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Post-Operative Swelling Management in Dental Surgery

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ABSTRACT

A surgical trauma in the oral cavity always causes tissue injury characterized by hyperemia, vasodilatation, increased capillary permeability with liquid accumulation in the interstitial space and granulocyte and monocyte migration, due to the increased osmotic pressure in capillaries (Starling law). Edema is the expression of exudates or transudation, and in surgery, probably both the events occur. Postoperative swelling following different surgical strategies is an area of great interest. Pharmacological therapy when performed with corticosteroids seems to improve control of the postoperative swelling related to this kind of surgeries. This article focuses on various pharmacological therapies and non-pharmacological methods used in post-operative swelling management.

KEYWORDS: Antibiotics, corticosteroid, cryotherapy, post-surgery swelling, third molar extraction, Home care

INTRODUCTION

A surgical trauma in the oral cavity always causes tissue injury characterized by hyperemia, vasodilatation, increased capillary permeability with liquid accumulation in the interstitial space and granulocyte and monocyte migration, due to the increased osmotic pressure in capillaries (Starling law). Edema is the expression of exudates or transudation, and in surgery, probably both the events occur. Transudation, in fact, is secondary to blood flow slowing (i.e., hyperemia, vasodilatation, stenosis, etc.), whereas a superimposed infection is responsible for exudates. Extension of the incision, as well as tissue manipulation and length of surgery, could affect the entity of swelling. According to previously published data, postoperative swelling and pain are significantly lower following a smaller incision. When impacted third molars are removed, post-surgery is characterized by limitation in the mouth opening, pain, reduced masticatory capability and swelling of variable degree. The postoperative period of a patient treated for impacted third molar is hardly predictable. This review will focus on the technical and pharmacological and Nonpharmacologic parameters to reduced postoperative pain, swelling after dental surgery.^{1,2}

PHARMACOLOGIC MANAGEMENT OF POST OPERATIVE SWELLING

Antibiotics: Antibiotic therapy to treat established infection or as prophylactic strategy to prevent distance site infection or to control postoperative discomfort in

third molar surgery is today a broadly accepted indication with documented efficacy. Surgeons use antibiotic prophylaxis, even if some controversies exist in this regard. In a study reported by Halpern et al., reduction of both alveolar osteitis and inflammation was observed in patients treated with penicillin (15,000 UI/kg bw, IV) or clindamycin (600 mg in subjects allergic to penicillin), 1 hr before surgery versus placebo-treated control patients.³

Antibiotics are largely used in the postoperative period. They can be applied topically or administered systematically, but the efficacy of antibiotic treatment in the preoperative period is also highlighted. According to some authors, to obtain results with the antibiotic treatment, they must be administered preoperatively to act when the bacterial infection starts. Topical endoalveolar application of minocyclin [10 mg in bioresorbable poly (D, L-lactide-co-glycolide) lactide sustained-release microspheres] following extraction of third molars, significantly reduces the risk of postoperative infection. Metronidazole, 1 g, 1 h before surgery, and 400 mg every 8 h for 5 days after surgery, reported that antibiotic treatment is not efficacious either in the pre- or postoperative period.⁴

According to the literature review, the use of the antibiotics before surgery could be considered a predictable procedure to avoid and control the possible infection related to the surgery. If infection and inflammation are present in the surgical area, an antibiotic therapy seems to give a better clinical compliance of the tissues undergoing surgery. The antibiotic administration before, during and after surgery seems to be a better therapeutic choice for controlling the

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infection arising in the postoperative period.

Corticosteroids: Perioperative use of corticosteroids has been advocated for reduction of pain, edema, and trismus following oral surgical procedures. Corticosteroids are commonly used to control post-operative morbidities and to provide comfort for patients. However, there are no definite protocols relative to molecules, doses, schedules, and routes of administration. The most commonly administered types of corticosteroids are betamethasone, dexamethasone, and methylprednisolone, administered intravenously, orally or by injection into the masseter muscle. Regarding orthognathic surgery, several investigations demonstrated that perioperative corticosteroid administration significantly reduced post-operative inflammation and edema.⁶

The effects of corticosteroids on post-operative edema after oral surgery have been widely investigated in the literature. Many prior studies demonstrated a significant decrease in post-operative edema after administration of corticosteroids. Similarly, several studies reported that corticosteroids significantly decreased post-operative edema and pain, indicating a strong correlation between edema and pain decreases.⁷

Steroid Guideline for Dental Use : Current evidence reveals that the majority of patients with adrenal insufficiency can undergo routine, nonsurgical dental treatment without the need for supplemental glucocorticoids. This conclusion is supported by the fact that these dental procedures do not stimulate cortisol production at levels comparable to those oral surgical procedures, and local anesthetic blocks neural stress pathways required for adrenocorticotrophic hormone secretion. For patients undergoing general anesthesia for minor surgery 100 mg hydrocortisone intramuscularly should be administered and the usual glucocorticoid medications maintained. For major surgery 100 mg hydrocortisone delivered as a bolus preoperatively followed by 50 mg 8-hourly for 48 h is adequate.⁸

The major controversy resides for the patients who are undergoing any oral surgical procedures and had discontinued steroids recently. These are prescribed with supplemental steroid therapy. A conservative approach remains to wait 2 weeks for the normal adrenal function to return before performing elective oral surgical procedures. However, this conservative waiting period is not required for patients who are receiving 30 mg of hydrocortisone (that is, 5 mg of prednisone) or less per day.⁹

NON-PHARMACOLOGIC STRATEGIES TO CONTROL POST OPERATIVE SWELLING

Surgical techniques: Different surgical strategies have been reported in the literature to reduce the postoperative discomfort after the third molar surgeries. They can be

used either separately or in association with pre- or postoperative strategies. Different kinds of flaps have been used during extraction of impacted third molars, specifically to assess whether a marginal flap could control postoperative swelling better than a para-marginal one.¹⁰

According to several authors, tight closure favors edema formation by creating a unidirectional valve that allows fragments of food to reach the cavity, but not to leave it easily. This can be the origin of local infection, inflammation, edema and potential alveolar osteitis and pain for difficult draining.^{10, 11}

According to other authors, different factors such as edema, pain and trismus that follow extraction of impacted third molars can be related to suture technique and to surgery length, and the use of a draining tube can be helpful in reducing or preventing postoperative swelling.

Different surgical procedures have also been related to postoperative swelling. Osteotomy through piezosurgery has given positive results on tumefaction compared to traditional techniques. However, often, the studies analyzed did not involve extraction of impacted third molars, but general osteotomy of the jaws.

Cryotherapy: Cryotherapy or cold therapy is the local or systemic application of cold for therapeutic purposes and has been in use as early as the time of Hippocrates. Ice therapy has been reported to control inflammation, pain and oedema [86] It is recommended that the ice pack be wrapped in dry clothe and applied at 20 minutes interval for 24 hours postoperatively. Ice therapy is a simple, cheap, repeatable and safe treatment modality but its use is considered to be contraindicated in patients suffering from cold hypersensitivities and intolerances as in Raynaud's phenomenon, or over regenerating nerves, areas with impaired circulation or peripheral vascular disease.^{12,13}

Laser: The use of laser is a relatively new method of reducing postoperative discomfort, especially oedema, after third molar surgery. It is believed that laser irradiation induces an increase in number and diameter of lymph vessels, with a simultaneous decrease of blood vessel permeability. The effect of laser irradiation on blood vessels is not completely understood. While some authors state that laser induce vasodilatation, others point to its initial vasoconstrictor effect. In addition, laser increases protein absorption by activating macrophages, modifying hydrostatic and capillary pressure, and inducing the absorption of interstitial fluids with consequent reduction in edema.^{14,15}

CONCLUSION

Postoperative swelling is a common event after surgery of impacted third molar or any other teeth and may affect, only for a few days, the social and working life of the patient. Clinicians should manage the postoperative discomfort after the surgery. While most surgeons adopt

antibiotic therapy in the postoperative period, more questionable is the use of antibiotics administered pre-surgery. The review showed that no single modality of management effectively prevents the occurrence of these complications without undesirable side effects.

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