EFFECT OF BROMELAIN AND ARNICA COMBINATION ON PERIORBITAL EDEMA AND ECCHYMOSIS IN SEPTORHINOPLASTY

ONER SAKALLIOGLU[1], EMRAH GÜLMEZ[1], YAVUZ SULTAN SELIM YILDIRIM[1], HASAN CETINER[2], SERTAC DUZER[1], and NIHAT SUSAMAN[1]

[1]Elazig Fethi Sekin Sehir Hastanesi
[2]Special East Anatolian Hospital

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Abstract

Purpose: The aim of this study to investigate the effect of bromelain-arnica gel combination on periorbital edema and ecchymosis seen after open septorhinoplasty. Methods: Sixty patients who performed open septorhinoplasty with osteotomies were included to the study. These patients were allocated into two groups: in group 1, 30 patients as control and in group 2, 30 patients as study group who were treated with topical bromelain-arnica gel after surgery. Scoring of eyelid edema and peroirbital ecchymosis were evaluated on the first, third and seventh postoperative days using scale of 0 to 4 used by observers. Results: We observed that the administration of topical bromelain-arnica gel after surgery was effective clinically and statistically in decreasing the score of both edema and ecchymosis in open septorhinoplasty with ostetomies. In group 2 patients, periorbital edema and ecchymosis scores were significantly lower compared to control group ($p < 0.05$). Conclusions: Our results support that topical administration of bromelain and arnica gel combination provided both clinically and statistically significant reduction in periorbital edema and ecchymosis following septorhinoplasty.

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Results: We observed that the administration of topical bromelain-arnica gel after surgery was effective clinically and statistically in decreasing the score of both edema and ecchymosis in open septorhinoplasty with ostetomies. In group 2 patients, periorbital edema and ecchymosis scores were significantly lower compared to control group ($p < 0.05$).

Conclusions: Our results support that topical administration of bromelain and arnica gel combination provided both clinically and statistically significant reduction in periorbital edema and ecchymosis following septorhinoplasty.

Key Words: Septorhinoplasty, Edema, Ecchymosis, Arnica, Bromelains

WHAT'S KNOWN?

Totonchi et al. investigated the effect of steroids and arnica following rhinoplasty and divided the patients into three groups: group P received steroids, group A received arnica, and group C (control group) received no medication. The results demonstrated that both steroids and arnica could be effective in reducing edema during the early postoperative period.

A previous study evaluated the effect of arnica and bromelain combination on ecchymosis after blepharoplasty. A total of 130 patients received the tablet forms of arnica and bromelain for a total of two weeks, one week before surgery and another week after surgery, while the control group received no treatment. The authors concluded that no significant difference was found between the two groups with regard to ecchymosis.

WHAT'S NEW?

This study, we applied bromelain-arnica gel combination topically to the patients' ecchymosis and edema around their eyes, and we also observed that topical application of bromelain-arnica gel combination was effective to significantly decrease patients' both ecchymosis and edema.

Septorhinoplasty is highly popular and the number of patients undergoing this procedure is growing worldwide. But, periorbital edema and ecchymosis following septorhinoplasty can cause to significant increase in morbidity and a significant decrease in patient satisfaction. Although, there are numerous studies investigating the reduction of periorbital edema and ecchymosis, and post-rhinoplasty care remains controversial. In this study, we investigated the efficacy of topical administration of bromelain and arnica gel combination in the reduction of periorbital edema and ecchymosis following septorhinoplasty, and we compared the results with those of control group in a randomized fashion. In conclusion, this study indicated that topical administration of bromelain and arnica gel combination lead to a significant reduction in periorbital edema and ecchymosis following septorhinoplasty.

INTRODUCTION

Septorhinoplasty is a commonly performed procedure in the Ear-Nose-Throat (ENT) clinics. In standard septorhinoplasty, osteotomies can cause significant periorbital edema and ecchymosis which result from injury in the vessels passing through the osteotomy areas and broken nasal bones and lead to a significant increase in morbidity. Accordingly, rapid recovery is of prime importance for patients undergoing septorhinoplasty. On the other hand, although edema and ecchymosis can be reduced with careful surgical techniques, they cannot be prevented completely [1,2].

Arnica is a genus of herbaceous plants native to Europe and the mountains of Western North America which has gained increasing popularity in complementary and alternative medicine. Due to its hematopoietic properties, arnica plays a key role in reducing edema and ecchymosis [3,4]. Although its exact mechanism in the reduction of edema and ecchymosis remains unclear, various theories have been proposed. Among these, one theory posits that arnica reduces histamine release via mast cells and another theory proposes that arnica reduces the expression of proinflammatory cytokines as well [3-7]. On the other hand, some of the studies examining the efficacy of arnica have shown its favorable effects on edema, ecchymosis, and pain [8-12].

Bromelain is a mixture of protease enzymes derived from the stems of pineapples which is primarily used for its antiedema, antithrombotic, and fibrinolytic properties [3,13]. Although the exact mechanism of bromelain is not fully elucidated, its main mechanism of action is considered to be through NF-kB inhibition. In invitro studies, bromelain has been shown to reduce prostaglandin E2, thromboxane B2, and interleukin-8. Moreover, bromelain has also been shown to increase blood flow and oxygenation of the injured area [3,14-16]. On the other hand, several studies examining the efficacy of bromelain have shown its beneficial effects on edema, ecchymosis, and pain as well [17-20].

The present study was designed to investigate the effect of topical bromelain and arnica gel combination on periorbital edema and ecchymosis following septorhinoplasty, which to our knowledge, has never been examined in the literature.

MATERIAL AND METHODS

Sixty patients who performed open septorhinoplasty (oSRP) with osteotomies were included to the study. Their ages were ranged from 21 to 42 (34 women and 26 men). This study was conducted in accordance with the Declaration of Helsinki and was approved by the local ethics committee. All patients were given about study and written informed consent was obtained from each of them.

Sixty patients were allocated into two groups: in group 1, 30 patients as control and in group 2, 30 patients as study group who were treated with topical bromelain-arnica gel after surgery. Bromelain-arnica gel was applied topically to each patients' ecchymosis and edema around their eyes from postoperative first day to seventh day as three times in a day.

Patients with diabetes mellitus, hypertension, peptic ulcer, psychiatric disorders, known allergy any drug, preoperative use of anticoagulant therapy, before 5 days to the operation, hematologic disorders and fibrinolytic disorders were excluded from the study. We avoided to operate the female patients during or immediately before their menstrual period. In both groups, the patients with complaints of nasal obstruction were diagnosed with nasal septal deviation by means of anterior rhinoscopy and endoscopic nasal examination by the first and second authors.

All the oSRP operations were performed under intubation and general anesthesia. To reduce the introduction of confounding factors, all operations were done by the first and second authors (O Sakallioglu and E Gulmez) using the same technique and equipment. After dorsal hump removal, guided and curved 4-mm lateral osteotomies were used for lateral osteotomies. Lateral osteotomies were made bilaterally without subperiosteal elevation and endonasally by performing a small incision at pyriform apertura just above the level of the anterior end of the inferior turbinate in all patients. Each surgeon operated on an equal number of patients in each group. During the operation, the mean arterial blood pressure was maintained at 70 to 90 mm Hg with esmolol infusion. Namely, dorsal hump extraction and medial and lateral osteotomies were done in all patients.

After completing the oSRP operation, antibiotic soaked nonabsorbable packs (Merocel; Medtronic Xomed) were put into the nose bilaterally. The external nasal cast splints were routinely used for all patients. During the first 24 hours postoperatively, patients lied down at 45 degrees head elevated position and ice packs were applied. The nonabsorbable packs of all patients were removed on the second postoperative day. All patients were given the same antibiotics (amoxicilline 1 gr twice in a day for 10 days) and the same analgesics (paracetamol 4 times in a day dor 10 days).

Scoring of eyelid edema and periorbital ecchymosis were evaluated on the first, third and seventh postoperative days using scale of 0 to 4 used by observers, Kara and Gokalan (Figures 1, 2) [1].

The IBM SPSS Statistics 21 was used for all statistical analysis. One-way analysis of variance (ANOVA) or Kruskal-Wallis ANOVA was used to compare variables between the groups. P values < 0.05 was considered as statistically significant.

RESULTS

A total of 60 patients who performed oSRP with osteotomies between age of 21 and 42 years (34 women and 26 men, mean age±SD, 29± 9 years) were included to the study. Of them 30 patients were as control (ages 21-39 years, 12 men, 18 women, mean age±SD, 28±7 years) and 30 patients were as study group (ages 21-42 years, 14 men, 16 women, mean age±SD, 27±8 years). No statistically significant difference was observed among the groups in terms of age and sex.

We observed that the administration of topical bromelain-arnica gel after surgery was effective clinically and statistically in decreasing the score of both edema and ecchymosis in oSRP with ostetomies. In group 2

patients, periorbital edema and ecchymosis scores were significantly lower compared to control group ($p < 0.05$). Graphics of postoperative edema and ecchymosis scores were showed as Figures 3-6. No complication associated with topical bromelain-arnica gel use or oSRP surgical procedure was observed.

DISCUSSION

Septorhinoplasty is an effective cosmetic surgery widely applied and accepted around the world. In this procedure, complications involving skin and soft tissues may occur due to the force applied to reshape the nose and these complications significantly affect patient satisfaction [21-23]. Edema and ecchymosis can be distressing for patients in the early postoperative period. Of note, edema in the first postoperative 24 hours may affect visual acuity and ecchymosis may lead to disruption of patients' social activities due to increased pigmentation [24]. Although numerous techniques have been developed to reduce edema and ecchymosis since years, post-rhinoplasty care remains controversial [25,26]. As rhinoplasty remains a demanding and popular operation, it is important to ensure that clinicians follow best practices to reduce morbidity [26,27]. To the best of our knowledge, this is the first study in the literature to investigate the effect of topically usage of bromelain and arnica gel combination on periorbital edema and ecchymosis following septorhinoplasty.

A previous study evaluated the effect of arnica and bromelain combination on ecchymosis after blepharoplasty. A total of 130 patients received the tablet forms of arnica and bromelain for a total of two weeks, one week before surgery and another week after surgery, while the control group received no treatment. The authors concluded that no significant difference was found between the two groups with regard to ecchymosis [28]. But, in this study, we applied bromelain-arnica gel combination topically to the patients' ecchymosis and edema around their eyes, and we also observed that topical application of bromelain-arnica gel combination was effective to significantly decrease patients' both ecchymosis and edema.

Another study evaluated the effect of topical application of arnica and mucopolysaccharide polysulphate in open rhinoplasty on periorbital edema and ecchymosis and divided the patients into three groups: group I received postoperative arnica cream treatment, group II received postoperative mucopolysaccharide polysulphate cream treatment, and Group III (control group) included patients who received no postoperative treatment. The authors found a significant difference between groups I and II and the control group with regard to periorbital edema and ecchymosis, while there was no significant difference between groups I and II. The authors proposed that a rapid regression of edema and ecchymosis could be achieved by local treatments of arnica and mucopolysaccharide polysulphate cream [29].

Sakallioglu et al. examined the effect of tranexamic acid and methylprednisolone on periorbital edema and ecchymosis in patients that underwent open septorhinoplasty. The authors divided patients into three groups: group I (control group) received no postoperative treatment, group II received oral tranexamic acid, and group III received intravenous methylprednisolone therapy. Groups II and III had significantly lower periorbital edema and ecchymosis scores compared to the control group, while no significant difference was found between groups II and III [30]. A prospective, randomized triple-blinded study examined the effect of dexamethasone and tranexamic acid on post-rhinoplasty periorbital edema and ecchymosis and divided the patients into four groups: group D received dexamethasone, group T received tranexamic acid, group DT received dexamethasone and tranexamic acid, and group P (control group) received no medication. All the drugs were administered intravenously. The results indicated that the periorbital edema and ecchymosis scores were significantly lower in groups D, T, and DT, compared to the control group, whereas no significant difference was found among groups D, T, and DT [31].

Totonchi et al. investigated the effect of steroids and arnica following rhinoplasty and divided the patients into three groups: group P received steroids, group A received arnica, and group C (control group) received no medication. The results demonstrated that both steroids and arnica could be effective in reducing edema during the early postoperative period [32]. Literature indicates that preoperative steroid administration could be a preventive measure to reduce edema and ecchymosis in rhinoplasty [1,33,34]. A previous meta-analysis reported that perioperative administration of repeated doses of steroids was more effective in reducing periorbital edema and ecchymosis than single-dose steroid administration [35]. Combined use of lidocaine

and adrenaline reduces intraoperative bleeding and postoperative pain in patients undergoing rhinoplasty while it may not lead to reduction in postoperative edema and ecchymosis [36].

In a prospective randomized controlled double-blinded study, Chaiet et al. evaluated the efficacy of perioperative use of Arnica montana on post-rhinoplasty ecchymosis and found that Arnica montana led to a significant reduction in ecchymosis compared to the control group [37]. Kara et al. found that the subperiosteal tunnel created before lateral osteotomy led to a significant increase in periorbital ecchymosis and also increased subconjunctival ecchymosis though insignificantly. Based on these findings, the authors recommended that the creation of a subperiosteal tunnel before lateral osteotomy should be avoided [38]. Another study by Sakallioglu et al. compared the effect of open and closed septorhinoplasty procedures on periorbital edema and ecchymosis and found no significant difference between the two techniques [39]. Kelles et al. investigated the efficacy of local heparinoids in the reduction of periorbital edema and ecchymosis and found that local administration of heparinoids following rhinoplasty had no significant effect on the prevention of periorbital edema and ecchymosis [40]. A recent systematic review indicated that favorable outcomes were obtained in terms of edema, ecchymosis, and pain control in surgical operations using arnica and bromelain, including not only rhinoplasty but also orthopedic surgeries. Based on these findings, the authors suggested that arnica and bromelain could be used not only in rhinoplasty but also in surgical operations that are suitable in terms of edema, ecchymosis, and pain control [41].

Septorhinoplasty is highly popular and the number of patients undergoing this procedure is growing worldwide. But, periorbital edema and ecchymosis following septorhinoplasty can cause to significant increase in morbidity and a significant decrease in patient satisfaction. Although, there are numerous studies investigating the reduction of periorbital edema and ecchymosis, and post-rhinoplasty care remains controversial. In this study, we investigated the efficacy of topical administration of bromelain and arnica gel combination in the reduction of periorbital edema and ecchymosis following septorhinoplasty, and we compared the results with those of control group in a randomized fashion. In conclusion, this study indicated that topical administration of bromelain and arnica gel combination lead to a significant reduction in periorbital edema and ecchymosis following septorhinoplasty.

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Figure 1. Grading scale for periorbital edema. 0, none. (+) 1, minimal. (+) 2, extending onto the iris. (+) 3, covering the iris. (+) 4, massive edema.

Figure 2. Grading scale for periorbital ecchymosis. (+) 1, extending to the medial canthus. (+) 2, extending to the pupil. (+) 3, past the pupil. (+) 4, extending onto the lateral canthus.

Figure 3. Mean ecchymosis scores of upper eyelids. POD, indicates postoperative day.

Figure 4. Mean ecchymosis scores of lower eyelids.

Figure 5. Mean edema scores of upper eyelids.

Figure 6. Mean edema scores of lower eyelids.