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PHOTO ESSAY

An Atlas of Lumps and Bumps, Part 36: Pyogenic Granuloma

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Pyogenic granuloma

Pyogenic granuloma, also known as lobular capillary hemangioma, is a common, acquired, benign vascular proliferation of the skin and mucous membrane.[1-4] The term “pyogenic granuloma” is a misnomer as the condition is neither pyogenic nor granulomatous.[1-3] In fact, it is a capillary hemangioma of lobular subtype that is prone to bleeding with minor trauma.

While pyogenic granulomas occur in patients of any age, they are more prevalent in children, adolescents, and pregnant women.[5] Pyogenic granuloma accounts for 0.5% of all childhood skin nodules.[6] In the pediatric age group, the mean age of onset is 6.7 years, with 42% of cases occurring by 5 years of age.[5] Rarely, the condition can be congenital.[7-9] In the adult population, the incidence peaks in the third decade of life.[1-3,5,10] Pyogenic granuloma, especially on the oral mucosa, occurs in approximately 2% to 5% of pregnancies, usually in the second or third trimester.[4,11,12] In this setting, pyogenic granuloma is often referred to as granuloma gravidarum, epulis gravidarum, or granuloma of pregnancy.[4,6] Cutaneous pyogenic granulomas usually have no gender predilection, whereas the oral mucosal ones are predominantly indicated in women with a male to female ratio of 2:1.[5]

Pyogenic granuloma is considered a reactive neovascular response to a variety of angiogenic stimuli such as physical trauma (e.g., ingrown toenails), irritation, burn, elevated levels of sex hormones, certain medications **(Table 1)**, pre-existing chronic dermatosis, and infections.[1-3,13-17] Approximately 7% of affected patients have a history of preceding physical trauma at the site of the lesion.[4,6,18,19] This is especially the case for lesions in the oral cavity, where physical trauma and poor oral hygiene are important predisposing factors.[20] Female sex hormones may also play a role as the condition occurs at an increased frequency in pregnant women and in those who use oral contraceptive pills.[5,11] It is believed that trauma and female sex hormones enhance expression of angiogenic factors such as vascular endothelial growth factor (VEGF) and basic fibroblast growth factor (bFGF) which will lead to evolution of the pyogenic granuloma.[5,11] It has been shown that *GNAQ*, *BRAF,* and *RAS* mutations have a role to play in the pathogenesis of pyogenic granuloma.[7,21,22] Chronic dermatoses such as atopic dermatitis and psoriasis

are a predisposing factor.[4] Infections such as those caused by Epstein-Barr virus and herpes simplex type 1 have also been incriminated.[24]

Table 1. Medications as possible contributing factors for pyogenic granuloma[6,12,19,23-29]

acitretin	ibrutinib
afatibin	imatinib
blinatumomab	indinavir
capecitabine	isotretinoin
cetuximab	lamivudine
cyclosporine	laptinib
docetaxel	mitozantrone
encorafenib	osimertinib
erlotinib	paclitaxel
erythropoietin	panitumumab
etanercept	ramucirumab
etoposide	tacrolimus
getfitinib	vemurafenib

Pyogenic granuloma typically develops as a small pinhead-sized, erythematous papule on the skin or oral mucosal surface **(Figure 1)**.[1-3] The papule usually enlarges rapidly to a few millimeters and occasionally a few centimeters over weeks to months and eventually stabilizes in size. **(Figure 2)**[5,12]

Clinically, pyogenic granuloma presents as a soft, dome-shaped papule/nodule or a sessile or pedunculated papule/nodule with a smooth, glistening, erosive, or friable surface **(Figure 3)**.[1-3,6] Rarely, it may present as a sessile plaque.[4] The color of the lesion is usually bright red, purple, to dusky red likely because of the high number of blood vessels. With time, the vascularity decreases, and the lesion tends to become more collagenized and pink **(Figure 4)**.[1-3]

Fig. 1 *A small, pinhead-sized erythematous papule on the skin is shown*.

Fig. 2 The *papule on the skin grows in size over the course of a few weeks to months.*

Fig. 3 *The papule presents as soft and dome-shaped or as a pedunculated nodule with a smooth, glistening, erosive, or friable surface.*

Fig. 4. *In time, the vascularity of the lesion decreases and it tends to become more collagenized and pink.*

Characteristically, the lesion is asymptomatic and painless.[1-3,30] Due to its pronounced vascularity, pyogenic granuloma tends to bleed and ulcerate even with minor trauma.[1-3,5,15,26] As such, patients often present with the “band-aid sign” where the lesion is covered by a band-aid before being removed to show the physician **(Figure 5)**.[1-3] The lesion is usually solitary, but multiple lesions may occur.[1-3,5,8] Multiple lesions in a linear distribution have, rarely, been reported.[31]

Fig. 5 *Patients often present with the "band-aid sign" where the lesion is covered by a band-aid before being removed to show the physician.*

In children, cutaneous pyogenic granulomas are commonly located on the head and neck (62.5%), trunk (19.7%) and extremities (17.9%), especially the fingers.[5] In this regard, multiple periungual pyogenic granulomas occur most frequently in association with medications and chronic dermatoses.[4] In adults, the trunk and extremities (more common on the upper extremities than the lower extremities) are sites of predilection.[4,8] In the oral cavity, pyogenic granulomas are more frequent on the gingival mucosa, followed by the lips, tongue, and buccal mucosa.[4,32] Lesions are slightly more common on the maxillary gingiva than the mandibular gingiva, anterior areas than posterior areas, and facial aspect of the gingiva than the lingual or palatal aspect.[1-3] Nasal pyogenic granulomas generally arise from the nasal septum and/or from turbinates on the roof of the nasal cavity, or in the maxillary sinus.[1-3,10] Pyogenic granulomas rarely occur in the gastrointestinal tract, trachea, urinary bladder, and central nervous system.[30]

Clinical variants such as satellite pyogenic granulomas, subcutaneous pyogenic granulomas, intravenous pyogenic granulomas, and disseminated pyogenic granulomas are rare.[19] Satellite pyogenic granulomas are most commonly seen in adolescents and young adults and commonly seen on the trunk.[9,33] Satellite lesions tend to occur 4 to 20 weeks after the primary lesion has been excised or treated and occur in very close proximity to the site of the original primary lesion.[33] Satellitosis might be the result of release of angiogenic factors such as bFGF and VEGF by the primary lesion. Subcutaneous pyogenic granulomas occur predominately in females.[34] The lesion typically presents as a well circumscribed subcutaneous nodule which usually does not bleed or ulcerate.[34] Intravenous pyogenic granulomas occur mainly in middle-aged individuals.[35] The lesion is confined within the lumen of a vein and typically presents as a soft, subcutaneous, slow-growing nodule which may be bluish, erythematous, or skin-colored.[35,36] Sites of predilection include the neck and upper extremities.[35] Disseminated pyogenic granulomas are generally seen after trauma such as a burn, with some medications, and in patients with an accompanying systemic disease or immunodeficiency.[4,26,37]

disease or immunodeficiency.

The diagnosis is mainly clinical based on the history of a small, erythematous papule that tends to bleed and enlarge quickly over weeks to months. Dermoscopy of the lesion reveals reddish homogenous areas (corresponding to proliferating capillaries and venules) and a white scaly collarette (corresponding to hyperplastic adnexal epithelium).[16,35,38,39] Polarized dermoscopy shows rainbow-patterned and irregular whitish areas.[40] The rainbow pattern (corresponding to vascular lumen-rich areas on histopathology) is the result of an interplay of light absorption, diffusion, and distraction.[40] Dermoscopy increases the diagnostic accuracy and has been shown to be a very useful tool to evaluate pyogenic granuloma.[41]

Pyogenic granulomas can be unsightly and cosmetically disfiguring, especially if they occur on the face.[1-3] Other complications include hemorrhage, ulceration, and infection in an ulcerated lesion.[9] Fortunately, pyogenic granulomas have no malignant potential.

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EDITOR'S NOTE:
This article is part of a series describing and differentiating dermatologic lumps and bumps. To access previously published articles in the series, visit: https://www.consultant360.com/resource-center/atlas-lumps-and-bumps.

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