Research Article

Clinicopathological analysis of 80 cases of oral lobular and non lobular capillary hemangioma (pyogenic granuloma): A Retrospective study

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Abstract: Background**:** Oral pyogenic granuloma (PG) is a clinicopathological entity that could develop due to the reaction to a variety of stimuli, such as low-grade local irritation, traumatic damage, and hormonal stimulation. There are two histopathological types of pyogenic granuloma; lobular type -capillary hemangioma (LCH) and non-lobular type; with PG,LCH has highly vascular, diffuse capillary growth while non- lobular variant mimicking granulation tissue with heavily inflammated stroma. The study aims were to review the clinical and histopathological spectrum of an oral pyogenic granuloma from different intraoral sites in order to avoid diagnostic pitfalls associated with similar morphological lesions and to determine whether lobular and non-lobular histopathological subtypes being distinct entities. Materials and Methods: A retrospective review of eighty formalin-fixed paraffin-embedded tissue blocks (40 cases each of males and females) were retrieved from the archives of Oral & Maxillofacial Pathology at the University of Baghdad, from 1979 to 2017. According to Mills et al., criteria for lobular capillary hemangioma description, the diagnosis of each case was confirmed by the examination of Hematoxylin and Eosin stained sections by an expert pathologists. Results:The present result revealed that patients with oral pyogenic granuloma were with age range from 12 to 59 years, with a mean of 30.57 years. Fourty nine cases (61.25%) out of eighty were of lobular pattern and 31 cases (38.7%) of non-lobular pattern type PG. The most common site of LCH was in the buccal mucosa, 12 cases (75%), while higher case numbers were observed in the 21-30 year age group. There were non-significant differences between lobular and non-lobular pattern prevalence regarding age groups and between other studied variables. Conclusio: It has been proposed that LCH and non-LCH subtypes reflect distinct phases in the development of a single lesion, which exhibits variable degrees of proliferative, angiogenic, and inflammatory activities.

Keywords: Lobular capillary hemangioma, pyogenic granuloma, Oral cavity,histopathological differences.

Introduction

Pyogenic granuloma (PG) is a relatively frequent type of vascular growth on the mucosal surface epithelium and skin. For the first time in 1904, Hartzell used the word "pyogenic granuloma" which is a misleading phrase since the lesion does not contain pus, as the name suggests [1,2]**.** The oral Pyogenic granuloma is a clinicopathological entity that could result from the tissues reaction to a variety of stimuli such as low-grade local irritation, traumatic damage, and sex hormones. It is a painless growth comonly occurs in maxillary gingival area, particularly on the gingiva's labial side as well as; the prefe ence incidence for the pregnant female, tumor that sometimes grows at an accelerating rate. Lesions are more prevalent intra-orally in the anterior and younger age groups, are believed to be due to a hormonal impact on the vasculature. However, a few infections, such as *Bartonella henselae,* have been linked to recurring pyogenic granuloma[3]. Oral PG is described clinically as a solitary soft mass that may be smooth or lobulated, sessile or nodule-like, or it can be a pedunculated growth. The color of the lesion varies from

pink to red that changes according to its vascularity and tumor progression. There may be some blood flowing spontaneously or as a result of a trauma[2,4].

Two common histopathological variants of PG were reported in previous studies. The first variant consists of lobular architecture including several small-sized capillaries lined by plump endothelial separated by fibrous septa with a paucity of the inflammatory stromal cells called lobular-capillary hemangioma (LCH). Non-lobular type PG (non-LCH) is the second histopathologic type characterized by highly vascular, diffusely arranged capillary proliferation resembling granulation tissue with heavy inflammatory stroma[5,6]. Numerous studies have previously investigated the clinicopathologic and immunohistochemical characteristics of PG, but distinctions between PG's two histological variants are uncommon.

To avoid diagnostic pitfalls associated with similar morphological lesions and to determine whether lobular and non-lobular histopathological subtypes are two distinct entities, the study aims were to review the clinical histopathological spectrum of an oral pyogenic granuloma from different intraoral sites.

Materials and Methods

A retrospective review of eighty formalin-fixed, paraffin-embedded tissue blocks reported as pyogenic granuloma of the oral cavity were retrieved from the archives of the department of Oral & Maxillofacial Pathology/College of the Dentistry/University of Baghdad; from 1979 to 2017. Clinical and Demographic data, including the patient's age, gender, and intraoral site of occurrence of PG, were obtained from the relevant histopathological reports that were available with the tissue specimens. According to Mills, et al., 1980 criteria for lobular capillary hemangioma description, the diagnosis of each case was confirmed by the examination of H & E sections by an expert pathologists. The statistical analysis was performed as follows: SPSS Version 23 was used to perform statistical analysis. A chi-squared test was applied to test statistical differences. Differences between studied variables were set as not significant $P>0.05$,significant $P\leq0.05$, or highly significant ($P\leq0.01$).

Results

A total of eighty cases (40 cases of males and 40 cases of females) of oral pyogenic granuloma were evaluated. The age ranges of patients with oral PG were from 12 to 59 years, with a mean age of 30.57year. There were no significant differences in the mean age of patients with PG between males (29.77 years) and females (31.37); Figure (1). Regarding the site, in the present study, equal numbers were collected in both males and females (16 cases from each: gingiva, buccal mucosa, tongue, palate, lips). Histopathological study of oral pyogenic granuloma cases revealed that 49 cases (61.25%) out of 80 were of lobular pattern, and 31 cases (38.7%) out of the 80 were of non-lobular pattern type PG. The higher number of cases and percentage of lobular pyogenic granuloma cases were detected in females, 25 cases (62.25%), at a young age (less than 15 years old and age (30-40) receptively, 10 cases (83.33%), and the most common cases were in the buccal mucosa12 cases (75%) While the number and of cases

percentage of non-lobular pyogenic granuloma cases showed higher case numbers in the 21-30 years of age group, 12 cases (66.67%), and higher cases of non-LCH occurred in the palate, 9 cases (56.25%) There were non-significant differences between lobular and non-lobular pattern prevalence regarding age groups, gender; Table (1). Microscopically, both groups had two distinct components: an ulcerated surface and a deep section. In both groups, the ulcerated surface was equivalent, consisting of inflammatory granulation tissue covered by a fibrinopurulent membrane. The deep part of the LCH group had lobular zones of tiny capillaries lined by plump endothelial cells separated by fibrous stroma with little or no inflammatory cell infiltration; Figures (2,3). The non-LCH type pyogenic granuloma in the deep part showed many dilated capillaries with a dispersed pattern comparable to that of the granulation tissue, which was more infiltrated by chronic inflammatory cells than the LCH type figures (4, 5).

Table (1): Demographic description of studied cases (lobular and non-lobular pyogenic granulomas)concerining gender,age,and intraoral sites .

Parameters	Lobular	Non-lobular	Total	**P-value**
Gender				
Males	24(60%)	16(40%)	40	**0.818**
Females	25(62.5%)	15(37.5%)	40	**ns**
Age groups				
≤15	10(83.33%)	2(16.67%)	12	
16-20	10(66.67%)	5(33.33%)	15	
21-30	6(33.33%)	12(66.67%)	18	**0.097ns**
31-40	10(71.43%)	4(28.57%)	14	
41-50	7(58.33%)	5(41.67%)	12	
>50	6(66.67%)	3(33.33)	9	
Site				
Gingiva	9(56.25%)	7(43.75%)	16	
Palate	7(43.75%)	9(56.25%)	16	
Lip	11(68.75%)	5(31.25%)	16	**0.477ns**
Tongue	10(62.5)	6(37.5%)	16	
Buccal muccosa	12(75%)	4(25%)	16	
Total	**49(61.25)**	**31(38.75)**	**80**	

χ 2 test, P<0.05 was selected to improve significant differences

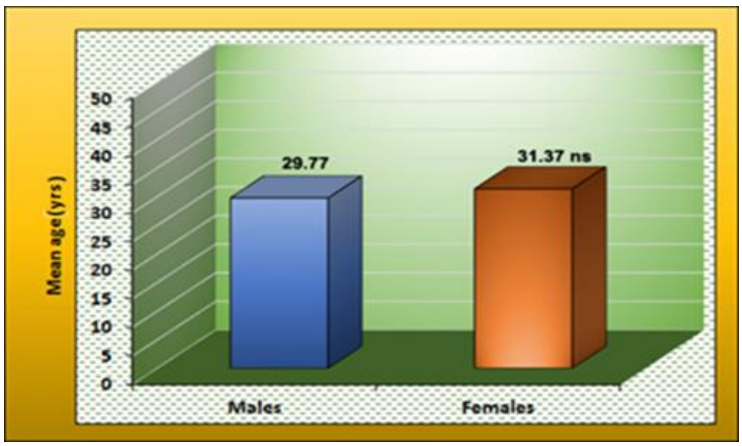

Figure (1): mean age of studied patients Independent t-test, ns =non-significant

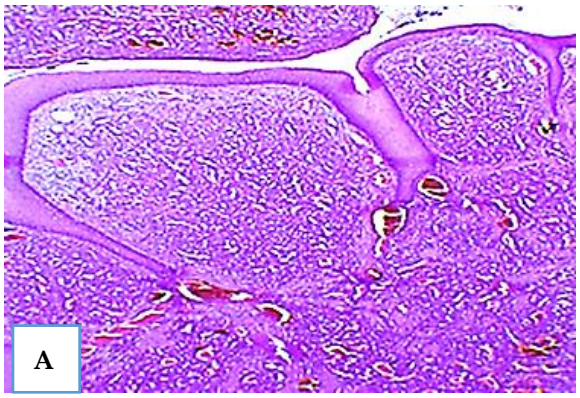

Figure (2-A): Photomicrograph lobular

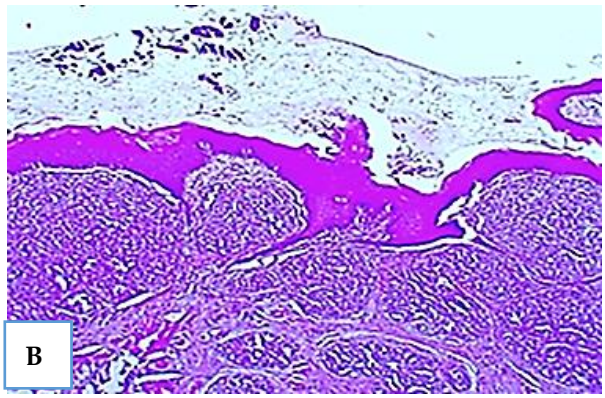

Figure (2-B): Photomicrograph lobular PG 10x

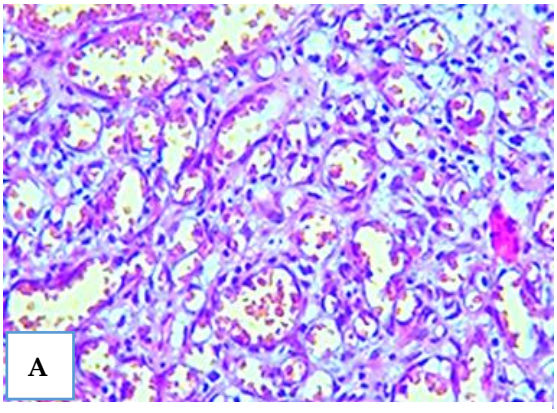

Figure (3-A): Photomicrograph lobular PG 40x

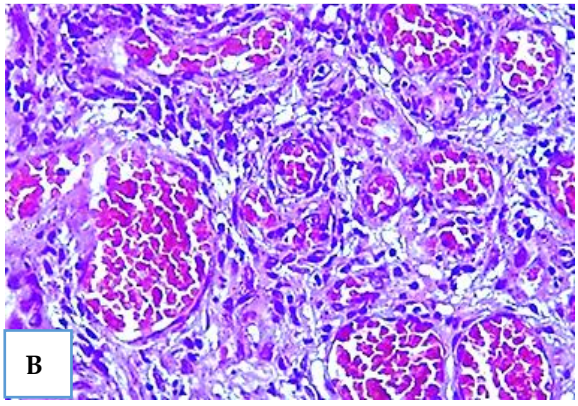

Figure (3-B): Photomicrograph lobular PG 40x

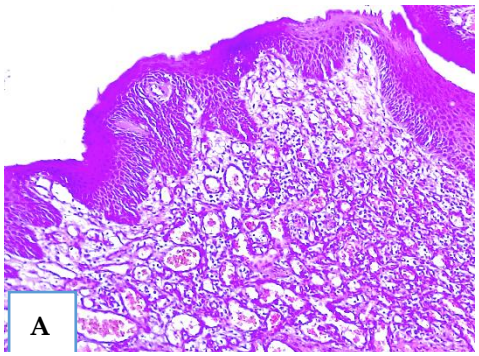

Figure (4-A): Photomicrograph non-lobular PG 10x

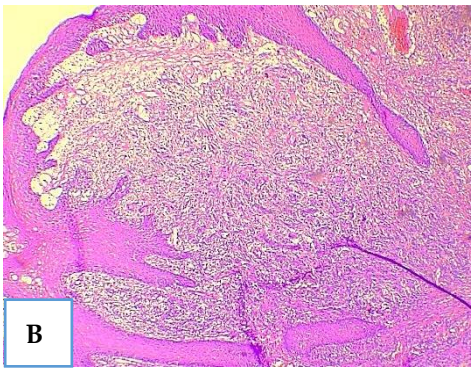

Figure (4-B): Photomicrograph non-lobular PG 10x

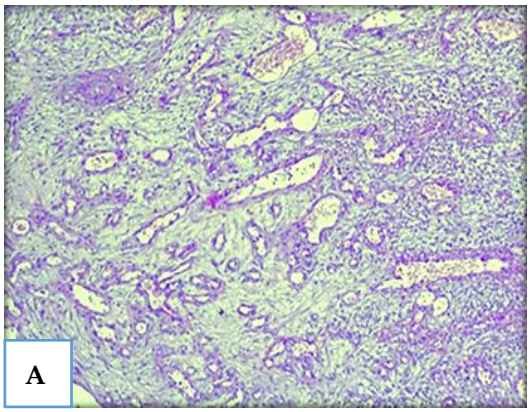

Figure (5-A): Photomicrograph non-lobular PG

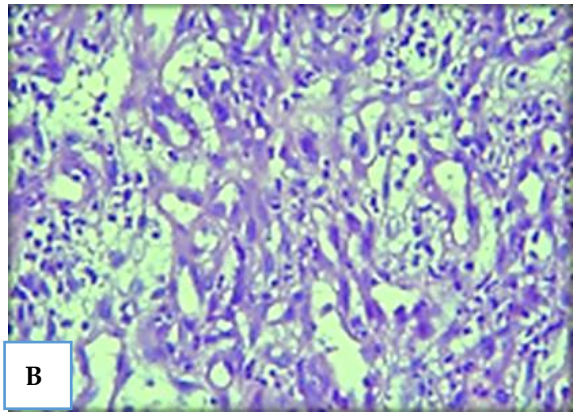

Figure (5-B): Photomicrograph non-lobular PG 40x

Discussion

Because the oral mucosa is continuously being influenced by external and internal factors, which could be lead to developmental disorders, irritants, inflammatory responses, as well as benign and\or malignancies. These lesions mimic benign and /or malignant clinically. Early identification and treatment of such lesions by clinicians may minimize dentoalveolar consequences.

This better understanding could help practitioners improve diagnoses and provide appropriate management [7]. Pyogenic granuloma is a vascular growth that occurs quite often on the mucosal surface epithelium and subcutaneous tissue. The term granuloma pyogenicum (pyogenic granuloma) was coined by Hartzell in 1904; while in 1980, the name "lobular capillary hemangioma" (LCH) was published as the synonym for pyogenic granuloma according to histological characteristics [5,8].

The prevalence of oral PG varied across investigations, ranging from 1.85 percent to 37 percent of reported oral lesions in previous research [9]. The clinicopathological findings of the present study revealed that the mean age for the occurrence of pyogenic granuloma was 30.57 years, and a higher number of cases and percentage of lobular pyogenic granuloma cases were detected in females, 25 cases (62.25%). These findings concur with previous studies [10,11]. This may reflect a hormonal impact on mu-

cosal lesions [10,12,13]. The gingiva was found to be the most often seen intraoral site of PG incidence. Following common sites intraorally were the lips, tongue, buccal mucosa, and palate [13].

Although our study involved 16 cases from the gingiva, buccal mucosa, lips, tongue, and palate equally. As well as for both genders. The most striking histopathological feature was detected in all examined oral PG cases was the presence of significant capillary development inside the hyperplastic granulation tissue, indicating the presence of robust angiogenic activity in both histological subtypes (lobular and non-lobular). The histological types of PG have been studied in many prior clinicopathological investigations, some of which included both LCH and non-LCH histopathological subtypes. Some of these studies have shown clinical, histological, and immunohistochemical distinctions between LCH and non-LCH PG. [2,6]; which agrees partially with our study findings that showed statistically clinicopathological differences between lobular and non-lobular subtypes. However, this study did not include immunohistochemical (IHC) makers to support our results. Even though immunohistochemistry may help exclude some alternative diagnoses and identify growth features, no immunohistochemical marker was specific for LCH, and diagnosis is often made using morphologic criteria. [14].

In addition, it is still not obvious how the many etiological factors contribute to the various histological types of PG. Accordingly, The oral PG may appear differently, creating a diagnostic challenge for the treating surgeon. As a consequence of an overactive tissue repair reaction, it's a begin vascular tumor. The diagnosis is confirmed by a histopathological assessment, which also excludes out other soft tissue lesions that seem similar. The most significant differential diagnoses are as follows: Hemangioma, peripheral giant cell granuloma, peripheral ossifying fibroma, Hodgkin's lymphoma, and conventional granulation as well as, for capillary-type vascular tumors.

The presence of giant cells or scattered ossifications inside the tumor stroma assists in ruling out peripheral giant cell granuloma, peripheral ossifying fibroma, or both to rule out are Kaposi sarcoma and low-grade angiosarcoma. lobular capillary hemangioma endothelial cells may be somewhat spindled. However, in Kaposi sarcoma, the spindle cells are elongated and organized in a slit-like pattern, forming pseudo-vascular blood-filled areas. Unlike capillary hemangioma and its variations, Kaposi sarcoma lacks conspicuous endothelial cells. Human herpesvirus type 8 (HHV8) has been detected in Kaposi sarcoma and, if present, may help confirm the diagnosis, Additionally, nuclear atypia and pleomorphism are required for the diagnosis of angiosarcoma. While mitotic figures may be observed throughout the proliferative phase of lobular-capillary hemangioma in children and adults, the mitotic index is much increased in angiosarcoma, and the mitoses often take on unusual configurations. Neither angiosarcoma nor Kaposi sarcoma has an overall lobular architecture; rather, they develop infiltrating. The preferred method of cure is surgical excision. After surgical excision, recurrence is very uncommon [11,15,16]. According to the results, this study proposed that LCH and non-LCH subtypes reflect distinct phases in the development of a single lesion (PG), which exhibits variable degrees of proliferative, angiogenic, and inflammatory activities. Our suggestion is the usage of the descriptive term "lobular capillary hemangioma" as a suitable alternative term (PG) in the oral cavity. Further research with larger sample size and molecular methods is suggested to confirm or refute this study assumption.

Conflict of interest: None.

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التحليل السريري المرضي لـ ٨٠ حالة من الشعيرات الدموية الفموية المفصصة وغير المفصصة ورم وعائي (ورم حبيبي قيحي): دراسة بأثر رجعي

كرار ناجح شريف [١] ، بشار حامد عبدالله [٢]

المستخلص:

التحليل النسيجي المرضي الإكلينيكي لـ ٨٠ حالة من الورم الوعائي الحبيبي الشعري المفصص في الفم (ورم حبيبي قيحي): دراسة بأثر رجعي الخلفية: الورم الحبيبي القيحي الفموي (PG) هو كيان إكلينيكي يمكن أن يتطور بسبب تفاعل الأنسجة مع مجموعة متنوعة من المحفزات مثل التهيج الموضعي منخفض الدرجة والضرر الناتج عن الصدمات وتحفيز الهرمونات. هناك نوعان من الورم الحبيبي القيحي - النوع الفصيصي - الورم الوعائي الشعري (LCH) والنوع غير الفصيصي PG.LCH لديه نمو شعري وعائي منتشر للغاية بينما يحاكي البديل غير الفصيص الأنسجة الحبيبية ذات السدى الالتهابي الثقيل.المواد وطرق العمل : تمت مراجعة ثمانين عينة نسيجية مثبتة بالفورمالين و مضمنة بالبارافين (٤٠ حالة لكل من الذكور والإناث) من أرشيف أمراض الفم والوجه والفكين في جامعة بغداد. مؤرخة في الفترة من ١٩٧٩ إلى ٢٠١٧. بالنسبة لمعايير ميلز وآخرون لوصف الورم الوعائي الشعري الفصيصي ، تم تأكيد تشخيص كل حالة من خلال فحص المقاطع المصبوغة بالهيماتوكسيلين والأيوزين من قبل اثنين من المتخصصين في علم الأمراض.

النتائج: المرضى الذين يعانون من الورم الحبيبي القيحي (P.G) تراوحت أعمارهم من ١٢ إلى ٥٩ سنة ، بمتوسط ٣٠,٥٧ سنة. ٤٩ حالة (٦١,٢٥٪) من أصل ٨٠ كانت من النمط الفصيصي و ٣١ حالة (٣٨,٧٪) من النمط غير الفصيصي p.G. كان الموقع الأكثر شيوعًا لـ LCH في الغشاء المخاطي الشدق ، ١٢ حالة (٧٥٪) ، بينما لوحظ ارتفاع أعداد الحالات في الفئة العمرية ٢١-٣٠ عامًا. لا توجد فروق ذات دلالة إحصائية بين انتشار النمط الفصيصي وغير الفصيصي فيما يتعلق بالفئات العمرية بالاضافة الى عدم وجود فروق احصائية المتغيرات المدروسة الأخرى.

الاستنتاجات: يستنتج من البحث اعلاه هو أن الأنواع الفرعية LCH وغير LCH تعكس مراحل متميزة في تطور آفة واحدة ، والتي تظهر درجات متغيرة من الأنشطة التكاثرية ، وتولد الأوعية ، وانتشار كثيف للخلايا الالتهابية في الورم.