

The Effects of Lateral Crural Strut Flap Technique on Improvement of Nasal Valve Collapse

Bizhan NaghibZadeh¹, Farnaz Farshbaf¹, Mahbobeh Oroei¹, Omid Shafagh¹, Navid Ahmady Roozbahany¹

¹Hearing Disorders Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Article Info

Article note:

Received: Feb, 2016

Accepted: May, 2016

Corresponding Author :

Navid Ahmady Roozbahany

Email:

ar.navid@sbmu.ac.ir

Keyword:

Rhinoplasty; Nasal Alar

Collapse; Surgical Flaps.

Abstract

Background: The nasal valve area is a functional unit that deformity and or obstruction of it can certainly influence the quality of life of patients. In order to resolve this problem, there are various surgical and non-surgical procedures. In the surgical procedure, the different techniques are recommended in patients with nasal value collapse and nasal tip pinching. One of these is lateral crural strut flap that can be preferred for correcting nasal tip.

Purpose: The evaluation of improvement nasal value collapse and nasal tip pinching with the lateral crural strut flap technique in rhinoplasty.

Methods: This quasi- experimental study was conducted on 25 patients with nasal obstruction and nasal tip pinching in Loghman Hakim hospital, Tehran, Iran. All patients underwent elective rhinoplasty using the lateral crural strut flap technique. Wilcoxon rank sum test was used to compare the clinical findings of before and after operation; The significant level was considered less than 0.05.

Results: There was statistically significant difference before and after rhinoplasty findings (p -value < 0.001). Eighteen out of 25 (72%) patients had high satisfaction for surgical outcomes

Conclusion: The lateral crural strut flap technique was shown to be a successful surgical procedure for resolving nasal value collapse and nasal tip pinching.

Cite this article as: Naghib Zadeh B, Farshbaf F, Oroei M, Shafagh O, Ahmady Roozbahany N. The Effects of Lateral Crural Strut Flap Technique on Improvement of Nasal Valve Collapse. 2016; 2(2): 43-46.

INTRODUCTION

The nasal airway obstruction and breathing problems can have negative effects on people's life. The nasal valve collapse is one of the most prevalent complaints among patients for rhinoplasty. The causes of nasal valve collapse could be congenital or due to traumatic disorders, but more often is due to wide resection of the alar rim during rhinoplasty (1-3). Physical deformity of the nose, deviated septum, turbines hypertrophy and inadequate support of cartilage (nasal tip ptosis) are the reasons for nasal valve collapse that it could strengthen in response to the negative pressure caused during inspiration in the vestibule. When the collapse is on both sides, pinched nasal tip occurs which in severe cases limit the volume of inhaled air (4).

Nasal valve collapse is recognizable by Cottle maneuver test, which the cheeks pulled toward upper laterally with one or two fingers to open the valve and recovery of subjective symptoms show positive test.

However, Cottle maneuver test is not always reliable and the best procedure for evaluation of collapse is rhinoscopy, which is not being applied routinely (3, 5).

There are surgical and non-surgical procedures for resolving nasal valve collapse. The surgical techniques are different, in which each one has distinct advantages and disadvantages. The selection of these techniques depends on the underlying pathology, possibility, graft availability and patient's priority. One of the most important techniques is spreader graft

surgery, which was introduced by Sheen (6). There are some disadvantages with spreader graft technique such as difficult accessibility of the graft, damage of nasal mucosa and nasal airway stricture due to scar (3, 7, 8).

The patient's satisfaction has an important role in selection of the appropriate approach by a surgeon. Lateral crural strut flap is a method that makes a significant recovery in patients breathing and physical beauty preservation, but it has not been applied so much (9, 10). In this study, we examined the effects of this technique for correction of nasal valve collapse and pinched nasal tip.

PATIENTS and METHODS

This quasi - experimental study was conducted on patients who were candidates for rhinoplasty in Loghman Hakim hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Twenty-five patients through convenience sampling were enrolled in this study. The patients (ranged 20-40 years old) had nasal obstruction and nasal tip pinching due to concave, boxy nasal tip and malpositioned lateral crura. All patients had positive response in Cottle maneuver. The patients with nasal trauma were excluded from the study. The severity of nasal valve collapse and pinched nasal tip were determined by physical examination. The level of nasal valve collapse during inspiration as ordinal variable was classified using visual analog scale(VAS); range 0-3, which was reported as follows: grade 0= no; grade1=mild; grade 2=moderate and grade 3= severe. Also, the severity of nasal tip pinching was considered as non-pinching, mild, moderate and severe.

All surgeries were performed by a group of surgeons via lateral crural strut flap technique. In this technique, the vestibular skin of nose was undermined from lateral crus and a pocket was created on both sides, then the cephalic end of the lateral crus, as flap, was placed under the remaining cartilage.

The patients were followed up three months after surgery and satisfaction level, the severity of the

nasal obstruction, nasal tip pinching, asymmetrical tip and the presence of the bossa in tip or supra tip were evaluated. The data were collected in a specific form and then entered in SPSS software version 18. In order to describe variables, frequency percent was considered for the qualitative variables and pre- and post-operative condition were compared by Wilcoxon rank sum test. The significant level was considered less than 0.05.

All patients were obtained written informed consent. The medical ethics committee of Shahid Beheshti University of Medical sciences, Tehran, Iran, approved this study.

RESULTS

In this study, 15(60%) female and 10(40%) male participated. The majority of patients were in 20 -25 years old age group. The distribution of patients in age groups 20-25, 26-30 and 31-35 years old were 18(72%), 6(24%) and 1(4%) respectively. Before rhinoplasty, nasal obstruction was evaluated by Cottle maneuver and there were 15 (60%) mild and 10(40%) moderate obstruction. Statistically, nasal obstruction had significant difference before and after rhinoplasty (p -value< 0.001) (table 1).

In investigation of postoperative complications, bossa nasal tip or supra tip deformities were found in 2(8%) patients .Figure 1 shows that 18 (72%) patients had high rate of satisfaction of rhinoplasty with this technique.

DISCUSSION

In this study, we used lateral crural strut flap technique on 25patientsfor resolving nasal obstruction and pinching. Before surgery, 60% of patients suffered from mild nasal obstruction, but this problem was significantly reduced with rhinoplasty and majority of patients (76%) showed improvement. The frequency of moderate pinching reduced from 14(56%) patients to 5(20%) patients and also completely resolved in 12(48%) cases. More than half of

patients were very satisfied with surgery results and only 3 cases needed corrective surgery. In patient one, after surgery the nasal obstruction was mild and the nasal tip pinching was not resolved and in second patient, the intensity of the nasal obstruction was medium and did not change after surgery, but pinching was improved. In the third patient, both problems

did not improve. Various studies have demonstrated that the use of the flap in lateral crura with different techniques had good results for correcting the nasal tip problems (11-14). For instance, in Janis et al. study on 21 patients, application of the lateral crural turn-over flap was successful in the reduction of the nasal tip pinching (11).

Table 1: Comparison of chief complications in patients before and after rhinoplasty using the lateral crura strut flap technique

Variables		Before N (%)	After N (%)	p-value
Nasal Obstruction	Grade 0	0	19(76%)	< 0.001
	Grade 1	15(60%)	4(16%)	
	Grade 2	10(40%)	2(8%)	
	Grade 3	0	0	
Nasal Tip Pinching	Non-Pinching	0	12(48%)	< 0.001
	Mild	10(40%)	8(32%)	
	Moderate	14(56%)	5(20%)	
	Sever	1(4%)	0	

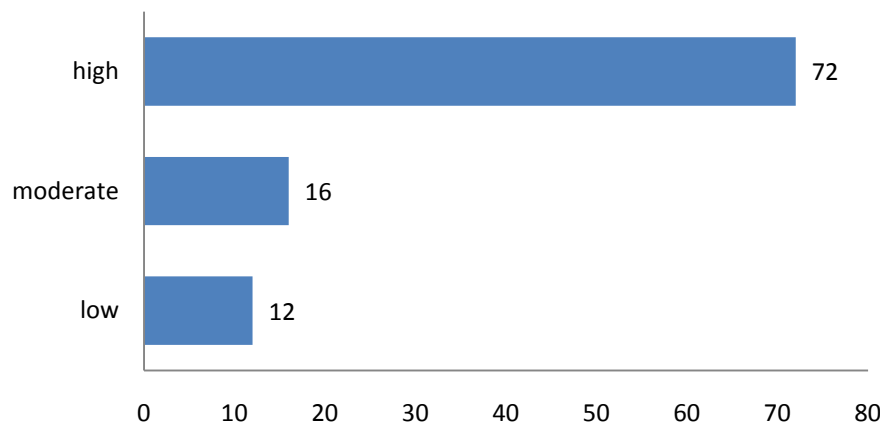


Figure 1: Frequency distribution of the level of patients' satisfaction after rhinoplasty with lateral crural strut flap technique.

Ashtiani and colleagues investigated 37 patients from whom 29 underwent primary rhinoplasty. They showed that usage of the lateral crural transposition flap technique on tip and nose was 100% successful and none of the cases needed reoperation and patients were completely satisfied (12).

Lateral crural strut flap technique is a functional and logical way for reconstruction of the

lateral crura and repair of the external valve that leads to reversal of the nasal obstruction. In this technique, the flap was placed under cartilage in vestibular side of the lateral crura, so the caudal part of upper lateral cartilage was moved in a lateral position and led to increased internal valve dimension.

In reconstructive surgery, this technique might prevent the occurrence of the boxy nasal tip and

it can also improve airway obstruction. In comparison with lateral crura strut graft, in the flap technique, preparation of cartilage is not needed and the flap can be prepared in both closed and open rhinoplasty approaches.

It should be noted that this investigation was only based on subjective evaluation of nasal obstruction. There is a considerable rate of false positive when patients are evaluated by Cottle's maneuver (3). The presence of bias is not improbable in this study.

Although, most researches in this field of surgery, like our study, used randomized trial without control group as well as long-term patient benefit evaluation. Therefore, it is recommended that more studies be implemented with comparison of this technique with others for longer follow-up and measurement of nasal obstruction using rhinometry and rhinoscopy.

CONCLUSION

The lateral crural strut flap technique was shown to be an effective surgical procedure for resolving nasal valve collapse and nasal tip pinching.

ACKNOWLEDGEMENTS

We would like to appreciate the support of Clinical Research Development Center of Loghman Hakim hospital, Tehran, Iran.

FUNDING/SUPPORT

None to declare.

CONFLICT of INTEREST

The authors declare no conflict of interest.

REFERENCES

1. Toriumi DM. Management of the middle nasal vault in rhinoplasty. *Operative Techniques in Plastic and Reconstructive Surgery*. 1995;2(1):16-30.
2. Tardy Jr M. Rhinoplasty in midlife. *Otolaryngologic clinics of North America*. 1980;13(2):289-303.
3. Ng L, Lo S. Management of the internal nasal valve. *AJOC*. 2013;5:43-5.
4. Gunter JP, Rohrich RJ. Correction of the pinched nasal tip with alar spreader grafts. *Plastic and reconstructive surgery*. 1992;90(5):821-9.
5. Stucker FJ, De Souza C, Kenyon GS, Lian TS, Draf W, Schick B. *Rhinology and facial plastic surgery*: Springer Science & Business Media; 2009.
6. Sheen JH. Spreader graft: a method of reconstructing the roof of the middle nasal vault following rhinoplasty. *Plastic and reconstructive surgery*. 1984;73(2):230-7.
7. Kridel RW, Konior RJ, Shumrick KA, Wright WK. Advances in nasal tip surgery: the lateral crural steal. *Archives of Otolaryngology-Head & Neck Surgery*. 1989;115(10):1206-12.
8. Hamra ST. Repositioning the lateral alar crus. *Plastic and reconstructive surgery*. 1993;92(7):1244-53.
9. Gunter JP, Friedman RM. Lateral crural strut graft: technique and clinical applications in rhinoplasty. *Plastic and reconstructive surgery*. 1997;99(4):943-52.
10. Constantian MB. Functional effects of alar cartilage malposition. *Annals of plastic surgery*. 1993;30(6):487-99.
11. Janis JE, Trussler A, Ghavami A, Marin V, Rohrich RJ, Gunter JP. Lower lateral crural turnover flap in open rhinoplasty. *Plastic and reconstructive surgery*. 2009;123(6):1830-41.
12. Ashtiani AK, Bohluli B, Bateni H, Fatemi MJ, Rashad A, Sadr-Eshkevari P. Lateral crural transposition flap in tip correction: Tehran retrospective rhinoplasty experience. *Annals of plastic surgery*. 2013;71(1):50-3.
13. Apaydin F. Lateral crural turn-in flap in functional rhinoplasty. *Archives of facial plastic surgery*. 2012;14(2):93-6.
14. Tan S, Rotenberg B. Functional outcomes after lateral crural J-flap repair of external nasal valve collapse. *Annals of Otolaryngology & Laryngology*. 2012;121(1):16-20.