ORIGINAL RESEARCH

EFFICACY OF THE HARMONIC SYNERGY® SCALPEL IN THE SURGICAL REMOVAL OF FIBROUS HYPERPLASIA

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ABSTRACT

Introduction: There have been countless surgical techniques developed for the purpose of removing the hyperplasia (FH) and improving the alveolar ridge to provide a better adaptation to full prostheses. Techniques used for this procedure may lead to post-operative complications, including oedema, pain, difficulty in swallowing, compromised movement, haemorrhage and/or infection. With the advent of the harmonic scalpel, removal of FH can be completed more quickly and less traumatically for the patient due to its intrinsic properties. With standard excision, episodes of pain, swelling and bleeding may be experienced post-operatively, leading to dysphonia and dysphagia, creating challenges to the surgeon.

Objectives: The aim of this study was to examine the efficacy of the Harmonic Synergy® scalpel (HSS) (Johnson & Johnson, Suprimed - Brazil) in the surgical removal of FH.

Methods: eleven patients underwent FH removal with HSS. Post-operative examination was conducted at 3, 7 and 30 days after surgery. In all instances, the surgeon was consistently able to control the tissue volume and maintain adequate surgical margins.

Results and conclusions: The results demonstrated that the use of the HSS offered better haemostasis, reduce the possibility of post-operative infection and, principally, provided more comfort when compared with a conventional scalpel. Re-establishing an aesthetic and functional state was also quicker with HSS.

Keywords: fibrous hyperplasia, harmonic scalpel, repair chronology

INTRODUCTION

Inflammatory fibrous hyperplasia (IFH), resulting from poorly adapted prostheses, presents as a conjunctive tissue tumour closely related to a fibroma and, in many cases, they are indistinguishable[1,2].

Clinically, it presents as a smooth-surfaced, raised lesion, with the coloration of normal mucosa, most commonly with a sessile base. The size of the lesion directly corresponds to the amount of surface area involved in the contributory trauma and may reach several centimetres. Its form is flabby in most cases and may be ulcerated, depending on the intensity of the trauma[2,3].

The aetiology of IFH is trauma, and its location is directly related to the areas subjected to this trauma. Edentulous areas within the arch may cause the patient to form abnormal habits, such as sucking of the adjacent mucosa or tongue interposition, contributing to the appearance of this lesion as an irritative response[4].

It is well known that hyperplasia related to denture use originate from chronic irritation. Patients and their relatives express anxiety when reporting to dental clinics for examinations. To avoid denture induced hyperplasia, dentures must be examined more often after their construction and delivery, the patients must be informed about cleansing and disinfection measures, and warned not to wear them a whole day at a time[5].

The indicated treatment is surgery through conservative excisional removal, and recurrence is rare, provided the causal habits are eliminated and/or the contributing prosthesis is properly adjusted[3].

Recovery from this type of surgery, mainly when involving large areas, has been widely improved with the advent of the harmonic scalpel.

Upon consulting the literature, it is noted that there are no previous reports of the use of the harmonic scalpel in dental and maxillofacial surgery. This led us to examine the intrinsic qualities of this type of scalpel as well as the necessity of casuistry to state that this is a technique that actually substitutes conventional techniques, mainly considering the benefits to the patient.

MATERIALS AND METHODS

After approval of this protocol by the Commission of Bioethics of the School Of Dentistry of Sao Paulo State University – UNESP, eleven patients with maxillary or mandibular complete dentures were evaluated. Thorough case histories and clinical examinations confirmed

that they had poorly adapted prostheses, requiring the confection of new dentures. Prostheses were unstable due to a poor adaptation to the edentulous ridge which exacerbates bone resorption and can cause a fibrous tissue response in the adjacent vestibular mucosa (Figure 1). These changes led to deficiencies in the prostheses with respect to occlusion, aesthetics and function, accentuating the reduction in the vertical dimension, poor centric relation and inappropriate facial profiles. The X-ray examination did not reveal any relevant alterations in the bone.

Figure 1 - Clinical view

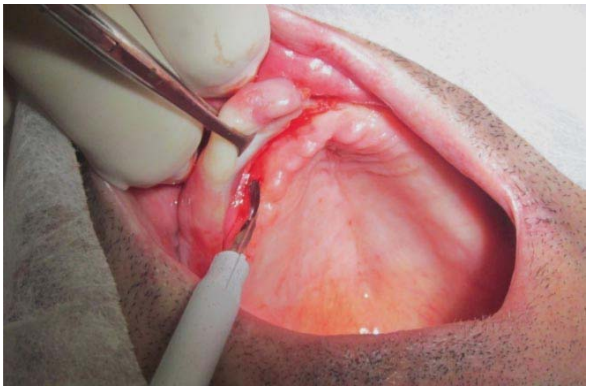

Figure 2 - Surgical removal with HSS

After careful surgical and prosthetic planning, patients were administered anaesthesia via local infiltration. The hyperplastic tissue delimited through fixation with Allis callipers. A Harmonic Synergy® system (Ethicon Endo-Surgery®, Johnson & Johnson Medical - Suprimed, Brazil) consisting of a generator supplying an alternating electric current through a high-frequency transducer and active surgical tips (Figure 2). The HSS has a dissecting blade with adjustable length between 4.8 and 10 cm and an integrated manual override. A 5 mm diameter tip was used for tissue removal. Each of the patients, as well as the surgeon and team, were protected with safety glasses, and the excised specimens were submitted for anatomical and pathological examination.

After surgery, all patients received post-operative antibiotics and anti-inflammatory therapy for seven days consisting of 500 mg cephalosporin every six hours plus 50 mg diclofenac every eight hours.

All cases were photographed before and immediately after the operation, as well as 24 hours, 7, 15 and 30 days after the surgery.

RESULTS

In all instances, the surgeon was consistently able to control the tissue volume and maintain adequate surgical margins. Minimal bleeding was noted except in one case where the size and location of the lesion necessitated the suture of an artery in the surgical field. The HSS proved adequate for removal of tissue and did not appear to cause any vascular complications by compromising the blood supply to the surgical site (e.g., local ischemia and/or clinical evidence of soft tissue necrosis).

At one week after the surgery, all cases showed satisfactory initial re-epithelialization of the surgical site. All patients reported minimal discomfort during the first 48 hours after surgery, and only one patient reported bleeding episodes, which were treated with cloth compression. This is in stark contrast to the typical experience with standard scalpel excision for similar tongue lesions, where it is common for patients to present immediately after surgery and for several days following with complaints of significant pain and difficulty speaking or eating. In addition, with conventional surgery, the associated post-operative oedema interferes with hygiene practices, further impairing healing.

After 30 days, all patients demonstrated full re-epithelialization of the mucosa with satisfactory aesthetic and functional results (Figure 3)

Histopathological examination of all surgical specimens confirmed that all tissue margins were disease free.

Figure 3 - Clinical aspect after 30 days

DISCUSSION

IFH is a common clinical condition in dental practice that can cause episodes of pain, swelling and bleeding in

the post-operative state with standard excision leading to dysphonia and dysphagia. Minimizing these outcomes can prove challenging to the operating surgeon[6].

For conventional surgeries, Tucker [7] suggests three techniques, depending on the size of the lesion. When minimal, electrosurgery provides good results. When the tissue mass is moderately sized, simple excision and placement of the remaining tissue may result in the full elimination of the vestibule. For cases when extensive areas of tissue are to be removed, an incision must be made superficial to the periosteum, creating a clean supraperiosteal tissue bed over the alveolar ridge, and the unaffected margin is sutured at the height of the vestibular periosteum using an interrupted suture technique. A surgical template or the patient´s own prosthesis, covered with tissue conditioner, is reinserted and should be worn continuously during the 5 to seven days immediately following surgery.

The harmonic scalpel was introduced into surgical practice nearly a decade ago in order to minimize risks associated with electro-surgical technologies, including energy damage at peripheral locations and complications associated with monopolar energy[8].

This type of scalpel is characterized by the conversion of electrical energy into mechanical energy, causing the blade to actively vibrate at 55,500 Hz per second. This mechanical vibration transfers energy to the tissue, resulting in simultaneous incision and coagulation[9].

Given the intrinsic properties of this technology, its use in tissue repair is worthy of examination. Traditional scalpel surgery and harmonic scalpel surgery were compared to identify relevant differences. The HSS is a cutting instrument providing simultaneous haemostasis and its properties are advocated by several authors [8-13]. The present study confirmed the homeostatic property of the HSS by demonstrating no significant bleeding during surgical procedures.

Localized gingival enlargements represent a group of lesions with distinctive clinical manifestations. They are reactive lesions emanating from the superficial fibers of periodontal ligaments and their rapid growth. After the removal of these lesions a follow-up is required to ensure the early diagnosis of any recurrence[14].

Sinha and Gallagher [15] describe a study of the oral mucosa that demonstrated that the use of the HSS promoted delayed healing when compared to conventional scalpel surgery, laser radiation and electrocautery. However, in our study there was no visible delay in the healing of patients undergoing surgery using the HSS.

The primary advantages of HSS surgical treatment include prompt haemostasis, reduced operative trauma and a better post-operative clinical condition with unaltered haemoglobin levels, which likely enhance the efficacy of postoperative radiotherapy. Postoperative results of HSS surgery showed wound sterilization and sealing of the adjacent lymphatic vessels [11-13]. The length of surgery is greatly reduced according to results reported in other studies [11-13], and the healing process is usually shorter and less painful as compared to healing following electrosurgery and cryosurgery techniques. Minimal or no suturing for surface lesions is an apparent advantage in this set of patients, except in those instances where the size of the defect and the influence of muscles adjacent to the site necessitated additional stabilization and the utilization of sutures.

A larger amount of sample may be judged necessary to better evaluate the results of this surgical technique in cases of FH.

In the present study, the extent and clinical characteristics of the hyperplasia led us to elect operative excision after potential surgical and post-operative complications were taken into consideration. The primary post-operative interest was patient comfort. No evidence of recurrence has been observed.

CONCLUSION

The clinical results indicated that, when compared with conventional scalpel surgery, the use of the HSS provided better haemostasis, eliminated the possibility of infection, good visualization of the surgical field and, principally, increased postoperative comfort while immediately re-establishing aesthetics and function.

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