to boxing-related and baseball-related injuries. Imaging examinations had diagnostic limitations, in that they showed a multilocular radiolucency suggestive of a simple bone cyst of the mandible, whereas intraoperative findings revealed a fluid-free unicystic cavity lined by a thin red membrane. Thus, histopathologic examinations were necessary for definitive diagnosis. The specimen demonstrated a spongy structure consisting of many small papillary fibrous tissues, lined by a typical monolayer endothelium that expressed CD34, but did not express D2-40 or AE1/AE3. Moreover, the Ki-67 labeling index was $<1\%$. Thus, the lesion was identified as intraosseous IPEH in the mandible. Although the pathogenesis of IPEH has been controversial, our findings in this case suggest that pathogenesis of IPEH may be related to a history of trauma.

Keywords

Intravascular papillary endothelial hyperplasia, Masson's tumor, trauma, multilocular radiolucency, endothelial cells, baseball, boxing, vascular neoplasm, mandible

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Introduction

Intravascular papillary endothelial hyperplasia (IPEH) is a non-neoplastic disease that is histopathologically characterized by papillary proliferation of vascular endothelial cells.[1] Masson first described this type of lesion in 1923; thus, the lesion was previously referred to as Masson's tumor.[1] However, IPEH has become the preferred term for this disease.[2,3]

IPEH typically occurs in the head and neck, fingers, and trunk; it is generally asymptomatic with purple swelling similar to that of a hemangioma, and is rarely accompanied by pain and tenderness.[1] In contrast to hemangioma, IPEH does not exhibit color fading.[1,2] Although IPEH often occurs in oral soft tissues,[2] IPEH in the mandible is rare and has been described in only four patients in the English-language medical literature.[4–7] Thus, there is poor understanding regarding the pathogenesis, radiographic features, and management of IPEH in the mandible. Herein, we describe a patient with IPEH in the mandible, and discuss the pathogenesis, radiographic findings, and management of this condition.

Case report

A 55-year-old man was initially referred to our clinic in September 2010 by a general dentist because of the presence of a left mandibular lesion with multilocular radiolucency. At that time, the patient did not report any symptoms and intraoral examinations did not reveal any abnormal findings (e.g., tenderness, swelling, or pain). Panoramic radiography demonstrated a 35- × 25-mm multilocular radiolucency with a scalloped unclear border in the paramedian to left premolar mandibular region (Figure 1a). Although the lesion involved teeth, no root resorption was observed; moreover, the involved teeth demonstrated vital reactions in the electric pulp test. The patient had no other relevant medical history. However, he reported many instances of minor trauma to the mental region, as he had frequently participated in boxing and baseball throughout his life. Although further examinations were planned, the patient was lost to follow-up.

The patient returned to our clinic in July 2018 for re-evaluation of the mandibular lesion. Panoramic radiography and physical examinations did not reveal changes, compared with the findings recorded 8 years prior (Figure 1b). Computed tomography revealed an osteolytic lesion with a rough bony inner surface, located in the paramedian to left premolar region (Figure 2). The lesion did not exhibit a cortical bone defect. The clinical course and findings suggested

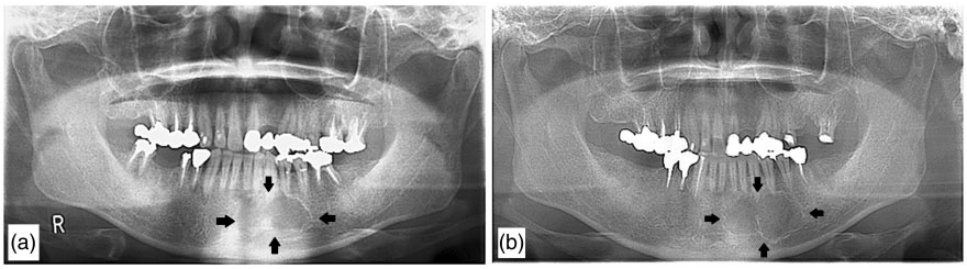

Figure 1. Panoramic X-ray photographs taken in 2010 and 2018. (a) Panoramic X-ray photograph taken in 2010. (b) Panoramic X-ray photograph taken in 2018. Both panoramic X-ray photographs demonstrated a multilocular radiolucency with a scalloped unclear border in the paramedian to left premolar mandibular region (arrows).

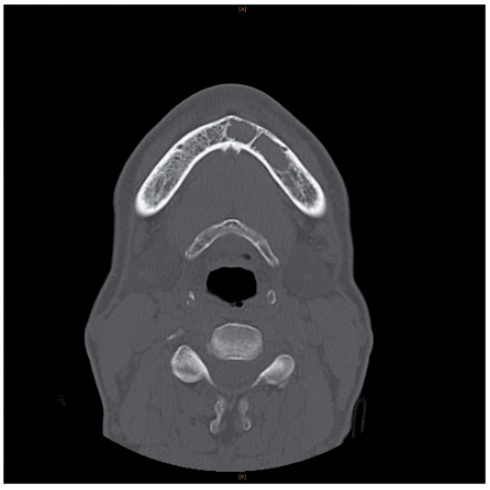

Figure 2. Computed tomography findings. Computed tomography demonstrated an osteolytic lesion with a septum.

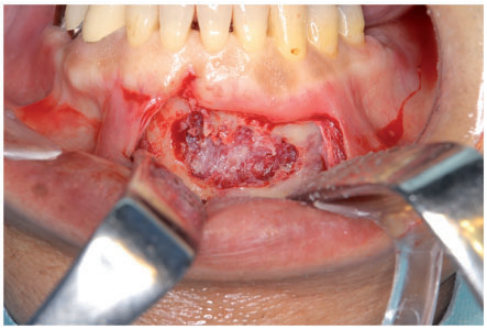

Figure 3. Intraoperative findings. The bone cavity is shown, lined by a thin red membrane.

that the lesion was a simple bone cyst of the mandible.

With the patient under general anesthesia, surgery was performed to excise the mandibular lesion. Despite the presence of multilocular radiolucency on preoperative images, intraoperative findings revealed that the lesion comprised a fluid-free unicystic cavity lined by a thin red membrane (Figure 3). The lesion exhibited no adhesions to surrounding bone; additionally, it was completely encapsulated by cortical bone. Histopathological examination of the surgical specimen revealed a spongy structure consisting of many small papillary fibrous tissues, lined by a typical monolayer endothelium (hematoxylin and eosin staining; Figure 4a). Immunohistochemical analysis revealed that the monolayer endothelium expressed CD34 (Figure 4b), but did not express D2-40 or AE1/AE3 (data not shown). The Ki-67 labeling index was <1% (data not shown). Based on these findings, the lesion was identified as intraosseous IPEH in the mandible. The patient's postoperative course was uneventful, and there was no evidence of recurrence during 2 years of follow-up.

Discussion

IPEH presumably arises from a hematoma following mechanical stimulation, such as trauma or inflammation.[8] However, the pathogenesis of IPEH is controversial because many affected patients have not reported a history of trauma.[3,7] Our patient had a history of many instances of minor trauma to the mental region during participation in boxing and baseball; moreover, he showed no evidence of periapical odontogenic infections. Although the pathogenesis of IPEH may not be solely related to trauma, our findings suggested that IPEH in our patient occurred as a result of trauma.

To the best of our knowledge, this is the fifth report of a patient with IPEH in the mandible in the English-language medical literature. We compared the findings in the past four reports with the findings in our patient. Panoramic radiography demonstrated characteristic multilocular radiolucency in all patients (including our patient), although root resorption was not observed in any patients.[4–7] Computed tomography examinations were performed in four of the five patients; bony expansion with a cortical bone defect was observed in

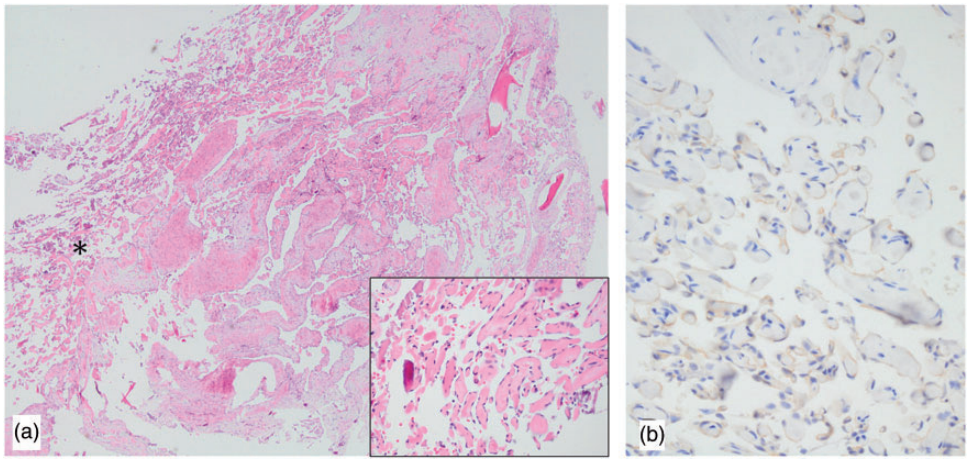

Figure 4. Histology findings. (a) Hematoxylin and eosin staining of the surgical specimen indicated a spongy structure consisting of many small papillary fibrous tissues, lined by a monolayer endothelium without atypia (inset indicates magnification of the area denoted by an asterisk). (b) The monolayer endothelium demonstrated expression of CD34.

two patients.[5,7] Importantly, these radiographic findings are similar to manifestations observed in patients with an odontogenic keratocyst, an intraosseous hemangioma, or a simple bone cyst.[6,8] Our patient was preoperatively diagnosed with a simple bone cyst because of the absence of bone defects and root resorption, as well as the presence of a multilocular radiolucency with a scalloped unclear border and the absence of bone expansion. Consistent with our findings in this report, it is generally difficult to diagnose IPEH by means of preoperative imaging examinations; histopathological examinations are necessary.

Histopathologically, IPEH is characterized by papillary proliferation of vascular endothelial cells.[1] Detection of vascular endothelial cells in patients with IPEH generally involves immunohistochemical staining for markers such as CD31, CD34, and Factor VIII.[1,2,4] In particular, CD34 is frequently used for the identification of vascular endothelial cells; therefore, we used CD34 as a marker for vascular endothelial cells in our patient. Moreover, it is important to distinguish between angiosarcoma and IPEH. The differential diagnosis between angiosarcoma and IPEH involves several key histologic features: (1) IPEH remains intravascular, while angiosarcomas invade surrounding tissue; (2) IPEH is often closely associated with a thrombus; (3) IPEH does not include necrotic tissue; and (4) IPEH has limited mitotic activity.[10,11] Although IPEH in our patient did not demonstrate vascular localization or the presence of a thrombus, it exhibited a lack of necrotic tissue and a lack of endothelial cells with mitotic activity. In addition, angiosarcoma was ruled out on the basis of the Ki-67 labeling index; angiosarcomas generally exhibit high expression of Ki-67,[12] whereas the index was $<1\%$ in our patient. Thus, the patient was diagnosed with IPEH.

IPEH is histopathologically divided into three subtypes: (1) a pure form that arises within dilated vessels; (2) a mixed form that arises within preexisting vascular lesions (e.g., hemangioma, aneurysm, vascular malformation, or pyogenic granuloma); and (3) an extravascular form that originates from a hematoma.[13] In our patient, the lesion was not associated with blood vessels or vascular

lesions, and had been present for at least 8 years. Therefore, despite the absence of a hematoma, our patient was presumed to exhibit the extravascular form of IPEH; the hematoma may have resolved during the 8-year gap in treatment.

Complete surgical excision is common treatment for patients with IPEH,[2] and recurrence is rare. Our patient exhibited no evidence of recurrence during postoperative follow-up because of the complete surgical excision. Notably, Tanio et al.[6] performed preoperative embolization in a patient with the histopathological mixed form of IPEH due to the occurrence of uncontrollable bleeding during biopsy. In contrast, our patient did not exhibit abnormal bleeding during surgery because he had the extravascular form of IPEH. However, the risk of operative bleeding during surgical treatment for IPEH should be considered because the mixed form includes both hemangioma and vascular malformation.

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Informed consent

The patient consented to publication of his clinical data.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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References

1. Akdur NC, Donmez M, Gozel S, et al. Intravascular papillary endothelial hyperplasia: histomorphological and immunohistochemical features. *Diagn Pathol* 2013; 8: 901. doi: 10.1186/1746-1596-8-167
2. Campos MS, Garcia-Rejas RA, Pinto DS, et al. Intravascular papillary endothelial hyperplasia: report of 4 cases with immunohistochemical findings. *Med Oral Patol Oral Cir Bucal* 2009; 14: e506–e509. doi: 10.4317/medoral.14.e506
3. Fasina O, Adeoye A and Akang E. Orbital intravascular papillary endothelial hyperplasia in a Nigerian child: a case report and review of the literature. *J Med Case Rep* 2012; 6: 300. doi: 10.1186/1752-1947-6-300
4. Komori A, Koike M, Kinjo T, et al. Central intravascular papillary endothelial hyperplasia of the mandible. *Virchows Arch A Pathol Anat Histopathol* 1984; 403: 453–459. doi: 10.1007/BF00737293
5. Xu SS and Li D. Radiological imaging of florid intravascular papillary endothelial hyperplasia in the mandibule: case report and literature review. *Clin Imaging* 2014; 38: 364–366. doi: 10.1016/j.clinimag.2013.12.006
6. Tanio S, Okamoto A, Majbauddin A, et al. Intravascular papillary endothelial hyperplasia associated with hemangioma of the mandible: a rare case report. *J Oral Maxillofac Surg Med Pathol* 2016; 28: 55–60. doi: 10.1016/j.ajoms.2015.06.007
7. Mirmohammadsadeghi H, Mashhadiabbas F and Latifi F. Huge central intravascular papillary endothelial hyperplasia of the mandible: a case report and review of the literature. *J Korean Assoc Oral Maxillofac Surg* 2019; 45: 180–185. doi: 10.5125/jkaoms.2019.45.4.180
8. An S, Lee J, Benavides E, et al. Multiple simple bone cysts of the Jaws: Review of the literature and report of three cases. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2014; 117: e458–e469. doi: 10.1016/j.oooo.2014.03.004.
9. Inoue H, Miyazaki Y, Kikuchi K, et al. Intravascular papillary endothelial hyperplasia of the oral cavity. *J Oral Sci* 2011; 53: 475–480. doi: 10.2334/josnusd.53.475

10. Stern Y, Braslavsky D, Segal K, et al. Intravascular papillary endothelial hyperplasia in the maxillary sinus. A benign lesion that may be mistaken for angiosarcoma. *Arch Otolaryngol Head Neck Surg* 1991; 117: 1182–1184. doi: 10.1001/archotol.1991.01870220130024
11. Cooke P, Goldrich D, Iloreta AM, et al. Intravascular papillary endothelial hyperplasia of the maxillary sinus in patient with tricuspid atresia. *Head Neck Pathol* 2020; 14: 803–807. doi: 10.1007/s12105-019-01070-w
12. Shin SJ, Lesser M and Rosen PP. Hemangiomas and angiosarcomas of the breast: diagnostic utility of cell cycle markers with emphasis on Ki-67. *Arch Pathol Lab Med* 2007; 131: 538–544. doi: 10.1043/1543-2165(2007)131[538: HAAOTB]2.0.CO; 2
13. Hashimoto H, Daimaru Y and Enjoji M. Intravascular papillary endothelial hyperplasia. A clinicopathologic study of 91 cases. *Am J Dermatopathol* 1983; 5: 539–546. doi: 10.1097/00000372-198312000-00004