Case Report

An Unusual Allergic Reaction to Polyglactin 910 Suture Material Following Muco-gingival Surgery

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ABSTRACT

The use of sutures is common following oral surgical procedures. The risk of developing an allergic reaction to a suture material is possible. This study presents a case of a 29-year-old male who suffered from Oral Contact Allergy (OCA) from a polyglactin910 suture material. The patient presented with gingival recession of the maxillary right canine, bicuspids and first molar requiring muco-gingival surgery to cover denuded root surfaces. After harvesting the sub-epithelial connective tissue graft from the palate, which was sutured using polyglactin910, the patient developed a significant allergic reaction to the suture material presenting as large palatal swelling and itching. The donor site - Hard palate – completely healed in few weeks' time after suture removal.

Key words: Sutures–Gingival Recession–Graft –Vicryl – Polyglactin.

INTRODUCTION

During dental treatment patients could be exposed to variety allergens. However, adverse events are luckily not frequent. Unexpected signs or symptoms including stomatitis, burning, tingling, cheilitis, oral lichenoid lesions, lip and facial swelling could be related to the use of dental products. The most common allergic reactions reported in patients include contact allergy to metals, acrylics, and immediate type allergy to latex. Adverse reactions following the administration of local anesthetics are seen in about 0.5% of cases, but immediate type allergy to these agents is rare [1]. A systematic review of allergic reactions to dental materials and products such as impression materials, sodium hypochlorite, Ledermix paste, zinc oxide eugenol, formaldehyde, Latex gloves, Methyl methacrylate, fissure sealant, composites, mercury, Nickel-chromium, Titanium, polishing paste and local anesthesia, revealed that the most common allergic reactions seen in the field of dentistry are allergies to latex, acrylates and formaldehyde. Polymethylmethacrylates and latex trigger delayed hypersensitivity reactions, sodium metabisulphite and nickel caused immediate reactions [2].

Optimum closure and stabilization of wound margins using sutures are the most important steps that could influence the success of any surgical operation. However, the presence of any foreign body at the surgical site could lead to possible wound infection. Sutures may serve as a pathway for bacteria into the wound. Furthermore, allergic reactions to suture materials have been reported leading to less than optimal wound healing [3]. The risk of OCA as result of suture material is very slim but can happen. Allergic contact dermatitis (ACD) to suture materials had been

reported in the past [4-5]. Currently, as a result of the advanced technology and development of new synthetic suture materials like polyglactin 910; it's very uncommon to develop any kind of allergic reaction. These synthetic inert suture materials are reportedly associated with less inflammation than sutures manufactured from natural materials [6]. The main problem of an allergic reaction to suture material at the surgical site is the interference with healing and potential wound necrosis [7].The current paper describes a case of possible allergic reaction to polyglactin 910 (Vicryl Rapide, Ethicon, Ethicon) sutures after a root coverage procedure. To the authors' best knowledge; there are no reports of OCA to polyglactin 910 suture material used in dental setting.

CASE PRESENTATION

Case examination and history

A 29-years-old male initially presented to a General Dentist with a chief complaint of gingival recession (GR). He reported having GR for many years and, it was progressing very fast. The patient also reported some sensitivity with both hot and cold drinks, as a result he decided to seek dental treatment. A review of the patient's medical history revealed nothing significant. A review of the oral hygiene measures revealed the use of electric toothbrush twice daily and interdental cleaning using dental floss once a day. Patient is a regular attender to dental appointments every 6 months for check-ups and scaling.

Figure-1: Pre-operative clinical photographs showing GR.

Figure-2: Pre-operative bite wings and Orthopantogram (OPG) x-rays.

The patient was referred to a Specialist Periodontist (NK) for treatment of GR. On clinical examination, the GR extended from teeth 13 to 16 and from 23 to 26 and was ranging from 2 to 4 mm from the cemento-enamel junction (Figure 1). There was a good zone of attached gingiva buccally and the inter-proximal bone level was normal as assessed by (MB) - (Figure 2). There was no probing depth more than 3 mm with few sites with bleeding on probing. The diagnosis was multiple grade- I gingival recessions according to Miller's classification [8].

The patient presented with multiple recession defects, surgical technique to be used must permits treatment of these recession defects on adjacent teeth as well in a single surgical operation making sure that root coverage where possible be effective. A coronally advanced flap with releasing incisions combined with sub-epithelial connective tissue graft harvested from the hard palate was the technique of choice [9]. This technique was chosen due to the presence of adequate zone of attached gingiva apical to the root exposure. The procedure was carried out using 4.5X magnifying dental loupes with light. The patient agreed to the treatment plan and provided a written informed consent understanding that complete root coverage would be difficult because of the significant amount of buccal bone loss and presence of multiple gingival recessions. On the day of surgery both medical and medication history were checked and no change was reported.

Recipient site preparation

After administration of local anesthesia, intra-sulcular incision was performed from the mesial of tooth 13 to the mesial of tooth 17; this horizontal incision was made to create surgical papillae with split thickness incision at a distance from the papilla tips equal to coronal flap advancement. Two releasing incisions extending into the alveolar mucosa were made mesial to teeth 13 and 17 leading to a trapezoidal flap design. With a muco-periosteal elevator a full thickness elevation of the gingival tissue apical to the exposed roots was performed. Split thickness incisions were made, starting deep and continuing at a more superficial level, to free the flap from the periosteum and muscle insertion of the lips and to allow for full coronal flap advancement. Once the flap is fully exposed, a marked bony dehiscence could be seen. The papillae adjacent to the recession area were de-epithelized to promote adhesion to the coronally advanced flap. The exposed roots at the recipient site were thoroughly scaled with hand instrument, irrigated with copious amount of normal saline and EDTA conditioning was applied for 2 minutes (Figure 3).

Figure-3: Intra-surgery clinical photograph, showing the flap design and exposed root surfaces.

Donor site preparation

The L-technique was used to harvest the graft from the hard palate. The flap was created with one horizontal and one vertical incision providing access for connective tissue graft harvesting [10]. The harvested graft was secured in position at recipient site. The donor site was closed with a series of interrupted 3-0 vicryl rapide (Polyglacyin 910, Ethicon, Ethicon) sutures anchoring the primary flap to the marginal soft tissue so that the palatal wound heals by primary intension.

After securing the harvested graft against the exposed roots at the recipient site, an interrupted 5-0 prolene sutures (Polypropylene, Ethicon, Ethicon) were made along the releasing incisions in an apico-coronal direction. Several coronal 5-0 prolene sutures were anchored to the palatal cingula. The surgery was uneventful with no complications and a proper homeostasis was achieved with sutures at both donor and recipient sites.

The patient was asked to avoid brushing or chewing on the surgical area for the first 4 weeks post-operative. Post-operative instructions included chlorhexidine mouthwash (20 ml) use for 2 minutes twice daily for 2 weeks. Patient was advised to use either 1 gram of Paracetamol or 400 mg of Ibuprofen as needed. No antibiotics were prescribed at the patient's request.

Buccal view **Palatal view**

Figure-4: Twenty four hours post-operative clinical photographs showing normal healing on the recipient site (buccal) and palatal swellings on the donor site (palatal).

Buccal view **Palatal view**

Figure-5: One Week post-operative clinical photograph showing no signs of significant improvement in healing on both recipient site (buccal) and donor site (palatal).

Buccal view **Palatal view**

Figure-6: Two Week post-operative clinical photograph showing acceptable healing on the recipient site (buccal) and initial signs of healing on the donor site (palatal).

Buccal view **Palatal view**

Figure-7: Twelve Months post-operative clinical photograph, showing complete healing at both the donor and recipient sites.

The patient felt an itching sensation around the donor site the night after surgery. He also began to develop small palatal swelling (Figure 4). At this stage these changes were assumed to be part of the healing process. However, the patient reported to have a large swelling around his palate that night and he rushed to see the general dentist in the next day, who assumed this was post-operative infection as the patient did not report the itching sensation. Amoxil 500 mg was prescribed to the patient to be taken three times per day for 5 days. The patient was referred to the Specialist Periodontist on the same day; a decision was made to remove the vicryl rapide sutures from the palate due to the possibility of allergic reaction and prescribing a daily dose of Diphenhydramine. Patient was asked to seek an urgent medical care due to the consideration of the possible allergic reaction. However, a few hours after removing the vicryl rapide sutures, the patient called and reported that the itching sensation started to fade and the swelling was getting smaller in size. Three days later the patient returned to the dental practice and there was no itching. The donor site was still slightly swollen but there was no itching sensation (Figure 5). The patient was followed up every several weeks until both the recipient and donor sites healed (Figures 6 and 7).

DISCUSSION

Dental sutures are used on a daily basis for a various types of gingival and periodontal surgical procedures. Development of any kind of allergic reaction to suture material nowadays is very rare and uncommon [6]. However, the risk of developing OCA as result of sutures cannot be excluded. It's more common to be faced with OCA, which usually associated with the oral lichenoid reaction that affects the oral cavity, in reaction to other antigens that present in dental materials including nickel and cobalt [11, 12].This article revealed the possibility of delayed hypersensitivity reaction to suture material.Polyglactin 910 sutures are synthetic, undyed, braided absorbable sutures. The suture holds its tensile strength for nearly two to three weeks in the tissue and is completely absorbed by hydrolysis within 50 to 70 days. Vicrylrapide sutures breaks down quicker. Vicryl is a copolymer of lactide and glycoside [13].

Delayed-type hypersensitivity reactions (type IV allergic reactions) also known and mediated by cellular immunity are allergic immune reactions manifesting primarily through T cells. Delayed hypersensitivity can only occur in patients who were sensitized through a history of contact with a specific antigen. The introduced antigen stimulates sensitized CD4+ T cells to the secretion of different cytokines including TNF-α and TNF-β, that induce the expression of adhesion molecules (E-selectin, ICAM-1, VCAM-1) on dermal endothelial cells of the blood vessels. The above mechanism allows the release of different inflammatory cells, mainly neutrophils, followed by monocytes and macrophages. Cytokines cause an increased permeability of local capillaries, leading to oedema. Enzymes from the macrophages contribute to tissue damage and necrosis. Delayed-type hypersensitivity reaction or type IV allergic reaction can cause different oral manifestations. They manifest 24-72 hours after the antigen has been introduced and they can be localized or diffusely visible on oral mucosa. Numerous oral manifestations result from this type of allergy. Offending antigens are most often external, such as metals and drugs. The most common oral manifestations documented are cheilitis, gingivitis, stomatitis, perioral dermatitis, burning mouth syndrome, lichenoid reaction and orofacial granulomatosis. [14].

The patient in this article had no significant medical history with no allergic and/or adverse reaction to any substance or material. In terms of allergic reactions; they can be immediate as in type-I hypersensitivity reaction (Anaphylaxis); which is a life threatening condition, or delayed; which will develop within the first 24 hours after exposure to the allergen or antigen [14, 15]. In this case, the patient most likely developed OCA, which is a cell mediated response in which previous sensitization to an antigen has occurred. The symptoms of the delayed allergic reactions usually include one or more of the following; itching or burning sensation, swelling and rash [16].

There is a possibility that this case is a post-operative infection, as it was originally diagnosed and managed, rather than OCA. An antibiotic was prescribed, which could control the swelling and the other symptoms. A suture material properties have the potential to influence wound healing negatively, a thorough understanding of the physical, mechanical and biological properties of commonly used suture materials is crucial to reduce the risk of infection [17].

The bacteria are present in all surgical wounds and especially in the oral cavity, which is characterized by a moist environment with a high infectious potential. The incidence of suture complications like local abscesses formation seems directly related to the degree of contamination at the time of suture placement. In one report, the occurrence of abscess formation reported to be greater with braided, non-

absorbable sutures than with the monofilament suture materials [18]. On the other hand, abscess formation with synthetic, mono-filament, non-absorbable suture is uncommon [19]. However, the clinical presentation of swelling and itching a few hours after the surgical operation, the good response to the anti-histamine and the quick recovery after the removal of sutures make the hypothesis of allergic reaction more likely. To confirm the diagnosis multidisciplinary approach is helpful with confirmatory skin testing [20].

CONCLUSION

This article describes a case of a possible OCA to polyglactin 910 suture materials after muco-gingival surgery. To the best of the authors' knowledge, this is first case reported in the literature of such a reaction. Awareness of allergic reactions and knowledge of management and interventions are critical for patient safety.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

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AUTHORS' CONTRIBUTION

Mahmoud M Bakr: Clinical, radiographical and histological assessment of the case. Conducted a literature review of similar articles and case reports. Wrote the initial version of the manuscript and contributed significantly to the discussion.

Caroline Kowalski Cruden: Initial examination of the case and referral to specialist periodontist. Post-operative care and monitoring of the case.

Hamza Albrani: Contributed to the drafting and revision of the manuscript.

Haifa Hannawi: Periodontal consultation, contributed to the drafting and revision of the manuscript.

Roy George: Participated in clinical photography of the case and contributed significantly to the discussion.

Nabil Khzam: Performed all treatment planning and surgical procedures. Contributed significantly to the discussion.

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