

## Case Report

# Pyogenic Granuloma (PG) - Common Lesion at Uncommon Site

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## Abstract

Pyogenic tumor or pregnancy tumor or lobular capillary hemangioma is an inflammatory hyperplasia occurs in oral cavity, due to hormonal effects on blood vessels. It is not a true granuloma or infection, and caused by localised irritation, hormones, trauma seen in between 2<sup>nd</sup> to 5<sup>th</sup> decade, more common in pregnant females occurs in gingiva most commonly, then lip, buccal mucosa, tongue, floor of mouth and rarely in hard palate. In this we are going to present a rare case of pyogenic granuloma of hard palate and detailed review in correlation with pregnant females.

**Keywords:** Hemangioma; Granuloma; Hyperplasia; Pregnancy tumor

## Introduction

Pyogenic Granuloma (PG) is a common tumor-like growth of the oral cavity or skin that is considered to be non-neoplastic inflammatory hyperplasia. The term “Pyogenic Granuloma” is a misnomer because the lesion neither contains pus/infection nor granuloma [1]. Pyogenic granuloma was first described in 1897 by Pence and Dor [2]. It was called as botryomycosis hominis later on Crocker and Hartzell’s gave name pyogenic granuloma in 1904 [3]. Aneglopoulos AP accurately expresses the histopathology and the inflammatory nature [4]. There are two types of PG namely Lobular Capillary Hemangioma (LCH), and non LCH type which differ histologically [5]. As soft tissue enlargements are usually a challenge to doctor because of diverse nature and different pathologic process.

## Case Presentation

A 25 years old female patient came to department of oral medicine and radiology with chief complaint of swelling in palate since 2 months. Initially it was small nodule and gradually increased, her medical history reveals that it started in third trimester and still retained after parturition, associated with bleeding. Patient is lactating mother. There is difficulty in chewing or speaking as there is tingling sensation, no history of pain, tenderness, numbness, or pus discharge.

### On examination

Single pedunculate soft tissue growth present 1 cm lateral to mid palatine Raphael in 17 region which is of 2 cm × 2 cm in size overlying surface was granular and red appears like mulberry (Figure 1 and 2). It was soft, non tender, bleeds on touch. Based on the history and the physical findings, pyogenic granuloma was considered as the differential diagnosis. Routine investigation including complete



**Figure 1 and 2:** Showing patient with soft tissue growth, pedunculated, overlying surface appear erythematous and mulberry like.

blood count, coagulation profile, serology, and biochemistry were within normal limits. Aspiration (Figure 3 and 4) was done and very little blood was aspirated. Excisional biopsy with wide margin down to periosteum was performed under local anaesthesia and bleeding stopped post excision (Figure 5).

### Histopathological examination

The fibrous connective tissue shows numerous endothelial lined blood vessels of varied size and few blood vessels (Figure 6).

Mixed inflammatory cells with few minor salivary glands are seen. Histopathology it was given as pyogenic granuloma by general pathologist.

## Discussion

PG is a common tumor-like growth of the oral cavity or skin that is considered to be non-neoplastic in nature [6]. It is a kind of inflammatory hyperplasia of oral cavity. The term “inflammatory



**Figure 3 and 4:** Showing little blood on aspiration, and excised lesion.

**Citation:** Tomar N, Soman BP. Pyogenic Granuloma (PG) - Common Lesion at Uncommon Site. *Ann Clin Case Stud.* 2019;1(2):1009.

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**Publisher Name:** Medtext Publications LLC

**Manuscript compiled:** July 23<sup>th</sup>, 2019

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Figure 5 and 6: Showing post excision and histological picture.

hyperplasia” is used to describe a large range of nodular growths of the oral mucosa that histologically represent inflamed fibrous and granulation tissues. It includes fibrous inflammatory hyperplasia (clinical fibroma, epulis fissuratum, and pulp polyp), palatal papillary hyperplasia, giant cell granuloma, pregnancy epulis and PG [1,7].

Hullihen’s description 5 in 1844 was most likely the first PG reported in English literature. Although it is a common disease in the skin, it is extremely rare in the gastro intestinal tract, except for the oral cavity [7] where it is often found on keratinized tissue [8]. Because of the high incidence of oral PG, especially in pregnant women, and the critical need for its proper diagnosis, management and treatment, this review will address the etiology, clinical and histopathologic features and its correlation with pregnancy.

Pyogenic granuloma (“Lobular Capillary Hemangioma”) is a proliferative vascular lesion often clinically confused with hemangioma, unfortunately, as both share the histologic designation “Capillary Hemangioma.” It is usually considered to be a reactive tumor like growth which arises in response to various stimuli such as a local irritation, traumatic injury, hormonal factors or certain kinds of drugs. It is now believed to be unrelated to infection [1,7]. So the term “pyogenic granuloma” is a misnomer because the lesion does not contain pus and is not strictly speaking a granuloma. Infective organisms such as *Bartonella henselae* (*peliosis hepatis*), and *B. quintana* (*bacillary angiomatosis*), and human herpes virus type 8 (Kaposi’s sarcoma and angiolymphoid hyperplasia) have been identified in other vascular tumors, some authors have postulated that infective agents may play a part in recurrent PG [9,10].

Other factors such as inducible nitric oxide synthase, vascular endothelial growth factor [11], basic fibroblast growth factor or connective tissue growth factor are known to be involved in angiogenesis and rapid growth of PG [12]. Lee et al. reported four cases of oral PG in chronic graft-versus-host disease in patients who were under cyclosporine [13]. It should be noted that the growth rate of tumors depends not only on the proliferative activity of the tumor cells but also on the rate of cell death [14].

Although PG may occur in all ages, but more predominantly in second decade of life in young adult females as seen in our case, possibly because of the vascular effects of female hormones [6,7]. Oral PG, is the most common gingival tumor, shows a striking predilection for the gingiva. The lips, tongue, and buccal mucosa are the next most common sites. Lesions are slightly more common on the maxillary gingiva than the mandibular gingiva; anterior areas are more frequently affected than posterior areas [1-7]. PG is a well-recognized inflammatory hyperplastic oral lesion which comprises about 1.85% of all oral pathologies [15,16].

PG is a smooth or lobulated exophytic lesion manifesting as small, red erythematous papules on a pedunculated or sometimes sessile base, which is usually hemorrhagic and compressible [1,3,11] and may develop as dumb-bell-shaped masses similar to our case. Clinical development of the lesion is slow, asymptomatic and painless but it may also grow rapidly. The surface is characteristically ulcerated and friable [6,7] which may be covered by a yellow, fibrinous membrane [11] and its colour ranges from pink to red to purple, depending on the age of the lesion. Young PGs are highly vascular in appearance [6] because they are composed predominantly of hyperplastic granulation tissue in which capillaries are prominent. Thus minor trauma to the lesion may cause considerable bleeding, due to its pronounced vascularity [7,16] in our case also lesions bleed on manipulation whereas older lesions tend to become more collagenized and pink or sometimes pale and fibrous [7].

### Pyogenic granuloma and pregnancy

PG of the gingiva develops in up to 5% of pregnancies [17,18] hence the terms “Pregnancy Tumor” and “Granuloma Gravidarum” are often used. The hormonal imbalance coincident with pregnancy heightens the organism’s response to irritation, [3] however, bacterial plaque and gingival inflammation are necessary for subclinical hormone alterations leading to gingivitis [17] Sometimes pregnancy gingivitis can show a tendency towards localized hyperplasia, which is called pregnancy granuloma. Generally it appears in the 2<sup>nd</sup> to 3<sup>rd</sup> month of pregnancy, with a tendency to bleed and a possible interference with mastication as in our case it started in 3<sup>rd</sup> trimester and retained after parturition [18]. During the initial months of pregnancy, the persistent influence of plaque induces catarrhal inflammation of the gingiva that act as a base for formation of hyperplastic gingivitis during the last months, modulated by the cumulating hormonal stimuli [17].

The profound endocrine upheaval of pregnancy is frequently associated with changes in the function and structure of the blood and lymph microvasculature of the mucosa [19]. Recent studies have revealed that sex hormones manifest a variety of biological and immunological effects. Oestrogen accelerates wound healing by stimulating Nerve Growth Factor (NGF) production in macrophages, Granulocyte-Macrophage-Colony Stimulating Factor (GM-CSF) production in keratinocytes and Basic Fibroblast Growth Factor (BFGF) and Transforming Growth Factor beta1 (TGF-β1) production in fibroblasts, leading to granulation tissue formation. Oestrogen enhances Vascular Endothelial Growth Factor (VEGF) production in macrophages, which may be related to the development of PG during pregnancy [20]. Yuan et al. [21] proposed that PG expressed significantly more VEGF and BFGF. Also, angiostatin was expressed significantly less in PG than in healthy gingiva and periodontally involved gingiva. Yuan and Lin proposed that the amount of VEGF was high in the granulomas in pregnancy [21].

Microscopic examination of PG shows a highly vascular proliferation that resembles granulation tissue. Numerous small and large channels are formed which are engorged with red blood cells [6,7] and lined by endothelial cells that may be mitotically active. The blood vessels often show a clustered or modularly pattern separated by less vascular fibrotic septa, leading some authorities to consider PG as a polypoid form of capillary hemangioma or nothing more than an inflamed lobular hemangioma [22].

At low magnification, a lobular arrangement is noted where in groups of capillaries proliferate but abruptly stop. Each lobule is surrounded by a thin collagen layer. This arrangement is disrupted at the base, where irregularly shaped larger vascular channels reside and presumably communicate with the proliferation [23]. Polymorphs, as well as chronic inflammatory cells, are consistently present throughout the edematous stroma, with micro-abscess formation [1]. The fibroblasts are typically plump and mitotic activity may be noted in the stromal cells. Older lesions demonstrate fewer and more mature cells, which are fabricates. The surface is usually ulcerated and replaced by a thick fibrin purulent membrane. A mixed inflammatory cell infiltrate of neutrophils is mostly prevalent near the ulcerated surface, chronic inflammatory cells are found deeper in the specimen [1].

In brief, the natural history of the lesion follows three distinct phases. In the cellular phase, the lobules are compact and cellular with little lumen formation. In the capillary phase, the lobules become frankly vascular with abundant intra-luminal red blood cells. One or more central vessels develop a large lumen with a thick muscular layer resembling a vein. In the evolutionary phase, there is a tendency for intra and perilobular fibrosis with increased venular differentiation [22].

There are two histological types of PG. The first type is characterized by proliferating blood vessels that are organized in lobular aggregates although superficially the lesion frequently undergoes no specific change, including oedema, capillary dilation or inflammatory granulation tissue reaction. This histological type of PG was called Lobular Capillary Hemangioma (LCH type), [10] where as the second type (non-LCH type) consists of highly vascular proliferation that resembles granulation tissue [1]. The lobular area of the LCH PG contains a greater number of blood vessels with small luminal diameter than does the central area of non-LCH PG [24].

Differential diagnosis of PG includes peripheral giant cell granuloma, peripheral ossifying fibroma, hemangioma, conventional granulation tissue, hyperplastic gingival inflammation [6,7,25].

Management of PG depends on the severity of symptoms. If the lesion is small, painless and free of bleeding, clinical observation and follow up are advised [18]. Conservative surgical excision and removal of causative agents are the treatments [6,7]. The use of ND; YAG laser for excision of this lesion because of the lower risk of bleeding compared to other surgical techniques. Although conservative treatment by techniques such as cryosurgery, laser surgery, and electro desiccation are usually adequate, excisional treatment can often result in scars [26].

Treatment considerations during pregnancy are very important. During this period, careful oral hygiene, removal of dental plaque, and use of soft toothbrushes are important to avoid occurrence of a pregnancy tumor. If uncontrolled bleeding occurs, management should be based on the individual condition [27]. After excision, recurrence occurs in up to 16% of the lesions [6,7,16]. Recurrence is believed to result from incomplete excision, failure to remove etiologic factors, or re-injury of the area [16].

## Conclusion

Pyogenic granuloma is not a granuloma and it more frequently occurs in pregnancy which is important. So, proper diagnosis and management reduces the chances of recurrence and other

complications. Although multiple treatment modalities like excision and some new approaches for treatment were introduced but recurrences were seen with these too. So during pregnancy, careful oral hygiene is important to avoid occurrence of pyogenic granuloma and its late complications.

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