

Prevention of Postoperative Facial Edema with Steroids after Facial Surgery

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Abstract. A one-bolus (dose) of 1 g of methylprednisolone was administered intravenously to patients undergoing facial surgery or craniofacial surgery, before the termination of the operative procedure. The degree of facial edema noted was reduced, and when it occurred, it was mild and of shorter duration. These observations were made on the experimental design first, and later in the clinical setting. No adverse effects were noted, and patients given this treatment required less pain medication in the immediate postoperative period. The mechanism of action of the steroids is multifactorial, related to decrease in the accumulation of fluid at the capillary level, and reduction of flow at the venoarterial sphincters. The use of steroids is safe when used with caution in selected patients, and by experienced surgeons.

Key words: Facial surgery — Craniofacial surgery — Postoperative facial edema, prevention — Steroids

In its physiological response to trauma, the face is similar to other organs of the human body. Trauma can occur in an uncontrolled design, as in major trauma victims. The major facial trauma may involve soft tissue and/or hard tissue. In the controlled design, facial trauma may be seen in the operating room after major facial surgical procedures. The degree of fluid accumulation is dependent on

the degree of hydration of the patient and the position of the head after the major surgical procedure. When considering outpatient surgical treatments, the plastic surgeon is faced with the dilemma of having to send the patient home for the immediate postoperative period with eyelids that may be completely closed because of edema or ecchymosis. In our efforts to resolve this problem, we have given 1 g of methylprednisolone to patients prior to the termination of the operative procedure, based on our prior experience in the experimental design of facial edema. Certainly, the degree of clinical facial edema varies from patient to patient even though each may have the same procedure by the same surgeon.

Experimental and Clinical Models

In 1977, Show and Parsons [8] for the first time observed severe facial edema in their patients undergoing chemical face peel or facial dermabrasion. These surgeons were able to treat these patients as "out patients" in their clinic when 1 g of methylprednisolone was given intravenously. In 1978, Habal produced a facial edema in the experimental model to test the hypothesis. Facial edema was produced by a coronal incision and complete degloving of the upper facial skeleton in an animal model (piglet). The experimental model received one dose of 1 g of methylprednisolone intravenously at the termination of the procedure and was compared to the control group that received a placebo. The results were statistically significant in that facial edema was reduced with the treatment, and when facial edema occurred in the treated group, it was of short duration [4]. Randall and his co-workers showed that administering dexamethasone (Dacadron) re-

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duced facial edema in patients undergoing cosmetic surgery [1]. Yamada and his co-workers showed that when experimental animals with brain tumors were given methylprednisolone (0.15 mg/kg per day), the para-tumor swelling was reduced [10]. Facial edema was reduced after oral surgery when methylprednisolone was administered [7]. These results indicate that the reduction in the formation of facial edema can be attributed to the large dose of methylprednisolone. Various methods were used to evaluate the results, but the surgeons' subjective observations were the final determining factor of the degree of facial edema that was present.

In the clinical setting when initiating the study, the randomization procedure used was similar to that used in the experimental model. However, the difference between the group of patients receiving 1 g of methylprednisolone and those receiving a placebo, after their cosmetic surgery operation, became immediately apparent. The treated group had minimal facial edema compared to the controlled. Subsequently, all patients undergoing facial surgery received methylprednisolone after their surgical procedure.

Results

Most patients (158) were treated as outpatients. Surgeries performed consisted of 79 rhinoplasties, 45 blepharoplasties, 10 rhytidoplasties, 6 neckplasties, and 20 dermabrasions. The same method of treatment was used on 238 inpatients undergoing major craniofacial surgical procedures. All patients were observed, particularly during the first 48 hours, and for a 2-week period in a prospective manner, looking specifically for facial edema, lid swelling, buccal swelling, and periorbital ecchymosis. It was more difficult to develop a grading method on the patients than on the experimental group. Therefore, this report refers basically to clinical observations on the patients that were treated after such surgical procedures. There were many variables that preclude any statistical analysis, even when a grading system could be developed. The variables considered are the age differential, nature of procedure, degree of dissection, the operating team, use of local anesthetics, and the anesthetic management of the patient during surgery.

The patients were observed for the study during the immediate postoperative period (5 days). All patients received 1 g of methylprednisolone intravenously, at the termination of the procedure. Minimal swelling was noted in all patients who had cosmetic procedures, and when swelling occurred, it was of short duration. Ecchymosis was dependent basically on dryness of the field at the end of the operation and is unrelated to the steroid treatment. Swell-

ing was dependent, to a lesser extent, on the degree of hydration of the patient and on the position utilized after the surgical procedure. Such swelling was not connected to steroid therapy. Almost all patients expressed a feeling of well-being. Neither adverse effects, nor increases in incidence of infection, after one dose of steroids, were observed. An important factor noted is that the requirements for analgesics were reduced in almost all patients. No incidence of chemosis in the patients undergoing craniofacial surgical procedures occurred, and we did not note incidence of "shut lids" in any patients undergoing cosmetic surgery.

Discussion

The presence, absence, reduction, and abrogation of facial swelling after major craniofacial and cosmetic procedures is determined based on observations from experiments in nature. These observations are subjective evaluations of the patients and an outcome that is individualized. In the experimental model, a standardized operation was performed with similar age groups so a grading system with meaningful data could be extracted. The ability to change these subjective evaluations and then evaluate them scientifically resulted in the notation of their statistical significance. In humans, such standardized evaluations are hard to achieve because the variables are too numerous (age, sex, nature of procedure, hydration, position, morphologic characteristics, etc.). However, regardless of the number of variables, the final evaluation, when utilizing the steroid treatment (methylprednisolone), resulted in a positive finding in the immediate postoperative period. The treatment is sound. There are no adverse effects and no contraindications.

It should be mentioned that some authorities feel it may have been more appropriate that the steroids protect the tissue after the traumatic injury, and that perhaps the dose of steroids should have been given at the beginning of the procedure. Others feel that multiple doses after the surgical procedure should be continued for a few days. However, for such treatments, further clinical evaluations are necessary.

The mechanism of action of the steroids is not clear. There is not just one basic form of action, rather, there are multiple, different actions. It can be postulated that the mechanism is dependent on the degree of injury, and that in the injured tissue, steroids are basically anti-inflammatory. Steroids also decrease capillary permeability by reducing intercellular bridging effects, thereby allowing less water and fluid leakage of the tissues. The steroids also make and render the small vessels more susceptible to the vasoactive effect of the vaso-amins;

therefore, fewer shunts are open and less fluid leaks out of the small venules. The cumulative actions will produce a reduction of fluid in the interstitial space, and less fluid will be noted in subcutaneous tissue, resulting in less facial edema [2, 3, 5, 6].

The interest and emphasis in the future is on utilizing outpatient surgical facilities, so patients do not need to occupy acute-care hospital beds which will be kept available for the patients with catastrophic illnesses [9]. The steroid technique described herein may help the patients recovering at home after facial surgery, and not leave them crippled with their facial edema.

Summary

In conclusion, a one-bolus (dose) of 1 g of methylprednisolone was administered intravenously to patients undergoing facial surgery or craniofacial surgery, before the termination of the procedure. The degree of facial edema observed was reduced, and when it occurred, it was milder and shorter in duration. These observations were made in the experimental model first, and later in the clinical setting. We did not note any adverse effects. The patients given this treatment required less pain medication in the immediate postoperative period. The mechanism of action of the steroids is multifactorial, related to accumulation of fluid at the capillary bed, and reduction of flow at the venoarterial sphincters. The use of steroids, as such, is safe when used with

caution in selected patients, and by experienced surgeons.

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