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Bone Necrosis in a Rheumatoid Arthritis Patient Secondary to Palatal Rotational Flap: A Practical Surgical Approach

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Authors' contributions

This work was carried out in collaboration between all authors. Author SA performed the surgery and wrote the first draft of the manuscript. Author GD performed the surgery and managed the preoperative and postoperative patient care. Author BCS managed the literature search and mentored the case. Author KG designed the treatment protocol and mentored the case. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Aims: To present failed rotational palatal flap of a severe rheumatoid arthritis patient with a chronic oroantral fistula and a practical surgical method to deal with the systemic outcomes.
Presentation of Case: Bone necrosis at donor site in closure of oroantral fistulas with palatal rotational flap is known to be very rare. We present a 57 years old female, rheumatoid arthritis patient under Methotrexate medication, with a chronic oroantral fistula in the left first molar region. Bone necrosis has been shown at the donor site after full thickness palatal rotational flap procedure. The treatment approach and alternative methods are discussed. Bone necrosis on the donor site has been treated with the re-rotation of the palatal rotational flap tissues, but this time with partial thickness to its original position. Successful healing has been achieved.
Discussion and Conclusion: The result of this approach could help practitioners challenging with rheumatoid arthritis caused healing problems and oroantral fistulas.

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Keywords: Methotrexate; necrosis; oroantral fistula; palatal rotational flap; rheumatoid arthritis.

1. INTRODUCTION

Oroantral fistula (OAF) is defined as a pathological communication between the oral cavity and maxillary sinus. Most common occurrences of OAF follow complications of maxillary molar or premolar extractions primarily because of the projection of the roots within the maxillary sinus [1,2].

Acute openings of healthy maxillary sinus that are smaller than 4–5 mm in diameter often heal spontaneously. However, openings lasting more than 3 weeks are described to be chronic fistulae and often require surgical procedures to close the gap [3]. Several techniques have been described for the treatment of oroantral communications [4]. Anatomic and systemic factors should also be considered when selecting the most suitable surgical technique [2].

In larger defects where the buccal vestibular depth must be preserved, a more-advanced surgical technique, the palatal rotational flap is a well-known technique for the treatment of oroantral fistula and provides excellent blood supply in abundance without reducing the vestibular depth [2,4].

Rheumatoid arthritis (RA) is a chronic autoimmune disease characterized by synovial inflammation and hyperplasia, autoantibody production, cartilage and bone destruction, and systemic features, including cardiovascular, pulmonary, psychological, and skeletal disorders [5].

In this report, we evaluate a hypertensive severe rheumatoid arthritis patient receiving immunosuppressive drugs with chronic oroantral fistula. Treatment approach and alternative methods for the resulting bone necrosis of the donor site are discussed.

2. PRESENTATION OF CASE

A 57-year-old female patient was referred to our clinic after complaining of an unhealed wound caused by the extraction of the maxillary left first molar 6 months prior. The patient had undergone an unsuccessful simple closure technique twice during the past 6 months [Fig. 1].

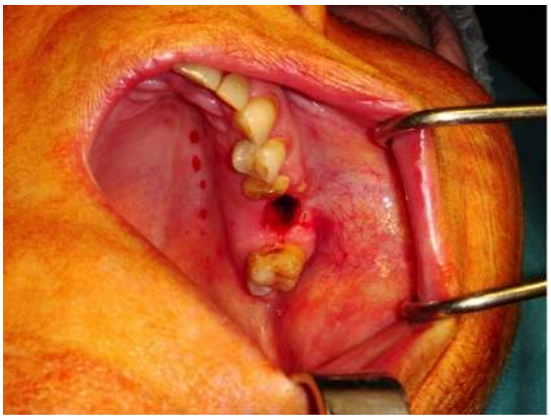

Fig. 1. Oroantral fistula

Strikingly, her medical history included hypertension and rheumatoid arthritis over the past 8 years. The patient had been prescribed the following medications as a result of the her condition: Arava 20 mg. (Avertis Pharma) 1x1 (Leflunomide); Emthexate tb 1.5 mg (Med-ilaç) once per week 1x5 (Methotrexate); Deltacortril 5 mg. (Pfizer) 1x3/2 (Prednisolone); Pritor Plus 80 mg. (GlaxoSmithKline) 1x1 (Telmisorban). Her smoking history included 10-15 cigarettes per day for over 20 years. An oroantral communication at the maxillary left molar region was detected during clinical examination and confirmed by the panoramic radiogram. Following the rheumatology consultation, Arava and Emthexate treatments were stopped immediately and the Deltacortril dosage was reduced from 7.5 mg to 5 mg per day. The systemic conditions of the patient as well as the metabolic effects of the drugs seem to have contributed to the complications of the vasculature and delayed wound healing. Hence, palatal rotational flap was thought to be the optimum choice for treatment and was performed to increase blood supply and enhance wound healing at fistula [Fig. 2]. The palatal region was protected by an acrylic stent postoperatively to protect the donor site.

Three weeks post-operation, the medical condition of the patient required continuation of the preoperative medication doses. At the 6-week follow-up, the OAF region healed but there was a noticeable delay in the healing of the donor site [Fig. 3].

Fig. 2. Palatal rotational flap

Fig. 3. Necrosis of the donor site, successful healing of the OAF

These conditions, in addition to consultation with the rheumatologist, warranted the application of hyperbaric oxygen therapy. As a result, we initiated 40 sessions for 150 minutes each of 2,4 ATA hyperbaric oxygen therapy (HBOT). To our surprise, the HBOT for the donor site was insufficient to fully heal the bone-exposed palatal region. We then scheduled a new procedure to surgically close the donor site opening after the 20th session (week 11 postoperatively). It is believed that if the palatal artery, which was removed within the palatal rotational flap and placed onto the OA communication during the first surgery, was returned to its original position, the blood supply at the donor site would be improved.

In the second surgery, the exposed necrotic bone at the donor site was removed with burs until the healthy bone region was reached. Fresh wound boundaries were created on the soft tissue surrounding the donor site using a scalpel. The rotational flap located on the OAF was incised from the same borders and contained the palatal artery but not the periost at its original location near the donor opening [Fig. 4].

Fig. 4. Second removal and re-rotation of to its original position of the palatal rotational flap. Thick connective tissue remaining on the treated OAF prevents OA communication with the arterial rotational flap repositioned at the donor site

Following this re-rotation, the exposed connective tissue over the former OAF was closed primarily using the buccal rotational flap. The rheumatologist suggested continued administration of the medications at perioperative doses. Twenty additional sessions of hyperbaric oxygen therapy were administered, and by week 16, the re-rotated flap successfully closed the donor site opening and healing was accomplished [Fig. 5].

Fig. 5. Successful healing of both OAF and the exposed donor site at week 16

The patient continues to be monitored and there are no indications of problems or complications at the donor site or OA opening.

3. DISCUSSION

Palatal rotational flap is one of the most frequently applied procedures for the closure of oroantral fistulae. The major disadvantage of this technique is the delayed healing of the exposed palatal bone at the donor site, which is expected to heal by secondary healing.

The healing time and the degree of complications at the palatal donor site may be related to the size of the created defect, age of the patient, and the integrity of the periosteum. Palatal stent is recommended after palatal rotational flap operations to reduce the edema and to stabilize the flap in its new position. It is imperative to prepare a passive stent that does not compromise the blood supply of flap [3]. In the present case, the stent was carefully prepared and monitored to avoid flap ischemia. As a result, the palatal rotational flap healed without complications. However, the palatal donor site failed to heal, resulting in donor-site bone necrosis. Palatal H-shaped modifying connective tissue flap is recommended to overcome such troubles, that the technique does not allow any wound region undergoing secondary healing [4]. Smoking is known to delay epithelial regeneration, resulting in delayed wound healing and reduced blood flow, which may compromise the wound healing process [6]. Our patient agreed to cease smoking during the surgical and healing process in an effort to reduce complications. On the other hand, challenges continue to be reported following surgery in rheumatoid arthritis patients such as continuing potent disease-modifying antirheumatic drug (DMARD) (Leflunomide, Methotrexate) and biologics therapy, which may increase infection risk and result in disease flares compared to withholding these medications [7,8]. Additionally, oral glucocorticoids are widely used to treat patients with RA, usually at a low dose [9]. However, excessive glucocorticoid supplementation predisposes to wound infection and impairs wound and bone healing [10]. The major problem is finding a balance between maintaining disease control and avoiding an unfavorable impact on wound healing and postoperative complications [11].

HBOT is used as a therapeutic modality which leads to an increase in tissue oxygen pressures at the wound site and hence allowing the reversal of a hypoxic state by increasing the oxygen diffusion within the plasma, consequently promoting angiogenesis, encouraging fibroblastic activity and supporting the tissues to resist against bacteria. It is used as an adjunctive treatment to enhance best-practice wound care and employing HBOT in a directed and appropriate way can significantly enhance wound healing efforts [12]. Besides, HBOT has demonstrated efficacy in decreasing edema and hyperalgesia in inflammatory conditions and researchers have explored the posiytive effects of hyperbaric oxygen treatment on arthritis [13].

4. CONCLUSION

Selection of the correct surgical technique with proper indications prevents morbidity. Patients suffering from rheumatoid arthritis, diabetes mellitus, radiation therapy and similar complications should consult the appropriate physician and receive perioperative medication, which may affect postoperative healing. The selected surgical technique is highly important in cases in which preoperative medication must remain unchanged. In such cases, selection of the palatal rotational flap seems to be an effective option due to the increase in blood supply via the palatal artery. However, healing problems caused by systemic conditions should not be disregarded. This case demonstrates that re-rotating the palatal rotational flap to its original position can be an alternative solution to donor-site healing problems. However, a flap technique that would not allow any exposed bony region—such as the palatal H-shaped modifying connective tissue flap [4]—may prove to be a more effective procedure that avoids or minimizes the risk of complications.

CONSENT

All authors declare that written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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