BIOSCIENCES BIOTECHNOLOGY RESEARCH ASIA, August 2014. Vol. **11**(2), 947-951

Steroids - An Effective Drug in Pre Operative and Post Operative Maxillofacial Surgeries

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doi: http://dx.doi.org/10.13005/bbra/1364

(Received: 15 July 2014; accepted: 10 August 2014)

Steroids are used in post operative pain, swelling, trismus and reduction of inflammatory reaction after surgical procedures. The use of short term steroids after oral and maxillofacial surgery have become common. The most commonly administered steroids, pre operatively or post operatively, intravenously or orally or by injecting into masseter muscle are betamethasone, dexamethasone and methylprednisolone. This article gives a review of the effects and uses of steroids in oral and maxillofacial surgeries.

Key words: Steroids pain swelling oral and maxillofacial surgery, postoperative surgery.

The removal of lower third molars is still the most common surgical procedure done by oral and maxillofacial surgeons (Shepherd and Brickley., 1994). Surgical procedures are often associated with pain and trismus as a result of postoperative response which affects the day to day patients quality of life. In recent days steroids are widely used to reduce the postoperative complications, particularly if healing is not compromised to give a better quality of life to the patient after surgery.

Steroid is a type of organic compound that contains a characteristic arrangement of four cycloalkane rings that are joined to each other. The core of steroids is composed of twenty carbon atoms bonded together that take the form of four fused rings: three cyclohexane rings and one cyclopentane ring

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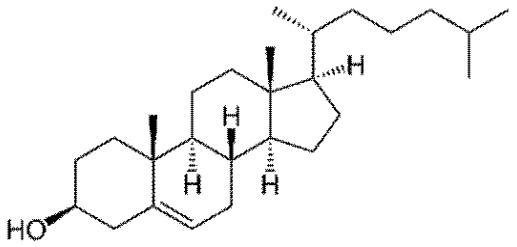
Structure

You may have heard of anabolic steroids which have harmful effects. But there's another type of steroid otherwise called of corticosteroid which is used to treat variety of problems. These



steroids are similar to hormones that adrenal glands produce to fight stress associated with illness and injuries. They reduce inflammation and affect the immune system.

Steroids Uses are to reduce inflammation (arthritis) and swelling (oedema), to reduce nausea and vomiting (in cancer chemotherapy), to suppress the immune response (systemic lupus

erythematosis), to reduce terminal pain (associated with cancer) as replacement therapy (in addison's disease), also used to treat brain oedema, shock conditions, certain type of blood cancer (B- and T-cell lymphoma) (Jehn and Osborne., 1997) as well as conditions involving adrenal cortex insufficiency.

The anti-inflammatory action of corticosteroids was first discovered by Hench and coworkers in the treatment of rheumatoid arthritis in 1949. During the 1950s, several researchers demonstrated that hydrocortisone may prevent inflammation following oral surgery (Stewart and Ross ., 1958).

Inflammatory process

The body's natural defense mechanism to cell injury or death is inflammation. The inflammatory response is manifested by redness, warmth, pain, and swelling of the affected area. When tissue damage occurs, large quantities of histamine, bradykinin, serotonin, and other substances are released into the surrounding area (Gyton AC). These substances, specially histamine, cause local vasodilation to occur, thereby increasing blood flow to the damaged area. Leukocytes infiltrate into the damaged area and phagocytize invading organisms and debris. The inflammatory process is necessary if healing is to occur, but often excessive inflammation causes the patient unnecessary pain, edema, and trismus. Steroids as anti- inflammatory agent. Corticosteroids act by inhibiting the body's inflammatory response to injury through various mechanisms, with a reduction of fluid transudation and therefore oedema(Messer.,1975 and Milles.,1993).Corticosteroids inhibit leukocyte migration to sites of inflammation and so reduces the general symptoms of inflammations(Cato and wade., 1996). First known use of corticosteroid was in 1944 (Webster, 2012). Studies have reported the effectiveness of corticosteroids given before or just after removal of third molars in improving recovery (Skjelbred P 1982, Tiwana PS 2005).

DISCUSSION

The administration of corticosteroids is thought to inhibit mast cell production and secretion of cytokine, kinin and histamine which promotes an inhibition of thromboxane and bradykinin, resulting in less blood vessel dilatation and less permeability(Huffman, 1997; Schaberg, 1984). (Montgomery and Hogg JP., 1990) described that a single preoperative or postoperative dose of corticosteroids given intramuscular gives a good plasma concentrations of the drug and prolonged anti-inflammatory action.

The body produces about 15 to 30 mg of hydrocortisones under normal conditions. During stressful situations, 300 mg of hydrocortisone per day can be produced. (Axelrod L 1979) states that for inflammation to be suppressed, exogenous corticosteroids must be administered in doses exceeding the normal physiological amounts of hydrocortisone released.

(Graziani 2006, Vegas-Bustamante 2008) reported that corticosteroids when injected near the operated site gave encouraging results postoperatively.(Alexander, 2000 and Gersema, 1992) stated that Preoperative use of corticosteroids is often used for reduction of oedema, trismus, and pain after removal of impacted mandibular third molars.

Recently (Markiewicz et al., 2008) in a meta-analysis, concluded that giving corticosteroids perioperatively was of mild to moderate value in reducing postoperative inflammatory signs and symptoms.

Corticosteroids selected for administration should have few mineralocorticoid effect and good biological activity dexamethasone meets the requirements, and its found to be effective in third molar surgery (Pederson., 1985; Neupert III., 1992; Grossi., 2007; Baxendale., 1993; Dionne., 2003).

(Alexander RE and Throndson RR 2000) states that an 8 to 12mg of dexamethasone given intramuscularly found to be effective in third molar surgery. .Schaberg et al., 1984 have described that methylprednisolone is effective for the control and management of postoperative facial edema following orthognathic surgery. Corticosteroids reduce edema by decreasing permeability of capillary endothelium and therefore reduce the amount of fluid, protein, macrophages, and other inflammatory cells entering areas of tissue injury (Brooks, 1986).

A double-blinded study was conducted by Caci and Gluck 1976 to investigate the effects of prednisolone and papase on the prevention of edema, trismus, and pain following the

removal of impacted third molars which proved that prednisolone was effective in reducing the postoperative trismus and pain. (Anne ,. 2010) suggested that the administration of Corticosteroids in oral surgery decreases oedema and pain significantly, with no higher risk of infection and with a minimum risk of other side effects

Hooley and Hohl, (1974) states that corticosteroids significantly reduce postoperative edema and decrease the average hospital stay. (Boc and Peterson, 1981; Gee, 1974) have recommended the use of steroids for orthognathic and traumatic oral surgical procedures when control of oedema and prevention of vascular congestion in the nutrient flap is critical.

(Kenji Seo, Yutaka Tanaka 2004) concluded that Steroid treatment for sensory impairment after orthognathic surgery has the potential to accelerate recovery and it appears desirable to start treatment later than 1 week postoperatively. (Mathhew Stoll 2012) suggested that Intra-Articular Corticosteroid Injections to the Temporomandibular Joints are Safe and Appear to Be Effective Therapy in Children With Juvenile Idiopathic Arthritis.

Flood, 1999 in a randomized prospective study of the influence of steroids on postoperative eye opening after exploration of orbital floor suggest that use of steroids are effective in postoperative swelling and eye opening.

Upper Airway Obstruction (UAO) is a well known complication of cleft palate repair. (abdel- aziz , Ahmed 2012) in a study evaluated the efficacy of steroid injection locally at the tongue base after palatoplasty and resulted that administration of local tongue base steroid injection helps in preventing or reducing the lingual oedema that can cause UAO following palatoplasty and less hospital stay for the patient. The side effects of short-term use of corticosteroids are listed in Table (Soudeh Chegini and Daljit, 2012).

Complications Of Short-Term Glucocorticoid Treatment

1) Allergic reaction – skin reaction/anaphylaxis
2) Skin changes – steroid acne/paper thin skin/ bruising
3) Increased serum glucose
4) Adrenal suppression (if high dose)
5) Disturbance of wound healing
6) Impaired immunity
7) Increased cardiovascular risk
8) Increased morbidity in pre-existing peptic ulcer disease
9) Glaucoma
10) Psychiatric disturbance – change in mood/ psychosis

The biological effect of glucocorticoids on wound healing is thought to increase the risk of a number of adverse gastrointestinal events such as gastritis, formation of an ulcer and gastrointestinal bleeding (Salerno and Hermann, 2006).

A trial by Weber and Griffin, 1994 have been showed significantly decreased edema with 1 single preoperative dose of dexamethasone and doses administered before and after surgery and on the first postoperative day.

Weber and Griffin,1994 states that in a randomised prospective double blind trial, 23 patient who required bilateral sagittal split osteotomy of the mandible were split into three groups and were given either placebo, preoperative dexamethasone 16mg intravenously or preoperative dexamethasone 16mg intravenously with three postoperative 8mg doses intravenously every 6h. In both dexamethasone group there was a significant ($p<0.5$) reduction in facial swelling on postoperative day one as assessed by computer scanning of clinical photograph, and was no stastical difference between two groups.

CONCLUSION

The use of short term systemic steroids preoperatively and postoperatively after orthognathic surgery or any kind of maxillofacial surgery is safe. Even though prednisalone and other steroids are available in medical field the most commonly used steroid in oral and maxillofacial surgery is dexamethasone. Preoperative intravenous dexamethasone significantly reduces postoperative inflammation and its associated edema after surgery. The administration of corticosteroids in maxillofacial surgery decreases pain and oedema significantly, with no higher risk of infection and other side effects. Steroids play a vital and a beneficial role in post operative management of maxillofacial surgeries, its risk of administration must be considered before using it.

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