

Pyogenic granuloma: description of two unusual cases and review of the literature

Granuloma Piogênico: descrição de dois casos incomuns e revisão da literatura

ABSTRACT

Pyogenic granuloma is a common, benign, vascular proliferation, usually secondary to other events, such as cutaneous trauma. It is known that some lesions can mimic melanoma and vice versa, and it is recommended that the lesion be surgically removed and analyzed histologically. The advent of technologies—such as dermoscopy—that amplify the image recognized by the eye through the identification of certain structures and specific patterns, can facilitate this differentiation and assist in decision-making. In rare situations, its clinical presentation is unusual. The current article is aimed at demonstrating this fact and reviewing the medical literature on the subject, focusing on dermoscopic findings.

Keywords: pyogenic granuloma; dermoscopy; melanoma.

RESUMO

Granuloma piogênico é proliferação vascular benigna e comum, geralmente secundária a eventos como trauma cutâneo. É sabido que algumas lesões podem mimetizar o melanoma e vice-versa, sendo recomendadas remoção cirúrgica e análise anatomopatológica. O advento de tecnologias que ampliam a imagem reconhecida pelo olho, como a dermatoscopia, através da identificação de algumas estruturas e determinação de padrões específicos, pode facilitar essa diferenciação e ajudar na tomada de decisões. Em situações raras, sua apresentação clínica mostra-se inusitada, e o objetivo deste artigo é demonstrar esse fato e revisar a literatura médica sobre o assunto, com foco nos achados dermatoscópicos.

Palavras-chave: granuloma piogênico; dermatoscopia; melanoma.

INTRODUCTION

Pyogenic granuloma is a common, benign, acquired vascular proliferation that affects the skin and mucous membranes.¹⁻⁴ It usually presents as a single nodule or papule of rapid growth, bleeds easily with only a minimum of trauma, and may develop into an ulcer.¹⁻⁴ It occurs commonly on the hands (especially on the fingers), face, lips and feet, however it can also involve other body sites such as the trunk and perianal mucosa.¹⁻⁴

It was first described by Poncet and Dor in 1897, being called botryomycose humaine. The expression pyogenic granuloma was subsequently proposed by Hartzel in 1904, however other names, such as telangiectaticum granuloma, granuloma pediculatum and lobular capillary

Case Reports

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Received on: 1 August 2013
Approved on: 28 August 2013

The present study was carried out at the Faculdade de Medicina do ABC (FMABC)—Santo André (SP), Brazil.

Financial support: None
Conflict of interest: None

hemangioma have emerged. The denomination pyogenic granuloma was established in the United States, for it was believed to be the term that best described the pathologic process.¹ However, these lesions are neither pyogenic (for it was not possible to prove the involvement of bacterial infection) nor granulomatous. According to Zaballos et al., the best designation for these lesions would be lobular capillary hemangioma, which, however, is still subject to debate.⁵

The lesion seems to be reactive, but its exact mechanism of onset is uncertain. One possibility is that it might occur due to a reactional hyperproliferative vascular response to a variety of stimuli such as infectious organisms, cutaneous trauma, hormonal factors, and drug therapy such as retinoids.^{1,4,5}

Histologically, it shows capillary proliferation close to the surface, with a radiated pattern and a loose edematous collagen matrix, with the epidermis extending down into the base of the lesion, producing an epidermal collar and in some cases causing the formation of peduncles. Mixed inflammatory infiltrate can occur—and fibrosis with septa that intersect the lesion, producing a lobular pattern that can take place in more severe cases.¹

Its diagnosis is usually facilitated by analysis of history and clinical aspects, however it may mimic benign or malignant tumors in some situations.^{1-4,6} The main differential diagnoses are: keratoacanthoma, squamous cell carcinoma, basal cell carcinoma, inflamed seborrheic keratosis, common warts, melanocytic nevus, Spitz nevus, metastatic carcinoma, Kaposi's sarcoma, true hemangioma, vascular tumors of intermediate malignancy, and amelanotic melanoma.¹

Previous studies have found 38% of cases incorrectly diagnosed.¹⁻³ Some papers focusing on dermoscopy were designed to better study the characteristics of pyogenic granulomas with a view to facilitating the differentiation from similar lesions. Dermoscopy has been a useful tool in the diagnosis of not only pigmented but also non-pigmented lesions due to the capacity of recognition of

vascular patterns not visible to the naked eye.⁷ Particularly in the case of pyogenic granulomas, dermoscopic patterns have been described.

In the present article, two cases of pyogenic granuloma with atypical clinical manifestations are presented with their dermoscopic images, followed by a review of the literature on the subject.

CASES

Patient 1: female, mulatto, 60-years-old, with a friable, asymptomatic tumor in the dorsal region of the third left finger for six months, recurring after previous treatments (surgical excision and electrocoagulation) (Figure 1).

Patient 2: female, Caucasian, 76-years-old, bearing a vegetating lesion with necrotic surface on the dorsum of the left hand, and wine colored satellite papules reaching the palm, for six months, with pain and bleeding (Figure 2).

Dermoscopy of the lesions showed a well-delimited raised nodular lesion, without melanin pigment, and characteristics compatible with melanocytic lesion (Figures 3 and 4).

Histological examination of Patient 1 revealed a raised, well-defined nodular lesion with conservation of epidermal areas and others with epidermal ulceration, inflammatory mononuclear cells, lymphocytes, intact and lysed polymorphonuclear neutrophils, with recent hemorrhage in the papillary dermis just beneath the ulcerated areas. In the deep and superficial papillary dermis, various capillary blood vessels were identified, proliferating in lobular arrangement, with thin walls overlaid by flattened endotheliocytes without atypia and containing red blood cells in the lumen. Capillaries had a radiated layout with some elongated vessels and others displaying obtuse angles (Figures 5 and 6).

A histopathological examination of Patient 2 revealed a lesion similar to that of Patient 1, in its nodular and lobulated arrangement, formed by a microvascular blood proliferative lesion with capillaries in a radiated disposition, and endothelial overlay without atypia. In deeper

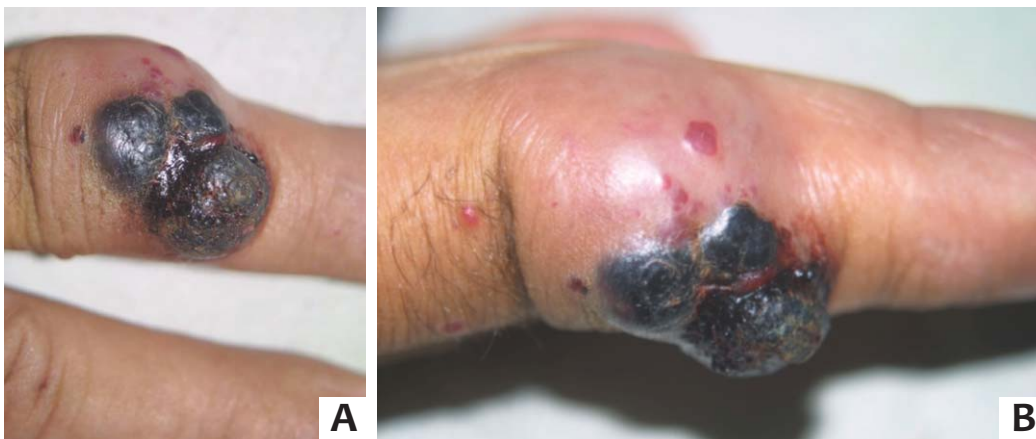


FIGURE 1: A e B. Clinical picture of Case 1.

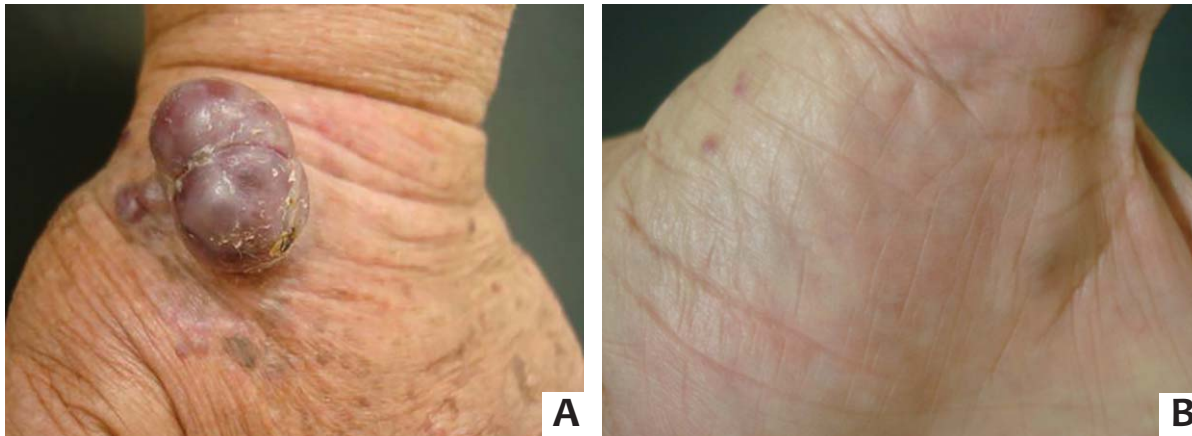


FIGURE 2: A e B. Clinical picture of Case 2.

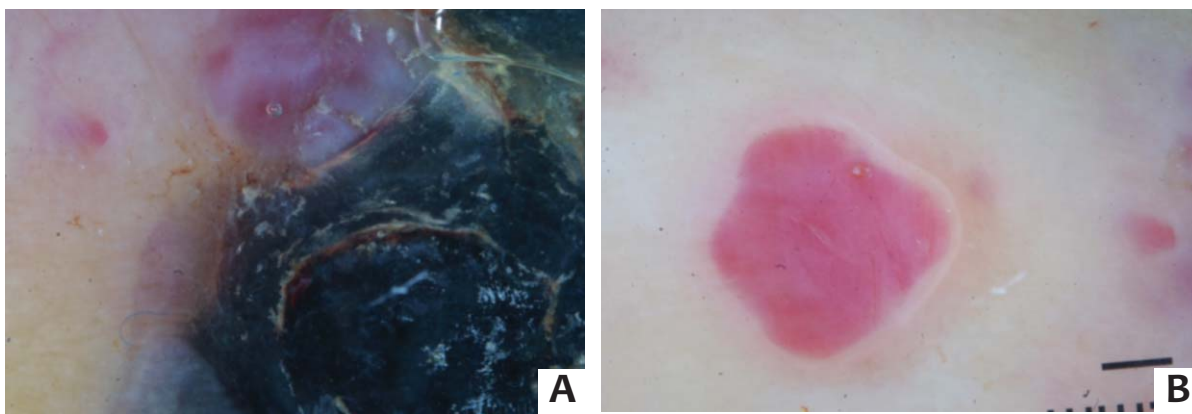


FIGURE 3: A e B. Dermoscopy of the lesion in Case 1.

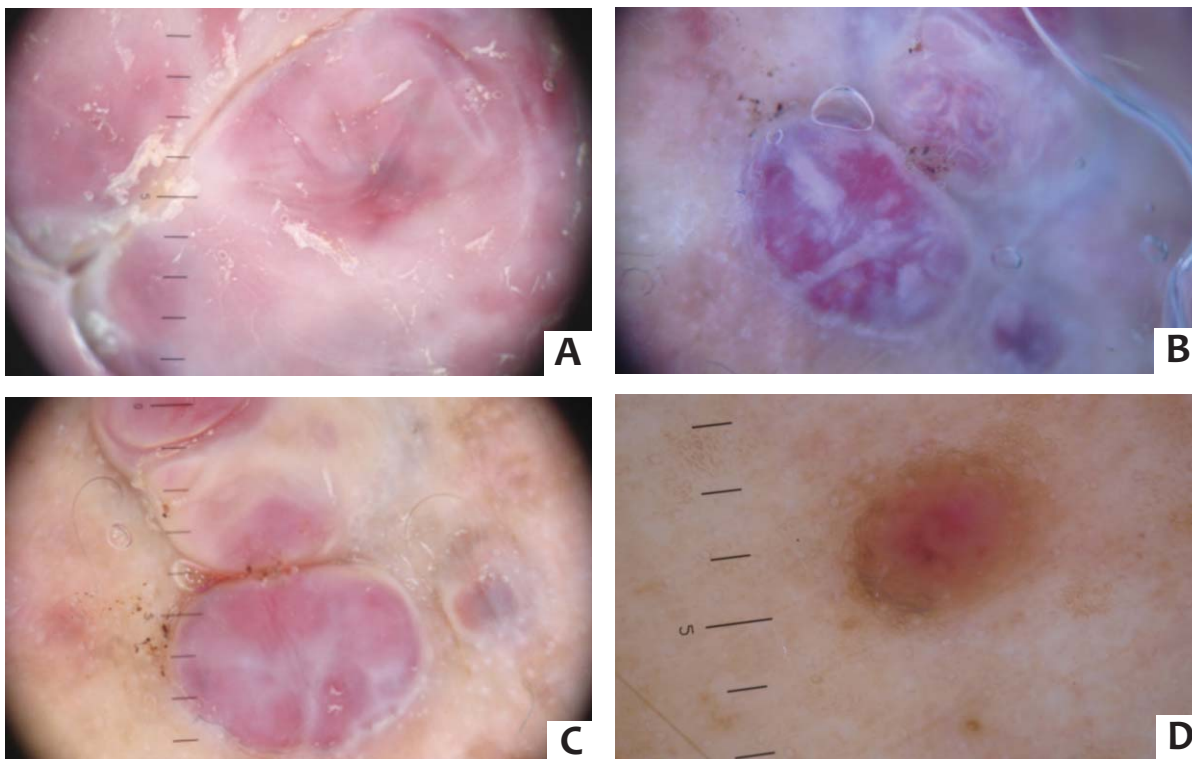


FIGURE 4 A: Dermoscopy of the lesion in Case 2; **B:** Dermoscopy with polarized light of the lesion in Case 2; **C:** Conventional dermoscopy of the lesion in Case 2 (the same lesion is shown in Figure 4B); **D:** Dermoscopy of the lesion in Case 2.

planes, however, an increase of endothelial cellularity showing elongated nuclei with fusiform aspect and mild nuclear atypia, such as hyperchromatism, was verified, without necrosis or mitosis. Despite the existence of other smaller satellite lesions (similar to the latter) on the hand of the patient, the final diagnosis was that of pyogenic granuloma (Figure 7).

The photograph not featuring a magnified view of the biopsy taken during the histological examination of Patient 2's cutaneous lesion, shows a full view of the lesion

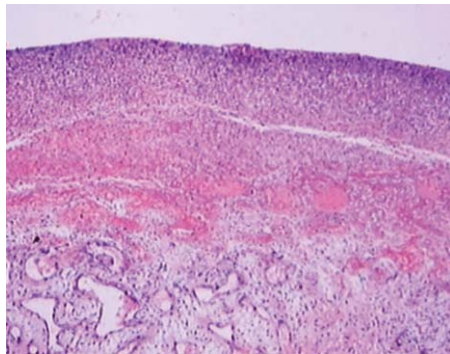
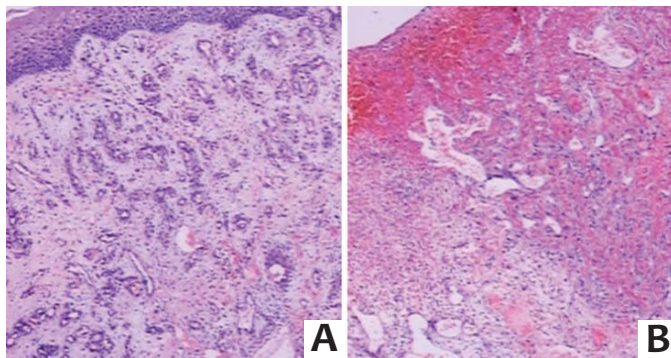


FIGURE 5: Patient 1: Ulcerated epidermis with mononuclear and polymorphonuclear inflammatory cells. Recent superficial hemorrhage, and blood capillary proliferative vascular lesion immediately beneath, are observed (photomicrography with 40X magnification in optical microscope).



FIGURES 6: A e B Patient 1: The radiated arrangement of proliferated capillary blood vessels in the superficial dermis are observed in Figure 6A; the proliferative microvascular lesion is seen in Figure 6B (photomicrographies with 100X magnification in optical microscope).

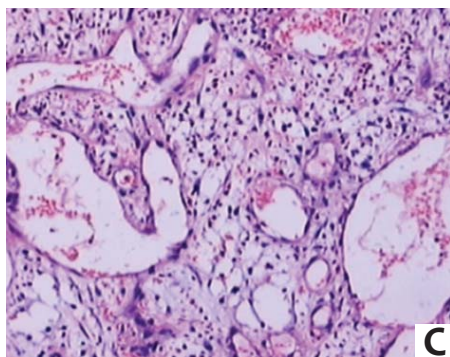


FIGURA 6: C Patient 1: Micro capillary blood vessels are seen in varied sizes and rounded shapes, sometimes angled, overlaid with flattened endotheliocytes and containing red blood cells in the lumen. It is possible to observe dermal stroma surrounding them, with loose and edematous appearance.

with nodular area. In the photomicrography, the images show the lesion just beneath the epidermis. These areas show less cellularity and contain a more recent hemorrhage, with the most differentiated area exhibiting froth with small blood capillaries, an aspect of lobular capillary hemangioma. The deepest areas of the lesion, in the subcutaneous tissue region, are hypercellular areas composed of fusiform cells with mild to moderate atypia, rose-colored cytoplasm, and elongated and hyperchromatic nuclei. This means that these are differentiated areas—characte-

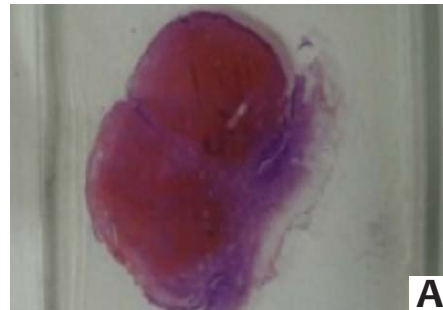
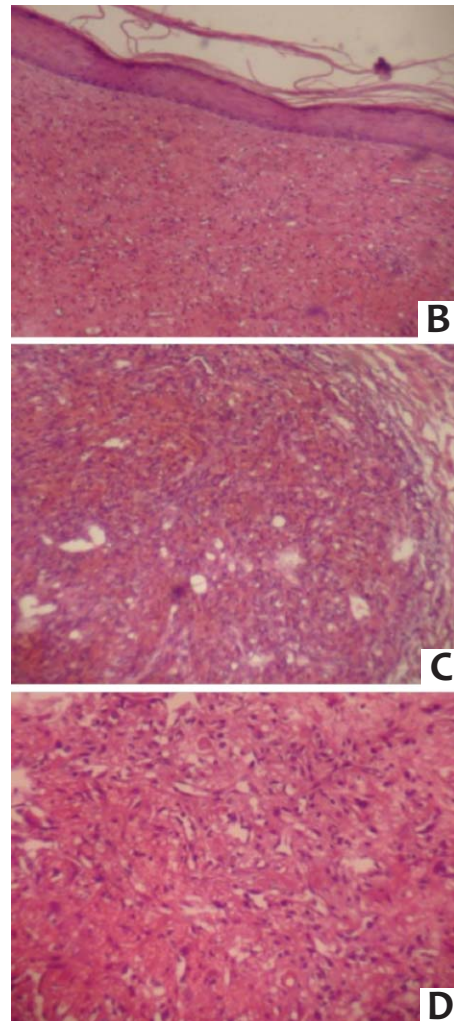


FIGURE 7: A Patient 2: Photograph of histological slide without magnification. Note the nodular and lobulated elevated lesion with reddish color.



FIGURES 7: B, C e D. – Patient 2: In the first two photomicrographies it is possible to observe the lesion overlaid with epidermal mild hyperkeratosis, with blood microvascular proliferation in the dermis, and with recent hemorrhage. Still, in Figure 7C, it is possible to note the presence of peripheral fibrous capsule conformation, corresponding to the white collarette seen in the dermoscopic examination. In photomicrography 7D, it is possible to note a proliferative vascular lesion formed by endothelial pattern cells with elongated nuclei in fusiform arrangement, more cellular than in the lesion areas in the superficial dermis, with mild cellular atypia and denser adjacent dermal stroma (photomicrographies 40X magnification in Figure 7B, 100X in Figure 7C, and 400X in Figure 7D).

ristic of hemangioendotheliomas—allowing a differential diagnosis with the low-grade angiosarcoma. The less cellular, more differentiated area is observed with greater magnification. (Figure 7)

DISCUSSION

The cases described in the present article show pyogenic granuloma lesions with atypical and exuberant clinical presentation. Due to the fact that it was not possible to clinically exclude malignancy, patients underwent biopsy for histological analysis. First, however, a dermoscopic examination without criteria for melanocytic lesions was carried out. Homogeneous red areas, white rail lines intersecting the lesion, white collarette, ulceration, hemorrhage crusting, and isolated lesions showing pinpoint vessels, were observed. Finally, the histological examination demonstrated the presence of benign lesions.

Pyogenic granulomas are benign acquired capillary lesions that affect the skin and mucous membranes, and whose pathogenesis is not yet explained. It is suggested that it might result from mechanical trauma, however the participation of hormonal factors, medications (retinoids), arteriovenous malformations, viral oncogenes and other microorganisms, as well as of angiogenic growth factors have also been proposed.

Usually solitary, painless, pyogenic granulomas may have different diameters—from a few millimeters to centimeters—and can ulcerate and bleed.¹⁻⁵

Due to the fact that some nodular melanomas mimic pyogenic granulomas, biopsy is always required for anatomopathological analyses, with an aim at avoiding the delay of diagnosis and improving the prognosis.^{1,7}

Dermoscopy is an *in vivo*, noninvasive technique, used for pigmented and vascular lesions that can help when there is suspicion of pyogenic granuloma, increasing diagnostic accuracy even in cases that are clinically atypical.^{1-3,5,7} More recently, studies on dermoscopic patterns of pyogenic granuloma have been carried out in order to assist in the differential diagnosis with amelanotic melanoma.³

Dermoscopy should be conducted without pressure to avoid compromising vascular visualization. In the absence of criteria for melanocytic lesions, it can evidence from homogeneous red areas to well-defined vascular structures.^{3,5,8} The main characteristics are homogeneous red areas (observed in more than 90% of cases), white collarette (80% of cases), white rail lines that intersect the lesion (30–45% of cases), ulceration (46% of cases) and vascular structures (45% of cases).^{1-6,8} No isolated characteristic was 100% specific.³ As a consequence, through observations of dermoscopic findings in pyogenic granulomas, Zaballos et al. recently defined 7 dermoscopic patterns for those lesions.¹⁻³ According to the combination of these characteristics present in the lesion, the patterns are:¹⁻³ (Figure 8):

- P1: homogeneous red area + white collarette
- P2: homogeneous red area + white rail lines
- P3: homogeneous red area + vascular structures
- P4: homogeneous red area + white rail lines + white collarette
- P5: homogeneous red area + white collarette + vascular structures
- P6: homogeneous red area + white rail lines + vascular structures
- P7: homogeneous red area + white collarette + white rail lines + vascular structures

The patients studied had had multiple lesions grouped in a single body segment. In those cases, the presence of a combination of the patterns described above could be observed, due to the presence of multiple lesions, each with a specific pattern.

The homogeneous red area corresponds to the area with absence of structure, whose color varies from red to whitish-red. It is attributed to the presence of numerous small capillaries or proliferative vessels arranged in a myxoid stroma.^{3,5} It is quite common in pyogenic granulomas, however it is not a finding specific only to this type, for it is also common in amelanotic melanomas.

In histology, the white collarette corresponds to the attached hyperplastic epithelium that fully or partially embraces the lesion in the periphery.^{3,5} It is the most specific structure of pyogenic granulomas. The white rail lines correspond to fibrous septa that surround the capillary tufts or lobules in the older lesions.^{3,5} In Patient 1, on whom both conventional dermoscopy and polarized light had been performed, it could be observed that the white

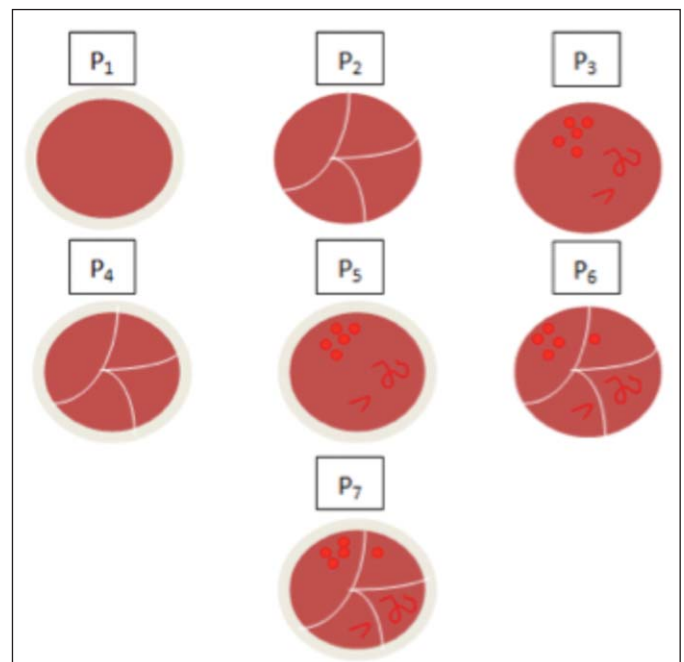


FIGURE 8: Dermoscopic patterns in pyogenic granulomas.

Source: Zaballos P, et al.³

rail lines became more apparent with the use of polarization (Figures 4B and 4C).

Regarding the vessels that can be observed, the following arrangements have been described: pinpoint, irregular linear, polymorphic/atypical, telangiectasia, and hair-pin-like. In the cases described in the present study, the vessels were minimally evident, not constituting a relevant finding despite the exuberance of the lesions.

Ulcerations were found to be common to many other skin lesions and were not included in the criteria.

In the study carried out by Zaballos et al., the pattern most frequently associated with pyogenic granuloma was the P4. Fifty-two percent of pyogenic granulomas showed one of three patterns: P1, P4, and P7, with no amelanotic melanoma having presented in any of them.³

In addition to atypical vessels, other findings, such as the whitish-blue veil, blotches, and hematic crusts—all of which are common characteristics of melanomas—

were also found in some cases of pyogenic granuloma. For that reason, there is the possibility they can simulate a nodular amelanotic melanoma. As a result, surgical excision and pathological examination of pyogenic granulomas are mandatory.^{1-3,6,7}

More recently, with the advent of new technologies such as confocal microscopy, advances in differential diagnosis have emerged. With this technique it is possible to evaluate the vascularization regarding dilatation, elongation, tortuosity, flow rate, and neovascularization. In addition, pagetoid cells and atypical melanocytes are not visualized in pyogenic granulomas. Studies are still preliminary, nevertheless there seems to be good histologic correlation.⁹

Due to the diversity in clinical presentations of benign tumor lesions, such as pyogenic granuloma, imaging studies linking dermoscopy and confocal microscopy, especially in atypical cases, may be useful for defining the characteristics of these tumors and their histopathologic correlation. ●

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