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CASE REPORT

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CO_2 laser-assisted treatment of a giant pyogenic granuloma of the gingiva

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Lindenmüller IH, Noll P, Mameghani T, Walter C. CO_2 laser-assisted treatment of a giant pyogenic granuloma of the gingiva.

Abstract: *Background:* Pyogenic granuloma (PG) may develop in the oral cavity of pregnant women. The periodontal treatment outcomes during and after pregnancy are described. *Methods:* A 34-year-old woman in the 39th week of pregnancy presented for surgical treatment with a mass on the lingual mandibular gingiva. She had been surgically treated *alio loco* in the 37th week, but this failed. The patient was reassured and an individual oral hygiene programme was initiated in our department. The tumour was about 20 mm in diameter. A CO_2 laser-assisted surgical excision was performed 4 weeks after delivery. The lesion was analysed histopathologically using a von Willebrand Factor immunoreactivity staining. The highly vascularized tissue with a dense inflammatory infiltrate was in accordance with the diagnosis of a PG. *Results:* The initial wound healing was uneventful. A 12-month follow-up revealed no recurrence of the mass and healthy periodontal tissues. *Conclusion:* This report describes an oral complication during pregnancy for which surgical excision of a PG after delivery seemed the best treatment. It is possible that gender-specific periodontal disease risk factors contributed to the development of the lesion. This is another reason why pregnant women should be encouraged to be assessed by oral health professionals before late pregnancy.

Key words: laser; periodontology; pregnancy; pyogenic granuloma

Introduction

Complications that may affect periodontal health during pregnancy include an increased susceptibility to gingivitis or to the development of a tumour. Hormonal changes, including increased oestrogen and progesterone levels, are thought to affect the periodontal tissues, immunity and/or the composition of the oral microflora (1–4) When gingivitis is very prevalent and ranges from 35% to 100%, a pyogenic granuloma (PG) develops in up to 5% of pregnancies only (4–6). Pyogenic granuloma is mainly referred as an inflammatory hyperplasia caused by various stimuli and comprises a large cluster of nodular growth in the oral cavity (7). Although a PG is neoplastic and non-malignant in nature, a mass in the oral cavity requires further diagnosis. However, treating a pregnant woman may be a challenge for the dental professional.

This report presents the clinical and histopathological findings and the management of a PG in a client during pregnancy and after delivery.

Case description and results

A 34-year-old woman presented to the Department of Periodontology, Endodontology and Cariology of the School of Dentistry at the University

of Basel, Switzerland with a mass on the lingual mandibular gingiva. She was generally in good health and in the 39th week of pregnancy.

The mass had been growing since the 32nd week of pregnancy and had been treated with surgery in the 37th week by a general dentist. The lesion was analysed histopathologically.

Clinical Examination

The patient had never smoked and her oral hygiene was generally good. Her anamnesis revealed no (relevant) medical or periodontal history. The only medication she was taking were magnesium and iron due to the pregnancy. The clinical examination, without radiographical imaging, revealed no caries lesions, increased periodontal probing depths (>3 mm), furcation involvement or increased tooth mobility. A lobulated exophytic mass with a smooth surface on a pedunculated base was detected on the lingual gingival margin between the lower left canine and the first bicuspid. The lesion was haemorrhagic, compressible and bled easily on manipulation or during eating, but it was not painful. It was about 10×10 mm in diameter with a pink colour at the lingual site (Fig. 1a). The lesion extended interdentally to the buccal papilla as a 3×4 mm nodular erythematous enlargement.

Treatment

An individual oral hygiene programme that included chlorhexidine-gel applications was initiated to control gingival inflammation in the affected area. The patient was informed about the impact of a pregnancy on periodontal diseases and the likelihood of oral complications, and a timeframe for treatment proposed. Surgical removal was planned after delivery. The tumour was about 20 mm (Fig. 1b) in diameter 4 weeks after delivery and 6 weeks after the last appointment. The mass was now interfering with occlusion and was painful. Surgical treatment was initiated.

Radiological examination

A periapical radiograph was taken after delivery and revealed no signs of osseous destruction between the lower left canine and the first bicuspid (Fig. 2).

Surgical Therapy

After rinsing with chlorhexidine, local anaesthesia was administered labially and lingually. The excision was started on the lingual mandibular site using a CO_2 laser (Spectra Denta; MAX Engineering Ltd., Korea) (Fig. 1c and d). A thorough debridement extending down to the periosteum and onto the adjacent teeth was performed with Gracey curettes after the excisional biopsy and vaporization from the buccal and lingual site. Finally, a sterile absorbable surgical haemostatic was placed (Tabotamp; Johnson & Johnson, Somerville, NJ, USA). The biopsy (Fig. 1d) was sent to the Institute of Pathology and Bioptic Diagnostics, Zurich, Switzerland. The initial healing was uneventful (Fig. 1e). Regular follow-ups revealed no recurrence of the tumour 1 year after treatment (Fig. 1f).

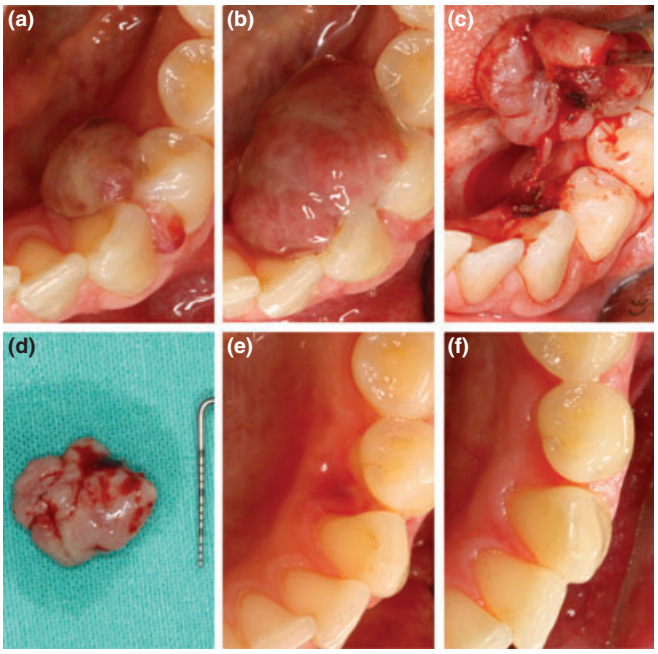

Fig. 1. Intra-oral view of the follow-up: (a) 2 weeks before delivery, (b) 4 weeks after delivery, showing the growth of the mass in 6 weeks, (c) during surgery, a blood vessel connecting the mass with the gingiva is shown, (d) the mass after excision, (e) 14 days after surgery, the wound healing was uneventful, (f) 12 month after surgery, the periodontal situation is healthy.

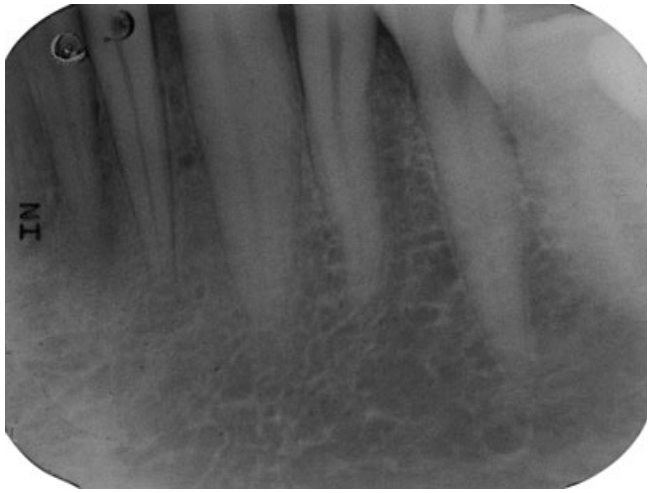

Fig. 2. Periapical radiograph of the mandibular left cuspid and bicuspids showing a regular osseous structure.

Histological examinations

A routine haematoxylin-eosin-stained histological section of the biopsy disclosed an abundant vascular component with newly

formed capillars (Fig. 3a and b), a great proliferation of fibroblasts and a mixed inflammatory infiltrate. The overlying epithelium was ulcerated. Mainly neutrophils were found near the ulcerated surface, whereas chronic inflammatory cells, i.e. lymphocytes and plasmacytes, were found in the deeper layers. The small capillary endothelial-lined spaces are themselves surrounded by leucocytes and lymphocytes. Angiogenic activity was demonstrated by a positive von Willebrand factor immunostaining (Fig. 3c). Both biopsy specimens were in accordance with the diagnosis of a pygenic granuloma of the gingiva.

Discussion

This clinical report describes the management of an unusually large pyogenic granuloma of the gingiva in a pregnant woman and after delivery.

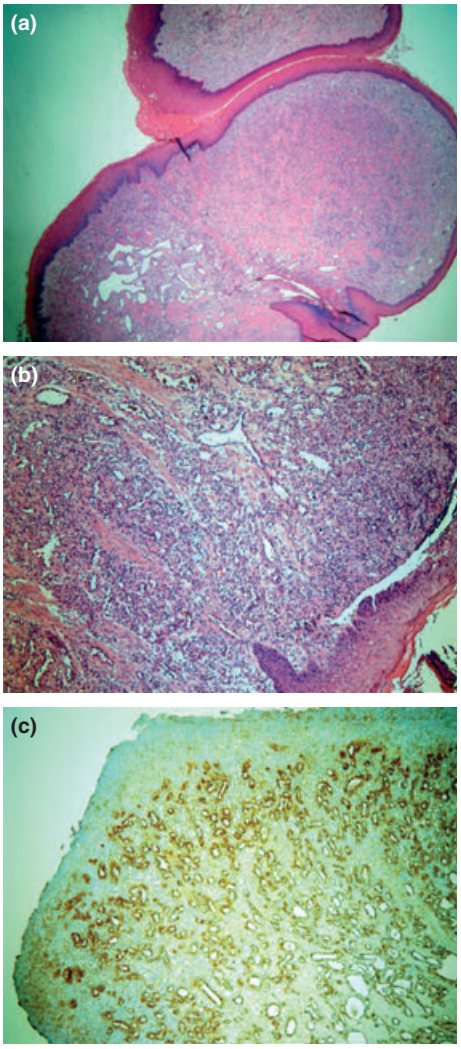

Fig. 3. (a) Histopathological overview – the lesion was characterized by a mixed inflammatory cell infiltrate, newly formed capillars and a proliferation of fibroblasts (Haematoxylin and eosin, original magnification: (a) ×16, (b) ×25, (c) a high angiogenic activity was demonstrated by an immunoreactivity staining for von Willebrand Factor (original magnification: ×60)).

Pregnant women may have an altered susceptibility to plaque accumulation, which may be aggravated by overhanging margins of restorations or calculus, and which may lead to gingivitis (6). If left untreated, a hyperplastic gingiva may develop and provide a basis for further growth, sometimes resulting in a PG (8). Hormonal changes during pregnancy, especially in the circulation of the sex hormones oestrogen and progesterone, affect biological and immunological physiological functions (2, 9–11). Some of them may support hyperplastic granulation reaction due to the stimulation of the Fibroblast Growth Factor and Transforming Growth Factor beta1 production in fibroblasts (11). In addition, oestrogen alters the Vascular Endothelial Growth Factor production (VEGF) in macrophages. The factor VEGF is highly expressed in PG during pregnancy, but almost undetectable after parturition. This suggests that it plays a critical role in the development and the regression of a pyogenic granuloma (12, 13). An immunohistochemical staining with the angiogenic marker von Willebrand Factor was chosen for the biopsy in the case described here. A high angiogenic activity was demonstrated, confirming studies underlining the importance of angiogenesis in the development of PG (14):

The woman presented to our department in the 39th week of pregnancy. At that late stage of pregnancy, surgery was not appropriate, and so the patient was reassured and more invasive treatment postponed until after the birth. A periapical radiograph was taken after delivery and prior to surgery to evaluate a possible osseous destruction generated by the mass, as a pyogenic granuloma may cause significant bone loss (15, 16). The first surgery during pregnancy was described as a superficial removal of the mass. However, elective surgery is generally not indicated in pregnant women. Moreover, it was possible in the case described here that the PG would disappear spontaneously after delivery (17). This did not happen. The mass was still present 4 weeks after delivery and interfered with mastication. Surgical treatment was therefore necessary. The treatment options for PG include: surgical excision with a blade, flashlamp-tunable pumped-pulsed dye laser, cryosurgery and intralesional injections of ethanol, sodium tetradecyl sulphate, or corticosteroid (18–23). A CO_2 laser-assisted excision was performed in this case as it involved less risk of bleeding and has superior coagulation characteristics (24). The excision was extended down to the periosteum and the adjacent teeth were thoroughly scaled using Gracey curettes. All irritants were removed to prevent tumour recurrence. The hormonal reconstitution after delivery and the more invasive surgical approach may affect the treatment outcome. The biopsy was analysed histopathologically to verify the diagnosis and to exclude any malignancies, including the differential diagnosis Karposi's sarcoma, angiosarcoma or metastatic cancer (7).

Conclusion

The case involved the treatment of a pyogenic granuloma. The CO_2 laser-assisted excision led to a complete healing of the

lesion. The immunohistological analysis revealed a hyperplastic granulation tissue, characterized by a high density of microvessels, which is in accordance with a diagnosis of a pyogenic granuloma. Surgical excision and debridement were performed after delivery as no spontaneous regression of the PG occurred. The development of the lesion was probably because of gender-specific periodontal disease risk factors, which should be routinely assessed in pregnant women by oral health professionals (25). A strict recall interval and oral hygiene encouragement is recommended for pregnant women. Ideally, any existing periodontal inflammation should be treated before pregnancy.

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