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Main Article

Steroids in rhinoplasty: a survey of current UK otolaryngologists' practice

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Abstract

The use of steroids during rhinoplasty to reduce post-operative periorbital oedema and ecchymosis has been advocated. A number of randomized controlled trials have demonstrated the benefit of steroids in rhinoplasty. The aim of this study was to determine current UK practice in the use of steroids during rhinoplasty performed by otolaryngologists.

A postal survey of consultant otolaryngologists in the UK was conducted. We received 203 responses, with 115 consultants performing 12 or more rhinoplasties per year. Only 28 consultants (24 per cent) used steroids routinely in patients undergoing rhinoplasty and of these 11 used a protocol, although this was unpublished. Dexamethasone was the most common steroid used (82 per cent), being administered as a single intravenous dose of 8 mg in the majority of cases (54 per cent). There was no correlation between the use of steroids and the number of rhinoplasties performed by individual consultants.

Despite the evidence supporting the use of steroids to reduce post-operative sequelae following rhinoplasty, only a minority of consultants in the UK appear to use them as part of their practice.

Key words: Steroids; Dexamethasone; Rhinoplasty; Questionnaire

Introduction

Rhinoplasty is a common cosmetic surgical procedure. Although well tolerated by most patients, it is associated with significant post-operative periorbital oedema and ecchymosis, due to the resultant bony and soft tissue trauma. These post-operative sequelae can increase morbidity and delay a patient's recovery.

The use of steroids, in particular dexamethasone, before, during and after rhinoplasty has been advocated to reduce the periorbital ecchymosis and oedema which would otherwise follow this procedure (Table I); however, the supporting evidence is controversial. The main shortcomings of these randomized controlled studies have been small sample size,[1–4] complex dosing regimen,[1,3] operating surgeon variability,[1–4] measurement bias[2–4] and the use of subjective grading systems.[1–4]

Steroids have well recognized side effects, such as water and electrolyte imbalance, peptic ulcer formation, behavioural disturbances, osteoporosis, proximal myopathy and cataracts.[5] In the absence of specific contraindications, a short course of corticosteroid therapy (up to one week) is unlikely to be harmful.[5] However, behavioural changes and osteonecrosis of the femoral head have been reported with short term, high-dose steroid use.[6–9] Hence, the theoretical anti-inflammatory benefits of steroids in reducing oedema and ecchymosis following surgery need to be weighed against the associated risks.

The aim of this study was to determine current UK practice in the use of steroids during rhinoplasty performed by otolaryngologists.

Materials and methods

A postal questionnaire[10,11] (Appendix I) was sent to all current full members of the British Association of Otorhinolaryngologists – Head and Neck Surgeons (BAO–HNS) on the BAO–HNS postal mailing list as of October 2004. Responders who performed 12 or more rhinoplasties per year were included in the study. Microsoft Office Access 2003 database software was used to enter results and analyse responses.

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TABLE I

PUBLISHED RANDOMIZED CONTROL STUDIES ON THE EFFECTS OF STEROIDS IN REDUCING PERIORBITAL OEDEMA AND ECCHYMOSIS FOLLOWING RHINOPLASTY

Study	Year	Steroid used	Dose	Route	Regimen	Grading system	Effects
Kargi *et al.*[1]	2003	Dexamethasone	8 mg	iv	(1) Stat dose 1 hr pre-op (2) Stat dose intra-op (3) 3 doses at: • 1 hr pre-op • 24 hr • 48 hr (4) 3 doses at: • operation • 24 hr post-op • 48 hr post-op	0 to 4-point scale for oedema and ecchymosis of the upper and lower eyelids, measured visually by an observer	Reduced periorbital oedema and ecchymosis for first 48 hr in all groups and at 5 days in groups (3) and (4), the 3-dose groups)
Kara & Gokalan[2]	1999	Dexamethasone	10 mg	iv	Stat dose either just before or at the end of surgery	0 to 4-point scale for oedema and ecchymosis of the upper and lower eyelids, measured visually by an observer	Reduced periorbital oedema and upper-eyelid ecchymosis for the first 48 hr only
Hoffmann *et al.*[3]	1991	Dexamethasone and prednisolone	10 mg dex 50 mg pred	iv/po	• Stat dose dex iv intra-op • 50 mg pred on day 1 post-op • Pred tapered by 10 mg/day until final dose of 10 mg on day 5	0 to 4-point scale for oedema and ecchymosis of the upper and lower eyelids and for paranasal oedema, measured visually by an observer	Reduction in upper-eyelid, lower-eyelid and paranasal oedema up to day 4 post-op
Griffies *et al.*[4]	1989	Dexamethasone	10 mg	iv	Stat dose at induction	0 to 4-point scale for oedema and ecchymosis of the upper and lower eyelids, measured visually by an observer	Decreased periorbital oedema and ecchymosis 24 hr after surgery

iv = intravenous; po = oral; pre-op = pre-operative; intra-op = intra-operative; post-op = post-operative; dex = dexamethasone; pred = prednisolone

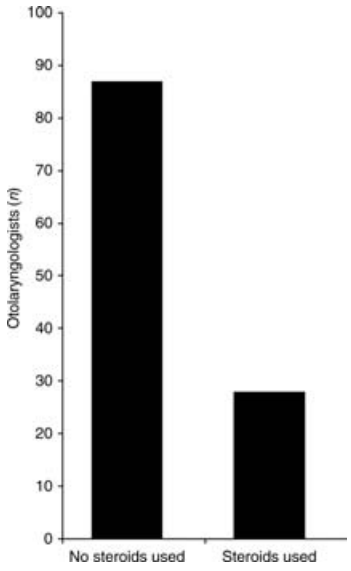

FIG. 1
Pattern of steroid use by otolaryngologists performing 12 or more rhinoplasties per year.

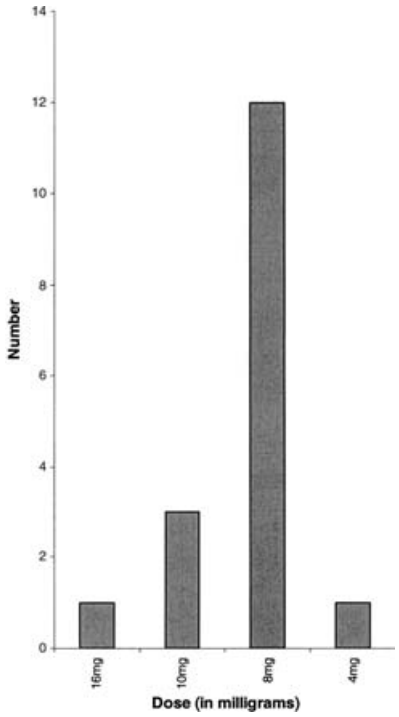

FIG. 2
Total dose of dexamethasone used by otolaryngologists during rhinoplasty.

Results and analysis

Two hundred and three questionnaires were returned, giving a response rate of 62 per cent. Of these respondents, 159 (78 per cent) performed rhinoplasty. Of the 159 consultants involved with nasal surgery, 115 (72 per cent) performed 12 or more rhinoplasties per year, and these responses were used in the survey.

Twenty-four per cent of otolaryngology consultants who performed 12 or more rhinoplasties per year used steroids routinely (see Figure 1). Eleven of these consultants used a protocol, however none of them indicated whether or not this protocol was published. The most common steroid used was dexamethasone (82 per cent), with hydrocortisone (11 per cent) and prednisolone (7 per cent) accounting for the other choices.

Dexamethasone was administered intra-operatively, using a single intravenous (iv) dose of 8 mg in the majority of cases (54 per cent). The smallest and largest single dose of dexamethasone used was 4 mg (4 per cent) and 16 mg (4 per cent), respectively (see Figure 2). Other dexamethasone dosing regimens were: 2 mg orally (po) three times a day for three days post-operatively (4 per cent); two doses of 4 mg iv administered intra-operatively and post-operatively (4 per cent); and three doses of 10 mg iv, the first given intra-operatively and the remaining two post-operatively (4 per cent). No adverse effects from steroid use were reported by respondents.

The use of steroids does not appear to be dependent on the number of rhinoplasties performed by individual otolaryngologists (see Figure 3). For any given number of rhinoplasties performed in a year, there were significantly more clinicians who did not use steroids compared with those who did. For example, of consultants who performed 51 or more rhinoplasties per year, only three used steroids compared with 14 who did not.

Seventy-seven per cent of otolaryngologists who used steroids during rhinoplasty preferred external osteotomies. External (open) rhinoplasty was performed in 17 per cent of procedures on average (range 0–60 per cent). However, the rhinoplasty technique used did not determine whether or not steroids were administered, for all but one clinician.

Fifteen out of the 28 consultants (54 per cent) who used steroids also tried other measures to reduce post-operative oedema and ecchymosis following rhinoplasty. These included: infiltration with 1:80 000

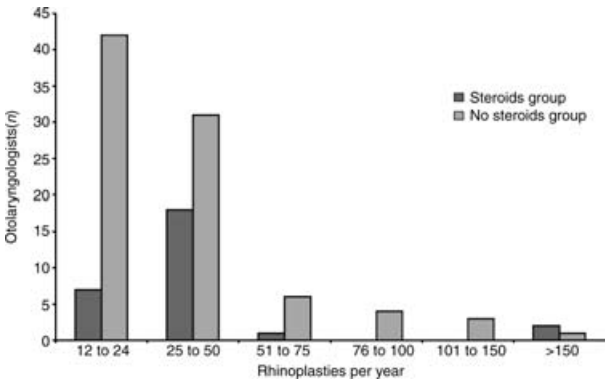

FIG. 3
Annual number of rhinoplasties performed by otolaryngologists in the 'steroids' and 'no steroids' groups.

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adrenaline; minimal dissection; intra-operative hypotension; nursing patient in the head-up position and digital pressure after osteotomies. Thirty-eight out of 87 consultants (45 per cent) who did not use steroids also employed the above techniques as well as using non-steroidal anti-inflammatory drugs and betamethasone nose drops in other cases.

Discussion

The anti-inflammatory and immunosuppressive effects of corticosteroids, in particular the glucocorticoids, are well known.[5] Glucocorticoids interact with specific steroid and intracellular receptors that control gene transcription of enzymes and proteins involved in the inflammatory response.[5] The exact nuclear processes that result in the regulation of gene expression are not entirely understood.

The various cellular factors and processes involved in the inflammatory response which are inhibited by glucocorticoids include: chemotaxins, vasoactive factors, lipolytic enzymes, proteolytic enzymes, fibrosis and the migration of leucocytes. This is irrespective of the provoking stimulus. The production of arachidonic acid and its metabolites (prostaglandin and leukotrienes) is inhibited in part through the production of a protein mediator, lipocortin, which restrains the action of phospholipase A_2 (PLA_2). Phospholipase A_2 is the enzyme responsible for liberating arachidonic acid from phospholipids. Metabolites of arachidonic acid are produced by cyclo-oxygenase (COX-2), another enzyme the expression of which is down-regulated by glucocorticoids. Glucocorticoids also inhibit production of cytokines such as interleukin (IL)-1, IL-6 and tumour necrosis factor (TNF)α, which are normally released by macrophages to activate T-cells and stimulate fibroblasts. Leucocyte localization requires endothelial leucocyte adhesion molecule-1 (ELAM-1) and intracellular adhesion molecule-1 (ICAM-1), both of which are expressed less in the presence of glucocorticoids, which also inhibit the immunoglobulin (Ig)E-dependent release of histamine and leukotrienes by basophils.[5] All these actions of glucocorticoids have been proven to reduce the clinical effects of acute and chronic inflammation, such as oedema, erythema and pain.

Dexamethasone is a synthetic glucocorticoid with negligible mineralocorticoid activity. It has an anti-inflammatory potency 25-fold greater than that of the endogenous glucocorticoid hydrocortisone and sevenfold greater than that of prednisolone.[5] Dexamethasone has a long duration of action, with a biological half-life of 36 to 72 hours.[5]

The anti-inflammatory and immunosuppressive therapeutic uses of glucocorticoids are numerous. They are used to suppress (amongst other conditions) inflammation in the eye, musculoskeletal system and gastrointestinal tract (e.g. in inflammatory bowel disease), and to reduce or prevent the cerebral oedema associated with intracranial neoplasms or parasites.[5] From an otolaryngology perspective, a recent meta-analysis has shown that dexamethasone reduces the need for endotracheal re-intubation of neonates at high risk of laryngeal oedema, following a period of intermittent positive-pressure ventilation (IPPV).[12] The well established anti-inflammatory properties of glucocorticoids should confer a theoretical benefit in decreasing the oedema and ecchymosis associated with rhinoplasty.

Our results show that the majority of otolaryngologists in the UK do not use steroids in patients undergoing rhinoplasty. This is despite published results from recent randomized controlled clinical trials that have demonstrated the benefit of glucocorticoids in reducing post-operative periorbital oedema and ecchymosis. Interestingly, none of the consultants who used steroids routinely cited published evidence on which to base their practice, and there was no correlation between the use of steroids and the number of rhinoplasties performed by individual ENT surgeons. Although anecdotal, the use of steroids by some otolaryngologists could be influenced by the theoretical anti-inflammatory benefits of glucocorticoids.

The unpopularity of steroids amongst otolaryngologists in the UK could be due to: the weaknesses of randomized controlled studies to date; the fact that most trials have shown no difference between steroids and placebo after 48 hours; or concerns over the adverse effects of steroids. Larger, better designed randomized controlled studies of steroids versus placebo in reducing the post-operative sequelae following rhinoplasty, with particular emphasis on the safety of steroid use, would help address the variability in practice identified by this survey. The role of other factors, such as intra-operative digital pressure to the nose and local infiltration of lignocaine with or without adrenaline, in reducing post-rhinoplasty morbidity is also worthy of investigation.

APPENDIX I

THE QUESTIONNAIRE

(1) Do you use steroids in patients undergoing rhinoplasty? Yes ☐ No ☐
(2) If the answer to question one is Yes, please indicate what percentage of your patients receive steroids:.....
(3) Do you follow a protocol? Yes ☐ No ☐
(4) If Yes, is your protocol published, and if so where? .....
(5) What steroid(s) do you use?.....

Please indicate:
(a) Dose (in milligrams please):
(b) Frequency (od/bd/tds/qds/other – please indicate):
(c) Mode of delivery (oral/im/iv/other – please indicate):
(d) Time(s) of administration (i.e. pre-op/intra-op/post-op):
(e) Length of treatment (e.g. stat dose, 24 hours):

(6) Approximately how many rhinoplasties do you perform per year?.....
(7) What percentage of these are external rhinoplasties?...
(8) What osteotomy technique(s) do you predominately use? Internal ☐ External ☐ Other ☐ .....
(9) Does the rhinoplasty technique used determine whether or not steroids are given? Yes ☐ No ☐
If so, how? .....
(10) Are there any other pre-op, intra-op or post-op measures that you employ to reduce post-operative oedema and ecchymosis following rhinoplasty?.....

Many Thanks

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- **A number of randomized controlled trials (RCTs) have advocated the use of steroids in patients undergoing rhinoplasty, to reduce post-operative periorbital oedema and ecchymosis**
- **This survey of otolaryngologists in the UK shows that a minority (24 per cent) of those who perform 12 or more rhinoplasties per year use steroids routinely**
- **The unpopularity of steroids may be due to concerns over potential adverse effects or to the highlighted weaknesses of recent RCTs. Better designed studies on the benefits of steroids in rhinoplasty are needed to address the observed variability in UK practice**

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