

# Pyogenic Granuloma: A Retrospective 10-year Analysis of 82 Cases

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**Objective:** Pyogenic granuloma (PG) is a common acquired hemorrhagic benign vascular lesion of the skin and mucous membranes. Recently, PG was considered a capillary hemangioma and was renamed as lobular capillary hemangioma (LCH). A clinical retrospective analysis of PG cases in our institute over a period of 10 years was performed.

**Methods:** The study involved 82 cases of pathologically diagnosed PG managed and treated at the Plastic Surgery Department of Tokai University between 1995 and 2004. Individual data from charts were reviewed for age, gender, affected site, size of lesion, predisposing factors, and treatment. All lesions were treated surgically using an excision followed by suture, or shave excision followed by CO<sub>2</sub> laser ablation.

**Results:** The overall male to female ratio was 1.5 : 1. In 28% of the total cases, a preceding lesion was evident prior to the occurrence of PG. The head and neck area were the most commonly affected sites (56%), followed by the upper limb (22%), trunk (16%), and lower limbs (6%). CO<sub>2</sub> laser ablation was performed successfully in 24% of patients and resulted in no recurrences.

**Conclusion:** Based on our results, we recommend surgical excision followed by CO<sub>2</sub> laser ablation as the first-choice treatment for PGs.

**Key words:** Pyogenic granuloma, CO<sub>2</sub> laser, Lobular capillary hemangioma (LCH)

## INTRODUCTION

Pyogenic granuloma (PG) is a common acquired hemorrhagic benign vascular lesion of the skin and mucous membranes [1]. This hypervascularized lesion grows rapidly, frequently presenting as a hemorrhagic, red to purple, sessile or pedunculated mass [2]. The term “granuloma pyogenicum” was originally used, suggesting an infectious origin with granulomatous inflammation [3]. However, no infectious cause has been proven. Recently, PG was considered to be a capillary hemangioma and was renamed as lobular capillary hemangioma (LCH) [4]. Most cases require some form of surgical treatment; thus, patients often visit outpatient plastic surgery clinics or dermatology departments. In the present study, we performed a clinical retrospective analysis of PG cases in our institute over a period of 10 years.

## PATIENTS AND METHOD

The study involved a retrospective analysis of 82 cases of pathologically diagnosed PG managed and treated at the Plastic Surgery Department of Tokai University Hospital between 1995 and 2004. All patients were treated surgically. The mass was excised using a scalpel followed by suture, or shave excision was performed with a scalpel followed by CO<sub>2</sub> laser ablation. All lesions were diagnosed pathologically. Individual data from the charts were reviewed for age, sex, affected site, size of the lesion, predisposing factors, and treatment.

## RESULTS

### Demographics

The mean age of the patients was 39.6 years (range: 10 months to 91 years). The mean age of male patients (n = 49) was 37.5 years and that of female patients (n = 33) was 42.7 years, i.e., slightly higher than that of male patients. The overall male to female ratio was 1.5 : 1; however, among juveniles between 0 and 19 years of age, the ratio was 3.3 : 1. Furthermore, among patients in the third decade of their life, the ratio was 1 : 1.7 (Table 1).

### Affected site

The head and neck area, including the oral cavity and nasal mucosa, were the most commonly affected sites (56%, n = 46), followed by the upper limb (22%, n = 18), trunk (16%, n = 13), and lower limbs (6%, n = 5). Among the lesions in the head and neck area, most were located in the oral cavity and nasal mucosa (28%, n = 13), followed by the scalp (17%, n = 8) and cheek and lips (13%, n = 6 each). Of the oral cavity and nasal mucosa lesions, 69% (n = 9) occurred on the tongue. The most commonly affected site on the upper limb was the fingers (16%, n = 13). In the trunk, the chest was the most commonly affected site (46%, n = 6). The ratio between cutaneous and mucosal lesions in male and female patients was 1.8 : 1 and 1 : 1.6, respectively (Table 2) (Table 3).

### Size

The size of the lesions was recorded on the chart in only 61 cases. The mean diameter of the mass (mea-

**Table 1** Age and sex

Age	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	total
Male	6	7	10	3	5	5	10	2	0	1	49
Female	2	2	7	5	2	5	7	2	1	0	33
											82

**Table 2** Detailed distribution of lesions by anatomical site

Anatomical site	Detailed site	Number of cases		Total per site (percentage, %)
		Male	Female	
Head and neck	Oral and nasal mucosa	5	8	13 (28.2)
	Scalp	4	4	8 (17.4)
	Cheek	5	1	6 (13)
	Lip	4	2	6 (13)
	Neck	3	1	4 (8.7)
	Forehead	1	2	3 (6.5)
	Eyelid	2	1	3 (6.5)
	Nose	1	0	1 (2.2)
	Mandible	1	0	1 (2.2)
	Orbit (ocular prostheses)	1	0	1 (2.2)
		27	19	46
Upper limb	Finger	6	7	13 (72.2)
	Hand	2	0	2 (11.1)
	Forearm	2	0	2 (11.1)
	Wrist	1	0	1 (5.6)
		11	7	18
Trunk	Chest	3	3	6 (46.2)
	Back	1	1	2 (15.4)
	Shoulder	1	0	1 (7.7)
	Axilla	1	0	1 (7.7)
	Abdomen	1	0	1 (7.7)
	Genitalia	1	0	1 (7.7)
		9	4	13
Lower limb	Knee	0	2	2 (40)
	Thigh	1	0	1 (20)
	Toe	1	0	1 (20)
	Foot	0	1	1 (20)
		2	3	5

**Table 3** Detailed distribution of mucosal lesions by anatomic site

	Male	Female	Total
Tongue	4	5	9
Gingiva	0	1	1
Palate	1	0	1
Cheek mucosa	0	1	1
Nose mucosa	0	1	1
	5	8	13

**Table 4** Preceding pathological lesion

Preceding pathological lesion	Number of cases
Microtrauma	14
Bite wound	6
Repeated mechanical stimulation	3
	23 (28%)
No evident history	59 (72%)

sured as the longest diameter) varied from 2 mm to 30 mm. In 85% of cases, the diameter was smaller than 10 mm.

#### Preceding pathological lesion

In 28% (n = 23) of the total cases, a pathological skin lesion was evident prior to the occurrence of PG. These pathological skin lesions varied and ranged from bite wounds on lips and mucosal surfaces, acne vulgaris, repeated mechanical irritations, hangnails, and lesions attained due to picking of thorns. The cause of repeated mechanical irritations included wisdom teeth, ocular prosthesis, and wristwatch. However, in 72% of cases, no evident preceding pathological skin lesion was determined (Table 4).

#### Treatment

All patients were treated surgically. The mass was excised using a scalpel followed by suture, or shave excision was performed with a scalpel followed by CO<sub>2</sub> laser ablation. Excision and suture were performed in 76% of cases (n = 62), and shave excision with CO<sub>2</sub> laser ablation was performed in the remaining 24% of cases (n = 20).

#### DISCUSSION

In 1897, Poncet and Dor [5] described a lesion in a man and designated it botryomycosis hominis. The term “pyogenic granuloma” was first introduced by Hartzell [3] in 1904 as “granuloma pyogenicum”. The term “lobular capillary hemangioma” was introduced by Mills *et al.* in 1980 to characterize the histopathological appearance of these lesions [4]. They determined the histopathological feature as “an essential com-

ponent of the lesion is a circumscribed aggregate of capillaries arranged in one or more lobules. In its most compact form, the lobule consists of closely packed clusters of endothelial cells with only a few scattered capillary lumina.” Many observers, equating PG with simple granulation tissue, concluded that PG is a non-specific capillary reaction that occurs in a setting of repeated trauma or irritation [6]. However, Mills *et al.* stated that non-ulcerated lesions may contain stromal edema and that inflammatory infiltration is slight. In recent articles, PG has been treated as a capillary hemangioma and the relation with a non-specific reaction caused by bacterial infection has been refuted.

The mean age of patients in the present study was 39.6 years. Several studies have shown that the typical age ranges from 30–40.5 years [2, 4, 7, 8]. Males were 3.25 times more common among children under 10 years old in this series, whereas there was a slight male preponderance among overall patients (59.8% male). Other authors have also reported a male preponderance among children. Giblin *et al.* described that PG was 2.6 times more common among male children [7]. Mills *et al.* reported that patients younger than 18 years of age were predominantly males (82%), whereas those between the ages of 18 and 39 years were predominantly females (86%) [4]. In a retrospective study of 206 children, Patrice *et al.* showed that the lesions were 1.5 times more common among males [1].

In the present study, the most common sites of PG were the head and neck area in both sexes even when the mucosal lesions were excluded. Harris *et al.* reported that the trunk and upper extremities were the most commonly affected sites [2], whereas Patrice *et al.* reported that the head and neck region was the most

**Table 5** Treatment outcome

Treatment	Local anesthesia	Post treatment pain	Scar	Recurrence rate
surgical excision followed by sutute	+	+	prominent	3.7% Giblin <i>et al.</i> [7] 5.8% Al-Khateeb <i>et al.</i> [8] 0% Patrice <i>et al.</i> [1] 0%*
shave excision with CO <sub>2</sub> laser ablation	+	–	obscure	0% Pagliai <i>et al.</i> [15] (> 10 mm) 0%* (< 7 mm)
surgical excision followed by electrocautery	+	+	acceptable	0% Pagliai <i>et al.</i> [15] (< 10 mm)
shave excision followed by argon laser, yellow dye laser, KTP laser	+	–	obscure	4.8% Kirschner <i>et al.</i> [16]
shave excision with Nd : YAG laser	+	–	obscure	D.N.** Powell JL <i>et al.</i> [17]

\* ; present study

\*\* ; D.N. means “did not note the recurrence rate”

commonly affected site in children under 17 years of age [1]. In our present study, among the mucosal lesions (n = 13), the tongue was the most commonly affected site (n = 9). In other articles, many authors have reported that the gingiva near the cervix of a tooth was the most commonly affected site [8–10]. Mucosal PG is reported as common in female patients [2, 4, 10]. Harris *et al.* found that mucosal lesions were twice as common in females as in males [2]. Mills *et al.* reported that patients with oral lesions in those aged between 18 and 39 years were predominantly females (89%) [4].

Often, minor injuries or infections have been described as triggers [6]. The fingers and feet are considered as the main site because of the microtrauma to which they are constantly exposed [11]. However, many authors have reported that only a minority of patients have a history of trauma. For example, Patrice *et al.* [1] revealed that in 178 patients with PG, only 7% had a history of trauma preceding the onset of the lesion.

Kerr *et al.* studied the similarity between PG and pregnancy tumor and stated that some systemic factor that stimulates vascular proliferation plays a part in the etiology of this lesion [6]. Maureen *et al.* also suggested a hormonal role in the pathogenesis because PG can occur during pregnancy or with the use of oral contraceptives [12]. These findings are unlikely to be related to cutaneous PG. Harris *et al.* stated that female hormones are not an etiological component of cutaneous lesions; however, the hormonal factor may be an important etiological element in the development of mucosal LCHs [2]. However, Mills *et al.* reported that LCH in pregnant women were histologically indistinguishable from lesions occurring in non-pregnant

individuals [4].

Conservative treatment for PG involves cryosurgery [13, 14], surgical excision, shave excision, or curettage followed by electrocauterization [15]. Giblin *et al.* reported that there was a recurrence rate of 3.7% in the 326 lesions treated by surgical excision [7]. Al-Khateeb *et al.* treated all oral lesions in 108 patients with surgically excision, where 5.8% of cases were known to have recurred [8]. On the other hand, other non-conventional surgical modalities have been reported. Kirschner *et al.* performed shave excision followed by laser (argon laser, argon-pumped tunable yellow dye laser, KTP laser) photocoagulation of the base. They reported that the recurrence rate was 4.8%, and cosmetic results were acceptable [16]. Recently, Nd : YAG laser [17], CO<sub>2</sub> laser [15], and flashlamp pulsed dye lasers [18–21] have also been used. White *et al.* concluded that the advantages of CO<sub>2</sub> and Nd : YAG laser treatment include minimal postoperative pain, site-specific minimally invasive surgery, and elimination of the need for sutures [22]. Pagliai *et al.* recommended shave excision and electrocautery as the primary treatment for uncomplicated PGs. Furthermore, they suggested large lesions (> 10 mm) may require more aggressive therapy such as CO<sub>2</sub> laser vaporization [15]. Some studies have reported on the injection of sclerosing agents [23] or corticosteroids [24], particularly for highly recurrent PGs. In our study, CO<sub>2</sub> laser ablation was performed successfully in 24% of patients and did not result in postoperative pain. Surgical excision was performed mainly for larger lesions (> 7 mm), and no recurrence was observed. Based on our results, we recommend surgical excision followed by CO<sub>2</sub> laser ablation as the first-choice treatment for PGs. The advantage of CO<sub>2</sub>

laser ablation is less pain after treatment. Usually the excisional treatment followed by suture needs analgesic medication for one or two days after the operation. CO<sub>2</sub> laser ablation needed no analgesic medication in all of our cases. The excisional treatment needs full thickness incision of the skin, and needs undermining separation below the dermis. However, CO<sub>2</sub> laser ablation only needs the superficial dermal ablation. This difference is the reason of the less pain after treatment by CO<sub>2</sub> laser ablation.

On the other hand, shallow ablation is expected to cause recurrence of the disease. That was why we chose the excision using a scalpel followed by suture at the period from 1994 to 2004. However, according to our experience in presented study, the recurrence rate of CO<sub>2</sub> laser ablation was 0%. For this reason, we recommend surgical excision followed by CO<sub>2</sub> laser ablation as the first-choice treatment for PGs. Several articles reported recurrence after excisional treatment or CO<sub>2</sub> laser ablation [7, 8, 16], however, we believe that a careful inspection and an accurate decision enables the elimination of recurrence.

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