

Local corticosteroid injections: Rational use in common orthopaedic problems

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Summary

The use of local corticosteroid injections in orthopaedic practice is common due to their anti-inflammatory and analgesic effect. However, the use may result in local or systemic complications. Moreover, the conflicting reports on their benefits versus side effects, throws the average user in confusion or fear. This review highlights the need for utility in only those conditions with clear outcomes.

Introduction

There is widespread use of local corticosteroid injections (LCI) in orthopaedic practice (1) that disregards geography due to similarity in occurrence of common inflammatory diseases. Such conditions include plantar fasciitis, shoulder impingement syndrome, tendinitis, other tendinopathies, bursitis and radiculopathy. Variability in patient response and reports of complications make these drugs a subject of use and also abuse (2). Literature covering their use contains both beneficial and deleterious effects even when treating the same condition. In Kenya, paucity of literature on conditions commonly treated by LCI defines lack of a common strategy in their utilisation.

Mechanism of action

Corticosteroids are naturally occurring 21-carbon derivatives of cholesterol synthesized by

the adrenal glands. They act directly or indirectly to alter protein synthesis especially of enzymes. They control inflammatory responses in the body as part of the healing process in case of injury or infection. Leucocytes release hydrolytic enzymes that in turn release arachidonic acid from the cell membrane phospholipids. The anti-inflammatory effect of corticosteroids is mediated by the inhibition of phospholipase A₂, the enzyme responsible for the release of arachidonic acid from the membrane. They therefore inhibit both the lipo-oxygenase and cyclo-oxygenase pathways resulting in broad effects in the body (3).

Preparations and local availability

Various preparations depending on the plasma half-life and solubility are available in Kenya (Table 1). Usually, the choice of the corticosteroid used depends on the discretion of the orthopaedic surgeon based on his/her previous experience or on the availability of the preparation. When administered locally, it is the solubility and not the plasma half life that influences the efficacy. It is therefore prudent to use in acute inflammatory conditions a more water-soluble preparation or a mixture of a short and long-acting compound, while a more water-insoluble preparation is preferable in suppression of chronic inflammatory conditions.

Table 1: The solubility of commonly used locally-acting corticosteroids in Kenya

Generic name	Trade name	Solubility
Betamethasone sodium phosphate	CELESTON	Most soluble
Dexamethasone sodium phosphate	DECADRON	Soluble
Methylprednisolone acetate	DEPOMEDROL	Slightly soluble
Triamcinolone acetonide	KENACORT	Relative insoluble
Betamethasone sodium phosphate and betamethasone dipropionate	DIPROFOS	Combination

Clinical conditions

Plantar fasciitis: The fact that the natural history of this condition has not been established and the myriad of techniques used in its management explains why local corticosteroids form part of the armamentarium in its treatment. The response to these injections varies from 27-77% (4, 5, 6). Concerns have been raised over the complication of ruptures of the plantar fascia (7). To minimize the risk of this happening, injections are limited to two per side and rarely a third one if a long time has passed after the last injection and that the first two were beneficial (8).

Overuse injury/cumulative trauma disorders: Majority of chronic tendon problems may result from excessive mechanical load. In most cases, spontaneous healing does occur, but should the tendon's healing capabilities be exceeded, symptoms appear. It is thought that inflammation results from these mechanical stresses hence the words tendinitis and tenosynovitis. It is important to note that many other factors play a role in the aetiology of these conditions (9). Treatment that aims at removing the excessive mechanical load and reversing the inflammatory changes alone does not therefore always lead to a satisfactory clinical outcome. Local corticosteroid injections become useful when symptoms cause functional impairment warranting intervention. The use of LCI around weight-bearing tendons such as the Achilles and patella tendons is controversial (10,11) and is generally not recommended because of reports of tendon ruptures (7,12) Rupture is either due to steroid atrophy or tendon injury

by intra-tendinous injections. The incidence of ruptures prior to LCI in some cases brings into doubt the contribution of steroids in the causation of the same. Gill S.S. *et al*, reported safe use of such injections when administered into the peritendinous space (13). When used however, the number of LCI should be minimized to two or three at least three months between them and to avoid strenuous activity two to three weeks after the injection when the phase of maximal steroid atrophy exists (14).

In supraspinatus tendinitis, LCI are tried if in about three weeks after administration, there is no improvement on non steroidal anti-inflammatory drugs together with activity modification and physiotherapy. Due to concerns about weakening or further tendon damage, the recommendation is three injections in a 12 month period (15).

Arthritis: Results of use of LCI in management of arthritis are better in rheumatoid arthritis as the pathology of the disease is synovial. They have been found to be effective in osteoarthritis though there are no clinical predictors of response (16). Concerns have been raised about the development of corticosteroid-induced arthropathy characterised by dose-dependent decrease in cartilage matrix production (17,18). This is despite lack of a clear cause-effect association and the difficulty in separating these effects from those caused by the primary arthropathy. Corticosteroids also affect menisci especially after repeated injections (19). Potential systemic side effects are due to absorption of the drug as in multiple joint injections or when more water-soluble agents are used. Use of a single

injection in one large joint at a time is advised. (20). There are also early reports of wound complications after total knee replacement in patients with a prior history of LCI (21, 22). This is more so when long-acting LCI were used. More and larger studies are however needed to clarify this.

Conclusion

Local corticosteroid injections have a great role in management of a number of acute and chronic inflammatory conditions seen locally. Their use in combination with other modalities of treatment may improve outcome. Careful use as per some guidelines based on prior experience minimizes the risk of complications.

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