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Review Article

Corticosteroids: A Dental Point of View

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Abstract

Glucocorticosteroids have proven to be the classic "double-edged sword of medicine". Glucocorticosteroids are used in dentistry for their anti-inflammatory and immunosuppressive effects. Corticosteroids have been commonly used over the last 50 years to treat various inflammatory mucosal conditions. The wide spectrum of potencies and bases allows these medications to be used effectively and safely under the care of an experienced dental practitioner. Most of the diseases for which steroids are used are characterized by inflammation, which appears secondary to a hypersensitivity reaction against auto components. Glucocorticoids do not interfere with the primary disease mechanisms but it causes immunosupperssion and has anti-inflammatory effect. The article deals with the use of topical, systemic, intralesional, intra articular glucocorticosteroids in dentistry and the side effects in general.

Keywords

Corticosteroids, Anti- Inflammatory, Topical Steroids.

Declaration of Conflicting Interest

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Introduction

By the middle of 19th century it was demonstrated that adrenal glands were essential for life. A number of steroidal active principles were isolated and their structures were elucidated by Kendell and his co-workers in the 1930s. However gate to their therapeutic potential was opened by Hench and colleagues (1949) first introduced cortisone for the treatment of rheumatoid arthritis, The Nobel prize was awarded the very next year to Kendell, Reichstein and Hench. Currently, corticosteroids are drugs with one of the broadest spectrum of clinical activity. Glucocorticosteroids have revolutionized treatment of immunologically mediated diseases. [1,2,3]

Physiology

The cortex of the adrenal gland produces both sex (androgens) and corticoid hormones, the latter being divided into mineralocorticoid (aldosterone) and glucocorticoid (cortisol) steroids. Glucocorticoids areprincipally concerned with glucose metabolism, have a 'permissive role' affecting many physiological processes, and also a limited mineralocorticoid effect altering electrolyte and fluid balance by increasing sodium and water retention.4 Glucocorticoids play a critical role in the body's response to stress. Stress results in release of cytokines, and in particular the cytokine interleukin-1, which causes cortisol levels to rise thereby mobilising the body's glycogen and fat stores.[5]

Control of cortisol release is modulated through the hypothalamic-pituitary-adrenal (HPA) axis, whereby secretion of corticotrophin-releasing hormone (CRH) from the hypothalamus in turn modulates release of adreno-corticotrophic hormone (ACTH) from the anterior pituitary gland. Cortisol release is in direct response to the action of ACTH. Cortisol, as well as exogenous glucocorticoids, functions to

provide negative feedback on CRH release from the hypothalamus and thus ACTH. [4]

Systemic Glucocorticoids:

While several corticosteroid agents possess properties of both hormones, fludrocortisone is most commonly used for its mineralocorticoid activity and hydrocortisone, cortisone, prednisone and prednisolone are used for their glucocorticoid effects. Table 1 summarizes the relative potencies of the hormonal effects in addition to providing equivalent doses.[6,7]

Corticosteroid	Activity	Relative potency	Equivalent dose (mg)
Dexamethasone	Long-acting	25	0.75
Prednisone	Intermediate-acting	4	5.0
Methylprednisolone	Intermediate-acting	5	4.0
Hydrocortisone	Short-acting	1.0	20.0

Table 1 Relative Potencies of Systemic Glucocorticoids

Systemic corticosteroids are prescribed for ulcerative and vesiculobullous oral mucosal diseases such as severe recurrent apthous stomatitis, behcet's syndrome, pemphigus vulgaris, pemphigoid, erythema multiforme. The drug is prednisone (deltasone) and is prescribed as
1.30-40mg/day after breakfast for 4-5day
2.1-2 mg/kg/d after breakfast until disease resolved
3.1-2 mg/kg/d, then maintenance of 2.5-15 mg daily
4.20-40 mg daily for 7-10 days
5.60 mg daily for 2 days, 50 mg daily for 2 days, 40 mg daily for 2days, 30mg daily for 2days , 20mg daily for 2days, 10mg daily for 2days.[8]

Topical corticosteroids

Topical corticosteroids have been commonly used over the last 50 years to treat various inflammatory mucosal conditions. The wide spectrum of potencies and bases allows these medications to be used effectively and safely under the care of an experienced dental practitioner.9 Indications are recurrent apthous stomatitis, behcet's syndrome, pemphigus, pemphigoid, OSMF, erosive lichen planus etc.[8,9]

	Steroids	Posology in every 6 hours	Comments
1	**WITH MODERATE EFFECT** • Betamethasone valerate 0,05% cream (Betnovate) • Mometasone 0,1% cream (Elocom) • Triamcinolone acetonide 0,1 % cream (Polocortolon)	To be applied on the lesion To be applied on the lesion To be applied on the lesion	growth or adrenal suppression is possible growth or adrenal suppression is possible growth or adrenal suppression is possible
2	**WITH POTENT EFFECT** • Beclomethasone dipropionate spray(Beconase, Becotide inhaler, Ecobec inhaler) • Budenoside spray(Budenoside forte, Neo-Reactive, Pulmicort turbuhaler) • Fluticasone 0,05% cream (Cutivate)	1 press of the pump, 100 µm 1 press of the pump, 100 µm To be applied on the lesion	growth or adrenal suppression is possible growth or adrenal suppression is possible growth or adrenal suppression is possible

3	WITH VERY POTENT EFFECT Betamethasone dipropionate & Gentamycin 0,05% cream,ointment (Diprogenta) Clobetasol propionate 0,05% cream, ointment (Clobederm, Dermovate)	To be applied on the lesion To be applied on the lesion	growth or adrenal suppression is possible growth or adrenal suppression is possible

Table 2 Topical corticosterois classified by potency

Patients are instructed to apply a thin layer of the prescribed topical corticosteroid upto 3 times a day, after meals and at bedtime. The gel or ointment can be applied directly or can be mixed with equal parts orabase (gelatin-pectin-sodium carboxymethly cellulose-based oral adhesive paste) to facilitate adhesion to the gingival tissues. In general, oral application is best accomplished with a gel preparation if available. Because potent corticosteroids may delay wound healing, it is advisable to lower the strength of the preparation as soon as erosions heal and erythematous lesions become asymptomatic.[2]

Intralesional, intramucosal injections:

In treatment of OSMF, Submucosal injections of a combination of dexamethasone (4 mg/ml0 and 2 parts of hyaluronidase (200 u.s.p unit/ml) diluted in 1 ml of 2 % xylocaine by means of a 27 gauge dental needle, not more than 0.2 ml solution/site for a period of 20 weeks. Similarly submucosal injection of triamicnolone 10 mg /ml diluted in 1 ml of lidocaine 2 % to avoid immediate tissue irritation and to facilitate proper distribution of drug to al the sites biweekly can be used.

For intractable erosive lichen planus lesions, intralesional triamcinolone acetonide (10-20 mg/ml) injections can be highly effective but more painful during administration. The administration of corticosteroids intralesionally is especially beneficial for lesions on the lateral border of the tongue and buccal mucosa. Intralesional injection involves the submucosal injection of 0.2-0.4 ml of 10 mg /ml solution of triamcinolone acetonide by means of a 1.0 ml, 23 or 25 gauze tuberculin syringe. Three to four or twice weekly treatments of intralesional triamcinolone acetonide in doses of 0.5–1 ml of a 1-mg/ml suspension seem to be a practical supplement for the treatment of erosions.

Intralesional corticosteroids may be used to speed the lesions. Triamcinolone acetonide diluted to 10-20 mg/ ml with epinephrine (to prolong the local effect) for mucosal lesions has been found to be effective when 0.05-0.1 ml per site is injected into the individual lesions. Large lesions may require multiple injections. Lesions are reinjected every 1-2 week until healed. This treatment has not always proved effective and therefore should be discontinued if no improvement is noted after 2-3 injections at the same site.[2]

Pulse therapy:

Pulse therapy with mega dose corticosteroids is used in patients with lesions that are unresponsive to high dose oral steroids and involves the administration of methylprednisolone, 1 g/day i.v over 1-3 hrs for a few (usually 3) consecutive days. The goal of this approach is to quickly achieve the immunosuppressive effects of glucocorticosteroids while avoiding the long-term side effects.

Lever and Schaumberg-Lever, recommend a two-tiered regimen that separates patients with mild disease from patients with severe disease. Patients with mild disease are given 40 mg of prednisone every other day, along with a daily immunosuppressive agent, usually azathioprine, for at least 1 year. For more severe cases, patients are given 200-400 mg of prednisone per day for 5-10 weeks. This is then reduced to 40 mg/day for 1 week then 30-mg/ day for 1 week, and then 25 mg/day for 1 week, at which time patients are started on the combined therapy schedule used for mild cases.

Bystryn and Steinman recommend a treatment schedule that is adjusted for the needs of the patient. If the disease is mild, the patient is started with an initial dose of 20 mg/day for 2 weeks. If the patient does not respond or rapidly progresses, the dose is increased to 80-90 mg/day. This dose is increased every 4-7 days in 50% increments until there are no new lesions or itching, which signifies that the disease is under control. The dose is maintained until 80-90 % of the lesions have resolved, at which time the dose is tapered by 50% every 2 weeks.[2,10,11]

Intra articular injection of glucocorticosteroid:

The anti-inflammatory effect of glucocorticosteroids on synovial tissues given systemically or intra articularly is well documented. Intra articular corticosteroids have been proved useful in alleviating pain, swelling and dysfunction in inflammatory diseases of joints and muscles such as rheumatoid arthritis and gout as well as in primarily noninflammatory diseases of joints such as degenerative joint disease. Preparation used is disodium phosphate ester of betamethasone (3 mg/ml) used together with its acetate aster (3mg/ml). Others used are methlyprednisolone acetate and triamcinolone acetonide. Glucocorticosteroids are often injected together with a local anesthetic agent to counteract some of

local adverse effects. After penetration of the joint and aspiration 0.5 –1.0 ml of the drug is injected preferably into the upper joint compartment.[2,12]

Conclusion:

Corticosteroids are very powerful drugs that reduce inflammation in various tissues of the body. The decision to begin corticosteroids is a big one and depends on your needs. Some patients may need to take the drug for a short time only, until disease symptoms get better or go away. Others with more serious or life-threatening problems may require higher doses of the drug for longer periods of time. Doctors are careful about prescribing corticosteroids because many complications are associated with taking this drug. The risks associated with corticosteroids parallel the benefits of their therapeutic power. The price for the benefits of corticosteroid therapy may be dear indeed; the side effects are well known. As a result, it is important to take the drug exactly as prescribed. People who have been taking corticosteroids for a long time may need higher doses of the drug before, during, or after a physically stressful event, such as surgery.

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