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Pyogenic Granuloma

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Abstract

Pyogenic granuloma, also known as lobular capillary hemangioma, is a common, acquired, benign vascular proliferation that typically develops as a small erythematous papule on the skin or oral mucosal surface. The papule usually enlarges quickly to a few millimeters over weeks and growth stabilizes over several months. 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. The color is usually bright red to dusky red. Characteristically, the lesion is asymptomatic and painless. Pyogenic granuloma is usually solitary. Cutaneous pyogenic granulomas are commonly located on the head and neck, as well as fingers and toes. In the oral cavity, pyogenic granulomas are more frequent on the gingiva. The lesion tends to bleed and ulcerate even with very minor trauma which brings patients to seek medical care. Although pyogenic granulomas occur in patients of any age, they are more prevalent in children, adolescents, and pregnant women. Cutaneous pyogenic granulomas have no gender predilection whereas the oral mucosal ones have a female to male ratio of 2:1. Trauma and female sex hormones are possible etiologic factors. The diagnosis is usually clinical. Pyogenic granulomas developing during pregnancy tend to resolve on their own after delivery and usually require no treatment. Most other lesions are treated. Surgical excision with linear closure allows histologic examination of the tissue. It also has the lowest rate of recurrence and is therefore the treatment of choice.

Keywords: Pyogenic granuloma; Lobulated capillary hemangioma; Friable; Bright red; Surgical excision

Introduction

Pyogenic granuloma, also known as lobular capillary hemangioma, is a common, acquired, benign vascular proliferation of the skin and mucous membrane [1]. The condition was first described in 1897 who reported four patients with "vascular tumors" on the fingers [2]. The term "pyogenic granuloma" or "granuloma pyogenicum", coined by Hartzell in 1904 [3], is a misnomer as the condition is neither pyogenic nor granulomatous [4]. Although "lobular capillary hemangioma" coined by Meller et al. is a preferred term [5]. The term may confuse it with infantile hemangioma [4].

Epidemiology

Although pyogenic granulomas occur in patients of any age, they are more prevalent in children, adolescents, and pregnant women [6,7]. Pyogenic granuloma accounts for 0.5% of all childhood skin nodules [8,9]. In the pediatric age group, the mean age of onset is 6.7 years; with 42% of cases occur by 5 years of age [6]. In the adult population, the incidence peaks in the third decade of life [6,10]. Pyogenic granuloma, especially on the gingiva, occurs in approximately 2 to 5% of pregnancies, usually in the second or third trimester [11,12]. In this setting, pyogenic granuloma is often referred to as granuloma gravidarum, granuloma of pregnancy, epulis gravidarum, or pregnancy tumor [8,12]. Cutaneous pyogenic granulomas usually have no gender predilection whereas the oral mucosal ones have a female to male ratio of 2:1 [6].

Etiology and Pathogenesis

The exact etiology is not known. Pyogenic granuloma is considered a reactive vascular response to a variety of stimuli such as trauma and increased levels of female sex hormones. Approximately 7% of affected patients have a history of trauma preceding the lesion [8,13]. Female sex hormones may also play a role as the condition occurs at increased frequency in pregnant women and in those who use oral contraceptive pills [6,11,14]. It is believed that trauma and female sex hormones enhance expression of angiogenic factors such as basic fibroblast growth factor (bFGF) and vascular endothelial growth factor (VEGF) which will lead to evolution of the pyogenic granuloma [6,7,11,15]. Medications such as isotretinoin, acitretin, cyclosporine, lamivudine, docetaxel, imatinib, and indinavir may also be contributing factors [8,13,15-18]. Infections such as caused by herpes simplex type-I and Epstein-Barr virus have also been incriminated [18].

Histopathology

Histologically, the lesion appears as a lobular proliferation of capillaries with each lobule containing a central feeder vessel surrounded by aggregates of capillaries [13]. The lobules are separated by a fibro-myxoid stroma [6]. In those lesions that are undergoing regression, there may be extensive fibrosis [19].

Clinical Manifestations

Pyogenic granuloma typically develops as a small erythematous papule on the skin or oral mucosal surface [4,6]. The papule usually enlarges quickly to a few millimeters and occasionally a few centimeters over weeks and growth stabilizes over several months [6,14]. 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 1) [8,20]. The color is usually

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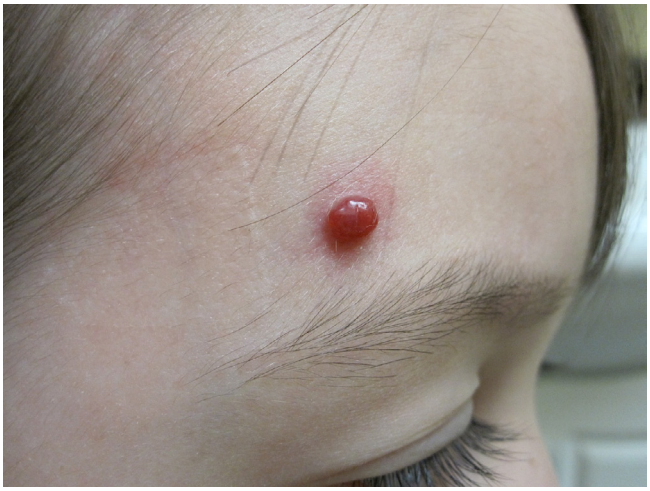

Figure 1: Pyogenic granuloma in the frontal area above the right eyebrow in a 9-year-old girl

bright red to dusky red initially. With time, the vascularity decreases and the lesion tends to become more collagenized and pink [14,20]. Characteristically, the lesion is asymptomatic and painless [19,20]. Due to its pronounce d vascularity, pyogenic granuloma tends to bleed and ulcerate even with very minor trauma [6,9]. 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. The lesion is usually solitary, but multiple lesions may occur [6,9].

Cutaneous pyogenic granulomas are commonly located on the head and neck (62.5%), trunk (19.7%) and extremities (17.9%), especially the fingers [6,12]. In the oral cavity, pyogenic granulomas are more frequent on the gingiva, followed by the lips, tongue, and buccal mucosa [6,14,20,21]. 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 [20]. 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 [10]. Pyogenic granulomas rarely occur in the gastrointestinal tract, trachea, urinary bladder, and central nervous system [19,22].

Clinical variants such as satellite pyogenic granulomas, subcutaneous pyogenic granulomas, intravenous pyogenic granulomas, and disseminated pyogenic granulomas are rare [13]. Satellite pyogenic granulomas are most commonly seen in adolescents and young adults and commonly seen on the trunk [23]. Satellite lesions tend to occur 4 to 20 weeks after the primary lesion has been excised and to occur in very close proximity to the site of the original primary lesion [23]. 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 [24]. The lesion typically presents as a well circumscribed subcutaneous nodule which usually does not bleed or ulcerate [24,25]. Intravenous pyogenic granulomas occur mainly in middle-aged individuals [26]. The lesion is confined within the lumen of a vein [26,27]. The lesion typically presents as a soft, subcutaneous, slow-growing nodule which may be bluish, erythematous, or skin-colored [26,27]. Sites of predilection include the neck and upper extremities [26]. Disseminated pyogenic granulomas are generally seen after trauma such as burns and in patients with an accompanying systemic or skin disease [28].

Diagnosis

The diagnosis is mainly clinical. Demoscopy of the lesion reveals red homogenous areas (proliferating vessels) and a white scaly collarette (hyperplastic epithelium) [29]. Dermoscopy increases the diagnostic accuracy and has been shown to be a very useful tool to evaluate pyogenic granuloma [29]. However, dermoscopy is not a substitute for histology, a biopsy is warranted if the diagnosis is in doubt (e.g. to rule out amelanotic melanoma).

Differential Diagnosis

Pyogenic granuloma has to be differentiated from bacillary angiomatosis (disseminated vascular lesions in immunocompromised individuals) and verruga peruana (crops of vascular nodules in immunocompetent individuals) caused by infection with *Bartonella* species [30,31]. Other differential diagnoses include pedunculated cherry angioma, granulation tissue, infantile hemangioma, venous lake, epulis, glomus, acquired digital fibrokeratoma, amelanotic melanoma, hyperplastic gingival inflammation, peripheral giant cell granuloma, peripheral ossifying fibroma, Spitz nevus, proliferating pilomatricoma, Kaposi's sarcoma, and angiosarcoma [6,8,15,19,32].

Complications

Pyogenic granuloma can be unsightly and cosmetically disfiguring, especially if it occurs on the face. Other complications include hemorrhage, ulceration, and infection in an ulcerated lesion [8]. Pyogenic granuloma has no malignant potential [31].

Management

Pyogenic granulomas developing during pregnancy tend to resolve on their own after delivery and usually require no treatment [6]. Most other lesions are treated. A series of treatment modalities are available, including surgical excision, shave excision, laser surgery, electrodessication, curettage, liquid nitrogen cryotherapy, sclerotherapy, topical silver nitrate, and topical imiquimod [1,6,7,15,33,34]. Recurrences may occur and are largely attributed to inadequate removal or incomplete destruction of the lesions. Surgical excision with linear closure allows histologic examination of the tissue [4]. It also has the lowest rate of recurrence and is therefore the treatment of choice [6,9,13,35]. Surgical excision, however, may leave scars [36].

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