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DEXAMETHASONE FOR THIRD MOLAR SURGERY- A REVIEW

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ABSTRACT

Every oral surgeon has encountered problems associated with edema, trismus, and pain after third Molar surgeries. In third-molar surgery, fear of pain and trismus are often directly proportional to edema. Use of the corticosteroid, dexamethasone, given as intramuscular, intravenous or sub mucosal either as preoperative, perioperative or postoperative injection , appears to be effective in the prevention of postoperative edema. This article reviews about the best technique and the dose required to minimize patient discomfort in third molar surgery.

KEY WORDS: Dexamethasone, third molar surgery, postoperative edema

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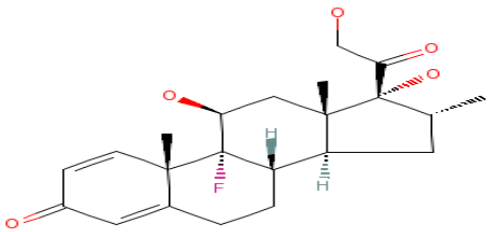
INTRODUCTION

Dexamethasone and methylprednisolone have been used extensively in oral and maxillofacial surgery due to their nearly pure glucocorticoid effects, and no mineralocorticoid effects, and the least adverse effects on leukocyte chemotaxis.[1,2] Different steroids have been used in various oral procedures which range from root canal, periodontal surgeries, impactions, trauma, orthognathic surgeries , release of fibrous bands in oral sub mucous fibrosis. Dexamethasone is one of the most potent anti-inflammatory drugs and for this reason has been used following minor oral surgery. However, a variety of conditions contra-indicate the use of corticosteroids. These include patients suffering from diabetes mellitus, peptic ulceration, active or healed tuberculosis, hypertension, ocular herpes, glaucoma, acute and chronic infections, psychosis,osteoporosis,[3] Cushing's syndrome and renal insufficiency. Pregnancy is a contraindication to the use of corticosteroids. [4] Today Dexamethasone are accepted in the treatment of multiple inflammatory conditions, allergies, adrenocortical insufficiency, preoperative and postoperative support, and diagnostic procedures by our medical colleagues. Dexamethasone is a synthetic adrenocortical steroid that exerts basic glucocorticoid actions and is approximately twenty-five times more potent that hydrocortisone.[5]

STRUCTURE OF DEXAMETHASONE



At equal anti-inflammatory doses dexamethasone essentially lacks the sodium-retaining properties of hydrocortisone and is three thousand times more soluble than hydrocortisone in water at 25^0C. The normal hormonal effects associated with prolonged steroid therapy are essentially absent with a single injection. If undesirable hormonal effects do occur, they are reversible and disappear when the steroid is discontinued.[5]

Table 1
Properties of corticosteroids[13]

Compound	Anti-inflammatory Potency	Equivalent dose(mg)	Sodium retaining potency	Plasma half life (min)	Biological half life(hrs)
Cortisol (hydrocortisone	1	20	1	90	8-12
Prednisone	4	5	0.8	60-200	12-36
Prednisolone	4	5	0.8	200	12-36
MethylPrednisolone	5	4	0.8	180-200	12-36
Betamethasone	25	.75	0	100-300	36-72
Dexamethasone	25	.75	0	100-300	36-72

MECHANISM OF ACTION

The amount of endogenous cortisol from the adrenal cortex does not appear to alter the process of inflammation significantly, on the other hand, large doses of exogenous cortisol or synthetic steroids appear to block all stages. Steroids prevent diapedesis, the initial leakage of fluids from the capillaries, and stabilize the membranes of the cellular lysosomes which hold large quantities of hydrolytic enzymes. There is also a decrease in the formation of bradykinin,a powerful vasodilating substance.[5] Glucocorticoids act by controlling the rate of synthesis of anti-inflammatory proteins [6]. Blackwell et al[7] and Hong and Levine[8] have shown that glucocorticoids can induce the release of antiphospholipase proteins, which presumably can inhibit the release of arachidonic acid and its metabolism to prostaglandins and thromboxanes, which increase capillary permeability. Tam et al[9] also have shown that glucocorticoids block deacylation of phospholipids or transport of arachidonic acid to the cyclo-oxygenase enzyme system after deacylation. The low analgesic effect at the low dose suggests that any putative analgesic effect of glucocorticoids occurs by a mechanism that is distinct from those mechanisms responsible for reducing facial swelling. [6]

CORTICOSTEROIDS AND TECHNIQUE OF DRUG DELIVERY

Dexamethasone is been delivered for third molar surgies by either oral , intravenous, intramuscular in masseter, gluteal or deltoid region , sub mucosal injection, endo alveolar powder. On injecting 4mg dexamethasone in masseter muscle , the drug has not interfered in a negative way on the postoperative mouth opening. In earlier studies, pain has been significantly reduced due to prophylactic steroid administration .[11,12] It was not significant on this dosage. The discordance might be due to the 2-3 times higher steroid doses in the previous studies.[10] Acute postoperative pain following third molar extraction is predominantly a consequence of inflammation caused by tissue injury [14]. The role of corticosteroids in preventing postsurgical pain is controversial. Corticosteroids alone do not seem to have a clinically significant analgesic effect [15,16,17,18], but it has been reported that steroids can be related to a reduction in the number of analgesic tablets used after surgical extractions [19,20]. Dexamethasone in particular appears to decrease pain after surgery [16].Both sub-mucosal and endo-alveolar administration of dexamethasone are effective in reducing postoperative sequelae of surgical removal of lower wisdom teeth.[21] On the second postoperative day, facial edema showed a significant reduction in both dexamethasone 4-mg and dexamethasone 8-mg groups compared with the control group, but no significant differences were observed between the 2 dosage regimens of dexamethasone[22].

Submucosal injection of dexamethasone 4 mg is an effective therapeutic strategy for improving the quality of life after surgical removal of impacted lower third molars with a comparable effect on postoperative sequelae to intramuscular injection[23]. It offers a simple, safe, painless, noninvasive, and cost effective therapeutic option for moderate and severe cases. 8mg of dexamethasone intramuscularly, 1h before surgery significantly reduced postoperative swelling on day 2, when most swelling occurs. The significant swelling reduction probably led to decreased tissue tension related to pain. [24] The effects of preoperative dexamethasone (4 and 8 mg)consumption, to decrease pain, facial swelling and trismus. Dexamethasone of 8 mg was more effective than that of 4 mg at reducing facial swelling and trismus[25]. No significant differences were observed between the 8 mg dexamethasone Intramuscular injection group and the 8 mg dexamethasone consumption group in this study. Both groups reported positive effects on facial swelling, pain and trismus on 1, 3 and 7 postoperative days. Therefore, dentists can use 8 mg dexamethasone Intramuscular injection or consumption for third molar surgery.[26]

CONCLUSION

From reviews seen, we could accept dexamethasone as the choice of the drug in third molar surgeries due to its half life and no sodium retaining capacity in reducing the pain and swelling. Submucosal dexamethasone may be preferred since having similar results as intramuscular and no pain while injecting it. The drug has good result when given preoperatively or perioperatively than postoperative. It should be made mandatory to give this drug in either of the routes in third molar surgery, as all routes has given significant improvement in pain and swelling unless otherwise when the dexamethasone is contraindicated.

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