Abstract

Objective: The aim of this study was to evaluate histopathological effects of Glubran 2 (b-n-butyl-2-cyanoacrylate and methacryloxyethylphosphonol co-monomer) (GEM S.r.l Italy) on septal tissues of rabbit.

Methods: Thirty adult albino New Zealand rabbits were included in the study. Rabbits were randomly divided into negative control (n=6), positive control (n=12) and study (n=12) groups. In positive control group unilateral mucoperichondrial flap was elevated and then unilateral nasal packing was inserted into ipsilateral nasal cavity. In the study group unilateral mucoperichondrial flap was elevated and Glubran 2 was applied between the flap and the septal cartilage. Rabbits in the positive control and the study groups were killed 3 weeks and 8 weeks after the flap elevation. Samples from the excised nasal septum underwent routine tissue procedure for histopathological evaluation.

Results: Mild mucosal inflammation was observed in both study and positive control groups. Mucosal thickening was not detected in the study group at the end of eighth week. Significant decrease in the thickness of the septal cartilages was observed in both of the groups, but there was no inflammation or degeneration.

Conclusion: We detected that Glubran 2 does not lead to a significant histopathological response in rabbit nasal septal tissues and can be used in septoplasty operations performed in humans.

Key Words: Nasal septum, septoplasty, nasal packing, rabbit, glubran 2.

Introduction

Septoplasty, performed to correct nasal septal deviation, is one of the most frequently performed procedures in ear nose throat clinics. The main principles of septal surgery include correction of the anatomical deformities of the septum and restoration of the nasal function, while protecting the mucosa, cartilage and bone as much as possible (1, 2). For this purpose, an incision is made from the caudal septum initially and then submucoperichondrial and submucoperiosteal flaps are elevated (3). Nasal septal anatomy must be restored after making the necessary corrections in cartilage and bony septum. Submucoperichondrial and submucoperiosteal should be placed back to restore the nasal septal anatomy. Nasal packing with a variety of materials is used to stabilize the flap application, close dead spaces between cartilage and mucoperichondrial flaps and prevent complications such as bleeding, septal hematoma formation, infection, abscess formation, septal adhesion, and displacement of the cartilage or bony grafts (4, 5). Nasal packs are commonly used for after septoplasty operations. However, they cause pain and patient discomfort (5-8). Recent studies have focused on alternative methods such as suture techniques and tissue adhesives.

Glubran-2 is a new synthetic tissue adhesive and hemostatic agent in a ‘ready-to-use’ applicator that is applied topically and can be used both in laparoscopic and open surgeries (9, 10). It has better properties than previously available cyanoacrylate adhesives regarding elasticity and polymerization temperature. On contact with live tissue in a moist environment, it polymerizes rapidly to create a thin but elastic film of high tensile resistance, which guarantees firm adherence of tissue. Polymerization occurs at a temperature of 45 °C so that there is no thermal damage to underlying tissues (9).

Methods and Materials

Thirty adult albino New Zealand rabbits were included in the study. Rabbits were randomly divided into negative control (n=6), positive control (n=12) and study (n=12) groups. Rabbits in the negative control group were sacrificed after removal of their nasal septum at the beginning of the study. The positive control and the study groups were divided into two subgroups with six rabbits in each group to investigate short- and long-term effects of Glubran 2 on nasal septal tissues of rabbit. In positive control group unilateral mucoperichondrial flap was elevated and then unilateral nasal packing was inserted into ipsilateral nasal cavity (figure 1). In the study group unilateral mucoperichondrial flap was elevated and Glubran 2 was applied between the flap and the septal cartilage (figure 2). After that septal cartilage lightly compressed with a wide-tipped forceps for 60 seconds. Rabbits in the positive control and the study groups were killed 3 weeks and 8 weeks after the flap elevation. Samples from the excised nasal septum underwent routine tissue procedure for histopathological evaluation (figure 3).

Results

Mild mucosal inflammation was observed in both study and positive control groups. Mild mucosal thickening was detected in the study group at the end of eighth week (chart 1). Mucosal ulceration was not observed in any of the groups.

Significant decrease in the thickness of the septal cartilages was observed in both of the groups, but there was no inflammation or degeneration (chart 2).

Conclusion

We detected that Glubran 2 does not lead to a significant histopathological response in rabbit nasal septal tissues and can be used in septoplasty operations performed in humans.

Discussion

Septoplasty is one of the most frequently performed procedures in otorhinolaryngology. Several complications including septal hematoma, infection, abscess formation, septal adhesion, and septal instability can be seen after this operation (11). Nasal packing, septal splints, septal suturing, or tissue adhesives may be used to avoid these complications. However, each has own advantages and disadvantages. Using fibrin Glubran 2 fix the flaps is a new technique that is effective and easy to apply in a shorter operative time, shorter hospital stay, and with better patient satisfaction.

Tissue adhesives are another unpacking method. Erkan et al (11) reported that fibrin glue cause to intense inflammation, prominent cilia and goblet cell loss, submucosal significant fibrosis, mucosal damage, increase in mucosal thickness and decrease in septal cartilage thickness.

References

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