Corticosteroids used in Dentistry: An Update

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ABSTRACT
Steroids are naturally produced in the body by the adrenal glands which are small glands lying above the kidneys. Steroids may regulate immune system; balance the intake of salt and water in our bodies. It helps in reducing inflammation. Commonly used steroids are hydrocortisone, dexamethasone, methylprednisolone and prednisolone. In dentistry, steroids are widely used and accepted modes of treatment for oral mucosal lesions, e.g. oral submucous fibrosis, erythema multiforme, oral lichen planus, vulgaris, pemphigoid, mucocele, temporomandibular disorders and recurrent aphthous stomatitis.

Keywords: Steroids, Prednisolone, Pemphigus vulgaris, Oral submucous fibrosis, Erythema multiforme.

INTRODUCTION
Corticosteroid drugs have been used therapeutically for a growing number of disorders over the last half-century. The number of synthetic corticosteroids available to the clinician has also increased, with drugs of varying potency and duration of action to suit the intended purpose. Corticosteroids have revolutionized the management of several disabling conditions and saved many lives. However, they have adverse drug reactions taking continuous oral corticosteroids, and more than half of all children being treated for asthma in primary care are exposed to chronic high doses of corticosteroids via a combination of inhaler and intranasal devices. Dental patients with a history of corticosteroid use may require special consideration prior to receiving dental treatment.

Corticosteroids have wide range of uses in dentistry. Steroids are used in intracanal medicaments, such as Ledermix to reduce pulpal inflammation and prevent root resorption; widely used in oral medicine, such as in vesiculobullous diseases, orofacial granulomatosis, temporal arteritis and other oral mucosal disorders. In oral surgical procedures, steroids are commonly used to limit postoperative inflammation. Hooley and Hohl described several instances of steroid use in prevention of postoperative edema and topical use on the lips and corners of the mouth to prevent ulceration and excoriation as a consequence of retraction during surgery. They are also used in the prophylaxis of adrenal crisis in patients with secondary adrenal insufficiency. Corticosteroids are immunosuppressive and anti-inflammatory drugs very widely administered to treat pathological process in medical and dental practice. For a dental patient taking large dose of steroid supplementation, requiring less than two weeks for minor dental procedure with minimal stress, no alteration of drug therapy is indicated. However, for more than two weeks for extensive major or stressful dental procedure, the daily dose must be doubled the day before, on the day of and the day after surgery and the patient should be asked to resume normal maintenance dose postoperatively for 2 days. If the patient has received at least 20 mg of cortisol for more than 2 weeks within 1 year, then 60 mg of cortisol should be taken the day before and on the day of surgery in the morning.

PHYSIOLOGY OF CORTICOSTEROIDS
There are three groups of steroid hormones produced in the adrenal cortex: The androgens, the mineralocorticoids and the glucocorticoids. Adrenal cortex secretes glucocorticoids, and steroids have widespread effect on the metabolism of carbohydrate and protein. The zona fasciculata secretes glucocorticoids, cortisol and corticosterone as well as small amount of adrenal androgen and estrogens. The secretion of these cells is controlled by hypothalamic pituitary axis (HPA) via adrenocorticotropic hormone (ACTH).

ORAL SUBMUCOUS FIBROSIS
Oral submucous fibrosis is an insidious, chronic, resistant disease involving the mucosa, submucosa or any part of the oral cavity including the pharynx and esophagus. The disease produces excessive salivation, burning sensation, difficulty in chewing, swallowing and restricted mouth opening in severe cases. Various treatment modalities are used for treatment of
oral submucous fibrosis but application of steroid ointment topically helps in cases with ulcers and painful oral mucosa. Such application has therapeutic effects and mainly shows anti-inflammatory activity showing a direct healing action on the mucosal patch.\textsuperscript{7}

**ORAL LICHEN PLANUS**

The erosive, bullous or ulcerative lesions of lichen planus are treated with high potency topical steroids, such as 0.05% fluocinonide ointment (Lidex, three times a day). Lidex can also be mixed 1:1 with carboxymethyl cellulose paste or other adhesiveointments. A gingival tray can also be used to deliver 0.05% clobetasol propionate with 1,00,000 IU/ml of Nystatin in orabase. Around 3 to 5 minute application of this mixture daily appears to be effective in controlling erosive lichen planus.\textsuperscript{8,9}

In case of oral lichen planus (LP), anti-inflammatory agents, such as the glucocorticosteroids (GC), e.g. hydrocortisone plays a front-line role in the management of such conditions.\textsuperscript{10,11} Intraleosomal injection of triamcinolone acetonide (10-20 mg) or short-term regimens of 40 mg of prednisone daily for 5 days, followed by 10 to 20 mg daily for an additional 2 weeks, have also been used in most severe cases.\textsuperscript{12}

**MUCOUS MEMBRANE PEMPHIGOID**

Mucous membrane pemphigoid is a rare chronic blistering condition of the mouth, eyes and genitals and, rarely, the skin. The initial site of involvement is the oral mucosa. Many patients have mucous membrane pemphigoid affecting only the gums. Fluocinonide (0.05%) and clobetasol propionate (0.05%) in an adhesive vehicle can be used three times a day for up to 6 months.\textsuperscript{13} Systemic therapy of mucous membrane pemphigoid prednisone is usually given at a dose of 1 to 1.5 mg/kg/day, with appropriate monitoring for side effects.\textsuperscript{14}

**TEMPOROMANDIBULAR DISORDERS**

Temporomandibular disorders are the major cause of facial pain and discomfort. Recently, different types of corticosteroids are available for intra-articular injection, which ranges from solutions of more soluble agents to suspensions of triamcinolone hexacetonide and other relatively insoluble steroids. Intra-articular corticosteroids have been proved useful in reducing pain, swelling and dysfunction in inflammatory diseases of TMJ disorders. Hydrocortisone 20 to 240 mg/day, prednisone 50 to 60 mg/day, dexamethasone 0.75 to 9.0 mg/day, betamethasone 0.6 to 7.2 mg/day.\textsuperscript{15}

**ERYTHEMA MULTIFORME**

Erythema multiforme is a blistering, ulcerative mucocutaneous condition of uncertain etiopathogenesis. The most common etiologic association with erythema multiforme is herpes simplex virus infection, which is frequently associated with the erythema multiforme flare.\textsuperscript{16} It displays a wide range of clinical disease. In mild cases, ulcerations develop, affecting the oral mucosa. In severe cases, diffuse sloughing and ulceration of the entire skin and mucosal surfaces are seen.

Early therapy begins with systemic prednisone (0.5 to 1.0 mg/kg/day) or pulse methylprednisolone (1 mg/kg/day for 3 days) has shown to be very effective.\textsuperscript{23} Intravenous (IV) pulsed dose methylprednisolone (3 consecutive daily infusions of 20 to 30 mg/kg to a maximum of 500 mg given over 2 to 3 hours) is reported, with the suggestion that this approach is superior to oral prednisone because it imparts the benefit when treatment is administered as early as possible in the progression of the cutaneous insult.\textsuperscript{17}

**MUCOCELE**

Mucocoele is defined as the mucus-filled cyst present in the oral cavity, appendix, gallbladder, lacrimal sac and paranasal sinuses. They classically appear as dome-shaped mucosal swellings ranging from 1 or 2 mm to several centimeters in size. The lesion characteristically is fluctuant, but some mucocoeles appear firm on palpation. The most favored site of occurrence in oral cavity is the lower lip, whereas the less common sites include floor of the mouth, anterior ventral tongue, palate, buccal mucosa and retromolar pad.\textsuperscript{18} Mucocoeles rarely appear on the upper lip.

There are mainly two etiological factors associated with mucocoeles, namely:

1. Trauma
2. Obstruction of salivary gland ducts

The surgical approach is the treatment of choice for treating these lesions. Intraleosomal injections of corticosteroids have been used successfully to treat cases of mucocoeles.\textsuperscript{19}

**BELL’s PALSY**

Idiopathic facial palsy, also called Bell’s palsy. It is an acute disorder of the facial nerve, which may begin with symptoms of pain in the mastoid region and produce full or partial paralysis of the movement of one side of the face. Facial nerve paralysis may be congenital or neoplastic or may result from infection, trauma, toxic exposures, or iatrogenic causes. Increasing evidence suggests that the main cause of Bell’s palsy is reactivation of latent herpes simplex virus type 1 in the cranial nerve ganglia. How the virus damages the facial nerve is uncertain.\textsuperscript{20} Treatment includes prednisone 60 to 80 mg daily during the first 5 days and then taper over the next 5 days.\textsuperscript{21}
BULLOUS PEMPHIGOID

Bullous pemphigoid is the most common autoimmune blistering condition. Pruritus may be the first sign of symptom followed by development of multiple, tense bullae on either normal or erythematous skin. The oral lesion begins as bullae but ruptures early, leaving a large, shallow ulceration with smooth, distinct margins. The primary treatment of bullous pemphigoid is moderate dose of systemic prednisone. Steroids sparing strategies (prednisone and other immunomodulator drugs) are used when high doses of steroids are needed or the steroid alone fails to control the disease. Clobetasol propionate 20 mg to 40 mg/day is more effective for the treatment of bullous pemphigoid.9

CONTRAINDICATIONS OF STEROIDS

Topical corticosteroids are contraindicated in the treatment of primary bacterial infections and in patients with hypersensitivity and systemic corticosteroids are contraindicated in22 peptic ulcers, diabetes mellitus, hypertension, pregnancy, tuberculosis and other infections, osteoporosis, herpes simplex virus, psychosis, epilepsy, congestive heart failure (CHF) and renal failure.

SIDE EFFECTS

Side effects are dependent on type and dosage of drug, length of treatment. It includes weight gain, impaired growth, adrenal insufficiency, increased susceptibility to infection, myopathy, osteoporosis, osteonecrosis, cataract, glaucoma, fractures, hypertension, insomnia, diabetes mellitus and peptic ulcer.23

Topical treatment causes adverse effects, such as skin atrophy, hypopigmentation contact dermatitis, oral thrush, subcutaneous fat wasting, and cushingoid effect from systemic absorption.

Inhaled corticosteroid-induced side effects are oropharyngeal candidiasis, dysphonia, reflex cough, bronchospasm, pharyngitis.24

It is an interesting fact that systemic absorption and adrenal suppression from superpotent topical steroids in the treatment of chronic skin diseases were reported. However, adrenal suppression is not found in long-term application of topical corticosteroids used for the management of OLP, such as fluocinonide 0.05%; fluocinolone acetonide 0.1% and clobetasol 0.05%, but treatment of OLP with clobetasol propionate 0.05% mouthwash can cause mild adverse effects (moon face and hirsutism) between week 4 and week 6 of treatment. Other minor adverse effects have been associated with fluticasone propionate spray, such as bad taste and smell, nausea, dry mouth, sore throat, swollen mouth and candidiasis. Fungal overgrowth of normal oral flora by Candida leading to candidiasis was the only common side-effect arising from topical corticosteroid therapy.25 However, candidiasis can be controlled or prevented by using anti-fungal therapy (e.g. miconazole gel alone or in combination with nystatin suspension) in topical corticosteroids. Even though the intralesional injection of corticosteroids can induce the healing of the longstanding lesions and improve the symptoms, it can have a localized side effect, such as mucosal atrophy.26

However, the side effects can be due to the absorption of topical steroid from oral mucosa mainly by direct absorption or by ingestion following incorrect use of the preparations. In addition, the precise risk factors for the side effects of topical steroids, such as age of the patient, treatment modalities, concomitant medications, time of application, site or size of the lesions, and ulcerated area of the lesions have not been studied; therefore, future research on these risk factors should be carried out to provide more information. At present, topical corticosteroids seem to be safe when applied to oral mucous membranes and they were effective in the treatment of OLP with no serious side effects in many studies.26

CONCLUSION

Corticosteroids have proven to be the archetypal and double-edged sword of medicine. The risks associated with corticosteroids are parallel to the benefits of their therapeutic power. Corticosteroids have wide range of uses in dentistry. Corticosteroids are used for treatment of various diseases affecting oral and maxillofacial area to control pain, edema especially after surgery. They have widest applications in chronic and acute conditions of allergy, inflammation, etc. It also carries the potential side effects, sometimes very severe. Nonsteroidal drugs are prescribed to minimize dosage of steroids to lesser side effects. The use of steroids should be viewed carefully in dentistry.

REFERENCES