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Case Report

Gingival Plasma Cell Granuloma Mimicking Malignancy in a Pediatric Patient with Poor Oral Hygiene and Malnutrition: A Case Report

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Abstract

Background: Plasma cell granuloma (PCG) is a rare benign inflammatory lesion characterized by infiltration of polyclonal plasma cells within connective tissue stroma. Although most cases are localized and indolent, oral involvement, particularly on the gingiva, is uncommon and may clinically mimic malignancy or reactive lesions. PCG usually occurs in adolescents and young adults, while in pediatric patients are rare and diagnostically challenging. Poor nutritional status and poor oral hygiene are systemic vulnerabilities that may worsen severity and complicate diagnosis. This report aims to present a case of gingival PCG mimicking malignancy in pediatric patient with poor oral hygiene and malnutrition, highlighting diagnostic challenges and management.

Case Presentation: A 3-year-old boy was referred due to gingival swelling and bleeding two weeks after a traumatic fall. The patient had never cleaned his teeth and was diagnosed with malnutrition. Clinical examination showed poor oral hygiene and widespread gingival enlargement with bleeding. Incisional biopsy confirmed plasma cell granuloma, showing plasma cell infiltration within fibrous stroma without atypia. Management included oral hygiene instruction, antiseptic gargle, oral debridement, nutritional correction, and oral antibiotics, which improved gingival condition.

Discussion and Conclusions: This case highlights the diagnostic difficulty of differentiating gingival PCG from malignancy and should be confirmed histopathologically. Although PCG is a reactive lesion, poor oral hygiene contributed to chronic inflammation, while malnutrition may compromise mucosal integrity and immune function. In pediatric patient with systemic vulnerabilities such as malnutrition and poor oral hygiene, gingival PCG may clinically mimic malignancy. Multidisciplinary approach, surgical excision, and histopathological confirmation are crucial for diagnostic accuracy and favorable outcomes.

Keywords: Gingiva, Malnutrition, Oral Hygiene, Pediatric, Plasma Cell Granuloma

BACKGROUND

Plasma cell granuloma (PCG) is an uncommon benign inflammatory lesion characterized by a dense polyclonal plasma cell infiltrate within a fibrovascular stroma and commonly referred as an inflammatory pseudotumor due to its clinical and histologic resemblance to neoplasms ¹. Although most cases are reported in the lung, extrapulmonary PCG has been discovered to be in the gastrointestinal tract, central nervous system, and the oral cavity. Oral involvement of PCG is reported rare with gingival localization is unusual with only limited number of cases reported most in adult patients ^{1,2}.

Gingival PCG clinically presents as an exophytic or polypoidal mass with ulceration or bleeding and close to mimic malignancy lesions. Aggressive fibromatosis and pediatric rhabdomyosarcoma can also be considered when evaluating rapidly enlarging gingival masses in pediatric cases as these conditions may closely resemble

PCG in their early clinical course. Irritative lesions with mass like appearance in gingiva such as pyogenic granuloma or fibroma may also considered as differential diagnoses ³.

Histopathological examinations are needed to determine the definitive diagnosis to distinguish the lesions from malignancy ⁴. Predisposing factors include chronic irritation from poor oral hygiene, local trauma, drug-related gingival overgrowth, and systemic vulnerabilities such as malnutrition ^{5,6}.

This case describes gingival PCG in pediatric patient clinically mimicking malignancy associated with poor oral hygiene and malnutrition. This report aims to highlight diagnostic challenges, discuss the systemic and hematologic findings, and the importance of histopathology and multidisciplinary management in distinguishing PCG from malignant lesions.

CASE PRESENTATION

A 3-year-old boy was referred due to gingival swelling and bleeding two weeks after a traumatic fall. The patient received blood transfusion in the previous hospital and due to no improvement on gingival condition and constant bleeding, the patient was referred to Hasan Sadikin Central General Hospital. The patient was treated under multidisciplinary department consisting of Oral and Maxillofacial Surgery, Pediatrics, and Oral Medicine. Informed consent was obtained and approved by the patient's parents.

The patient was initially suspected with aggressive fibromatosis for the gingival lesion with rhabdomyosarcoma and pyogenic granuloma as the differential diagnosis. The patient also diagnosed anemic due to severe bleeding on the gingiva, coagulant factor disorder, and malnutrition. The treatment interventions included intravenous tranexamic acid, intravenous vitamin K, ceftriaxone, folic acid by Department of Pediatrics. Nutritional correction was also provided for malnutrition condition caused by inadequate nutritional intake resulting from severe bleeding. The patient was also received blood transfusion due to decrease in hemoglobin levels (6.1 g/dL) and severe bleeding.

The patient referred to Department of Oral Medicine with increased hemoglobin levels (10.6 g/dL) post-transfusion. Intraoral examination showed poor oral hygiene evaluated clinically the oral cavity showed plaques almost on every region of the teeth, multiple decays, and radix. The patient also reported had never cleaned his teeth. There was also erythematous gingival enlargement with pseudomembrane on gingival margins and bleeding was presence on almost every

region of the gingiva (Figure 1; A-F). Oral debridement with hydrogen peroxide (H₂O₂) 1.5% and normal saline was performed, oral metronidazole and amoxicillin were prescribed, and the patient was instructed to maintain the oral hygiene by cleaning the teeth and oral cavity using gauze moistened with chlorine dioxide mouthwash two times a day in the morning and night before sleep, and to compress the swollen and bleeding gingiva using gauze soaked with chlorin dioxide mouthwash for around 1-5 minutes, three times a day.

On the next day, there was slightly improvement on oral hygiene showed by decreasing plaques on upper and lower anterior and lower right posterior teeth, and gingival swelling on labial region of lower anterior gingiva was decreased (Figure 1; G-L), pain was still present on almost every region of swollen gingiva, oral hygiene instruction was performed by the patient's parents as instructed and the patient showed no allergies or discomfort to the mouthwash, the patient was scheduled for incisional biopsy. Two days after the incisional biopsy, there was slight pain on the biopsied gingiva (lower right posterior and anterior gingiva, upper anterior gingiva) when evaluated by palpation and the biopsied gingiva is still in the healing process, minor bleeding and pseudomembrane tissue were still present on the gingival margin (Figure 1; M-R). There was a decrease in hemoglobin levels (8.0 g/dL) and the patient received another blood transfusion. The patient continued to maintain oral hygiene by cleaning the teeth and oral cavity using gauze moistened with chlorin dioxide mouthwash and to compress the swollen and bleeding gingiva using gauze soaked with chlorin dioxide mouthwash for around 1-5 minutes, three times a day.

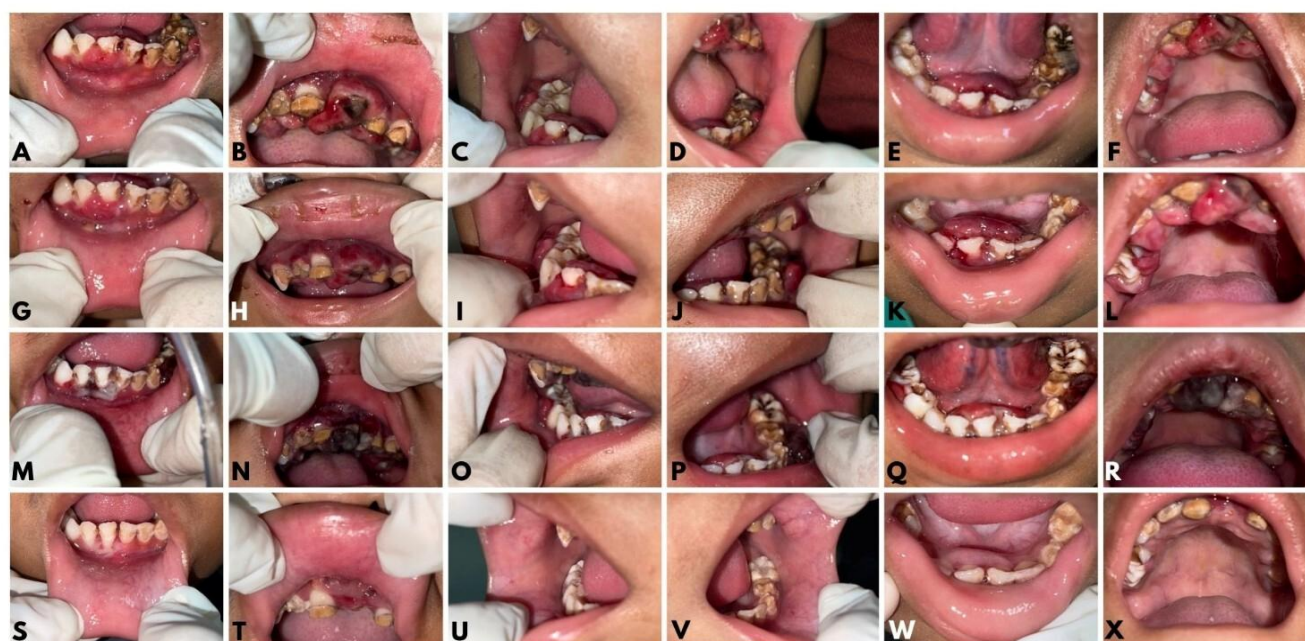


Figure 1: Intraoral findings showed gingival swelling on almost every region of gingiva alongside with erythematous and pseudomembrane on gingival margin and bleeding (A-F); Slightly improvement on gingiva of the labial region of the mandible and overall conditions on second visit (G-L); Two days after incisional biopsy performed (M-R); Ten days after incisional biopsy performed, the oral hygiene and gingival swelling showed good improvement (S-X).

Ten days after the biopsy, the gingival swelling healed, there was no bleeding and pain reported, the oral hygiene also showed good improvement (Figure 1; S-X). The laboratory findings showed normal levels of hematology parameter (Hemoglobin, hematocrits, leucocytes, erythrocytes, and platelets) with slightly increased in red blood cell distribution width-coefficient of variation (RDW-CV) and red blood cell distribution width-standard deviation (RDW-SD) levels and decreased in Iron Serum levels indicating anemic

conditions due to blood loss and multiple blood transfusion history.

Histopathological examination resulted gingival plasma cell granuloma, characterized by stratified squamous epithelium with nuclei within normal limits. The underlying fibrocollagenous connective tissue stroma exhibited dense infiltration of plasma cells, lymphocytes, and histiocytes, along with vascular dilation and areas of hemorrhage. No signs of malignancy were presented (Figure 2).

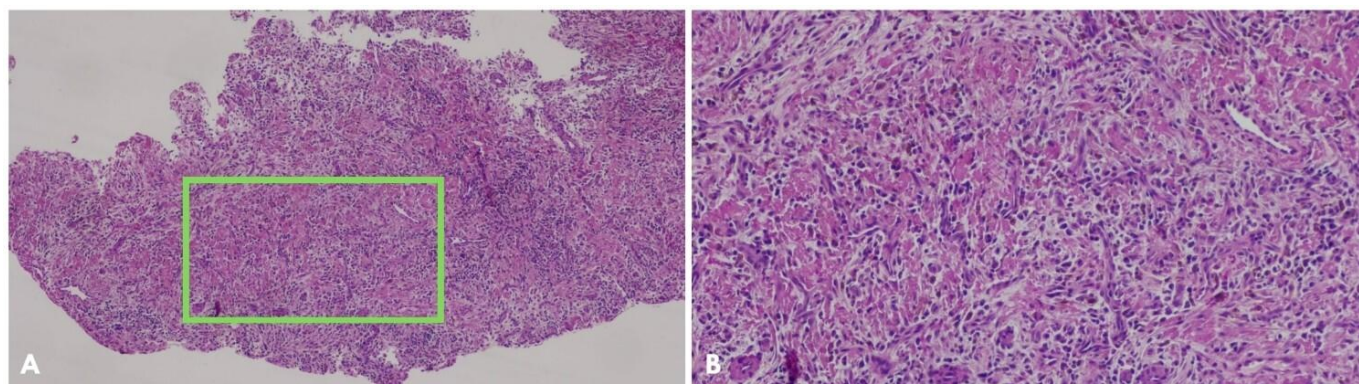


Figure 2: Histopathological picture in H&E stain 40x (A) and 100x (*green rectangle*; B) magnification showed stratified squamous epithelium with no malignancy signs. On the subepithelial showed fibrocollagenous connective tissue with a very dense infiltration of chronic inflammatory cells predominantly plasma cells, lymphocytes and histiocytes with vascular dilation and area of hemorrhage.

DISCUSSION AND CONCLUSION

Gingival PCG is an uncommon lesion but of clinical importance because it can resemble neoplastic conditions. It has been reported that gingival enlargements initially suspected as malignancies, later confirmed as PCG after histopathology demonstrated polyclonal plasma cell proliferation^{1,2}. This diagnostic dilemma underscores the essential role of biopsy and histological confirmation in patients presenting with atypical gingival swellings.

The differential diagnosis for gingival PCG is broad. Common reactive entities include pyogenic granuloma and fibroma. Malignant lesions such as aggressive fibromatosis and rhabdomyosarcoma must also be considered. The diagnostic should be confirmed by histopathological findings. Aggressive fibromatosis presents as a firm, infiltrative gingival or jaw-associated lesion of myofibroblastic origin, often requiring wide resection due to local invasion⁷, such lesions clinically overlap with PCG when there is rapid growth and severity. Pediatric rhabdomyosarcoma, the most common soft tissue sarcoma in pediatric patient, may appear as a rapidly enlarging gingival or alveolar mass with ulceration and bleeding, features that overlap with PCG and highlight the diagnostic challenge⁸. In cases of fibromatosis, histopathology reveals spindle-shaped fibroblasts in interlacing fascicles, variable collagenous stroma, some mitotic activity but low cytologic atypia, distinct from rhabdomyosarcoma which shows marked pleomorphism, high mitosis, and markers like desmin or myogenin positivity⁷⁻⁹.

Histopathological examination is crucial for differentiating PCG from malignancy lesions such as aggressive fibromatosis and rhabdomyosarcoma. Lu *et al.* described multiple gingival PCG lesions in a 15-year-old, showing dense plasma cell infiltration without atypia, with no recurrence at 2-year follow-up². Similarly, Pandav *et al.* detailed gingival PCG associated with chronic periodontitis, where excision and supportive periodontal therapy achieved resolution, and histopathology confirmed the absence of atypia and polyclonal plasma cell infiltration¹. Across reported cases, PCG histopathological findings typically reveals dense plasma cell infiltrates, fibrovascular or fibromyxoid stroma, occasional Russell bodies, and chronic inflammatory cells such as lymphocytes and histiocytes, but importantly, no malignant cytologic atypia^{1,2,4}.

Local factors mostly contribute significantly to PCG development. In the present case, lifelong absence of oral hygiene practices indicated by widespread plaques almost on every region of the teeth, multiple decays, and radix likely predisposed to severe inflammatory conditions on the oral cavity. Chronic poor oral hygiene promotes plaque-induced inflammation, creating a microenvironment rich in pro-inflammatory cytokines such as IL-6 that promote plasma cell differentiation and angiogenesis, explaining the vascular, hemorrhagic clinical features of PCG¹⁰⁻¹².

Elevated serum IL-6 levels are also associated with poor nutritional intake. Recent study reported that patients with recurrent aphthous stomatitis (RAS) with higher

level of serum IL-6 and reactive oxygen species (ROS) were significantly associated with poor nutritional intake and atopy, supporting the link between systemic vulnerabilities and worsened mucosal inflammation. The study suggests that cytokine-driven inflammation may exacerbate mucosal damage in nutritionally compromised individuals^{13,14}. In addition to cytokine-driven inflammation, low hemoglobin levels may contribute to malnutrition, since anemia is often associated with inadequate intake of hematinic nutrients such as folic acid, iron, and vitamin B12, which are commonly obtained from green leafy vegetables and red meat proteins¹⁵. The patient's oral condition compromised nutritional intake, leading to reduced hemoglobin levels and subsequent malnutrition. The patient also received folic acid supplementation from the Department of Pediatrics, consistent with studies showing that folate deficiency elevates homocysteine, disturbs oral epithelial blood supply, and causes tissue damage, while supplementation improves hematologic parameters and supports mucosal healing in conditions of bleeding and malnutrition¹⁶. Systemic conditions, particularly malnutrition, may exacerbate oral lesion severity. Malnutrition compromises mucosal integrity, delays wound healing, and impairs immune function, which increases the inflammatory response to local irritation¹⁷⁻²⁰. Although direct evidence linking malnutrition to PCG is limited, clinical severity in this pediatric patient case supports its contributory role. Furthermore, hematologic abnormalities complicated the conditions. Elevated RDW-CV and RDW-SD indicate anisocytosis, commonly associated with nutritional anemia or post-transfusion effects^{21,22}. Raised serum iron was likely secondary to multiple transfusions, which increase iron stores^{23,24}. While not directly implicated in PCG pathogenesis, these findings illustrate systemic instability and highlight the importance of a multidisciplinary approach.

Management of gingival PCG involves complete surgical excision, elimination of local irritants, and correction of systemic vulnerabilities. In both adult and pediatric cases, recurrence is uncommon if excision is complete and predisposing factors are controlled^{1-3,25}. In the present case, clinical improvement paralleled reinforcement of oral hygiene and nutritional correction, highlighting the value of comprehensive care. In addition to surgical excision, strict oral hygiene measures play an essential role in improving gingival conditions in PCG. This includes professional debridement, plaque control, and antiseptic rinses. Evidence from a recent case report in a patient with beta-thalassemia major demonstrated that spooling with hydrogen peroxide, the use of chlorine dioxide mouthwash, systemic antibiotics, and scaling, combined with oral hygiene instructions, effectively reduced gingival enlargement, bleeding and inflammation²⁶. Although the underlying systemic condition was different, the improvement highlights the importance of comprehensive oral hygiene management as an adjunct to lesion control. Similarly, in this case, gingival condition improved significantly after reinforcement of oral hygiene practices and adjunct antiseptic use,

supporting the role of local plaque control in reducing lesion severity and preventing recurrence. Importantly, distinguishing PCG from malignancy through histopathological confirmation remains crucial to avoid mismanagement or delay in oncologic referral when malignant mimics are suspected.

In pediatric patients with systemic vulnerabilities such as poor oral hygiene and malnutrition, gingival plasma cell granuloma (PCG) may present with unusual severity and mimic malignancy. Histopathological confirmation and a multidisciplinary approach remain crucial to ensure diagnostic accuracy, avoid mismanagement, and achieve favorable outcomes. In this case, lesion improvement paralleled reinforcement of oral hygiene and nutritional support, underscoring the importance of controlling local and systemic factors.

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Conflict of Interest: The author(s) report no conflicts of interest in this work.

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