

Frequency of Septal Perforation in Sub-Mucous Resection of Nasal Septum

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ABSTRACT

Objectives: In this study, the efficacy of sub-mucous resection (SMR) in the management of patients presented with deviated nasal septum (DNS) was assessed with particular emphasis on the post-operative septal perforation.

Methods: A descriptive study was carried out for six months (i.e., from October 2021 to March 2022) at the Ear, Nose and Throat (ENT) Department of Hayatabad Medical Complex, Peshawar, Pakistan.

Results: A total of 203 patients who presented with DNS were included herein, where the male to female ratio was 1.39:1 while the mean age was 30 ± 3.74 (range= 20-60) years. The majority patients presented with S type DNS (80; 39%), followed by C type DNS (75, 37%) while the spur type DNS was seen in only 48 (24%) cases. After SMR, 08 (4%) cases of septal perforation were observed with anterior rhinoscopy.

Conclusions: These results demonstrate the fact that post-surgical septal perforation is a critical clinical complication.

Keywords: septoplasty, DNS, sub-mucous resection, septal perforation, rhinoscopy

INTRODUCTION

Deviated nasal septum (DNS) is an abnormality of the nasal septum that hinders breathing through the nose. DNS is typically treated with two different surgical interventions: septoplasty and sub-mucous resection (SMR). Ideally, after the reconstructive procedure, the caudal septal plate should be stable, straight, fixed and of appropriate size (1,2). The common complications SMR include excessive bleeding, septal perforation, adhesions, hyposmia, infection leading to prolonged healing time, temporary reduced visual acuity, cosmetic defects (e.g., supratip depression, saddle nose deformity), etc. (3–5). To achieve a functional nasal airway with minimal complications, consideration of several factors- such as good intraoperative visualization, adequate planning, frequent follow-up- is critical (6,7).

In this study, our experience of SMR for the treatment of patients presented with DNS and postsurgical complications, with particular emphasis on the septal perforation has been presented.

MATERIALS AND METHODS

A descriptive study was designed and executed at the Ear, Nose and Throat (ENT) Department of the Hayatabad Medical Complex, Peshawar, Pakistan. The appropriate sample size for this study ($n = 203$) was calculated using WHO calculator, considering proportion of 5% septal perforation, 95% confidence interval and 3% margin of error. The required number of patients for this study were recruited during six months (i.e., from October 2021 to March 2022). Patients presented with DNS and aged 18-60 years were included in this study, irrespective of their gender. Specifically, patients with history of septal surgery, trauma or secondary nasal pathology (e.g., polyps, rhinosinusitis) were not included. Written informed consent form was signed by all patients or their attendants. The variables collected for the enrolled patients were gender, age, type of surgery (septoplasty vs SMR) and septal perforation.

The diagnosis of DNS was established on the history of nasal obstruction and anterior rhinoscopy, which demonstrated the off-centering/ displacement of nasal septum on one side. Paranasal sinus (PNS) x-rays of each patient was used to exclude patients with nasal polyps, rhinosinusitis, previous surgery or trauma.

The submucosal resection of the nose was carried out following the standard surgical procedure (8). The splints of the patients were removed on day-10 post-operatively, followed by assessment for any signs of septal perforation. Specifically, the

septal perforation was characterized with a whistling noise (clinically) and presence of crust as indicated by anterior rhinoscopy.

RESULTS

A total of 203 patients who presented with DNS during the six months study period were included herein. The number of male patients was higher than female patients (118 versus 85), with a male to female ratio of 1.39:1. A summary of the demographic details of the patients included herein has been presented in Table 1.

Table 1: Demographics of the DNS patients included herein

| | |
|--|-------------------------|
| Mean (\pm standard deviation, SD) age at presentation | 30 (± 3.74) years |
| Age range | 20-60 years |
| Male patients | 118 (58%) |
| Female patients | 85 (42 %) |
| Male to Female ratio | 1.39: 1 |
| C shape DNS | 75 (37%) |
| S shape DNS | 80 (39%) |
| Spur DNS | 48 (24%) |
| Bilateral nasal obstruction | 53 (26%) |
| Right side nasal obstruction | 80 (39%) |
| Left side nasal obstruction | 70 (35%) |

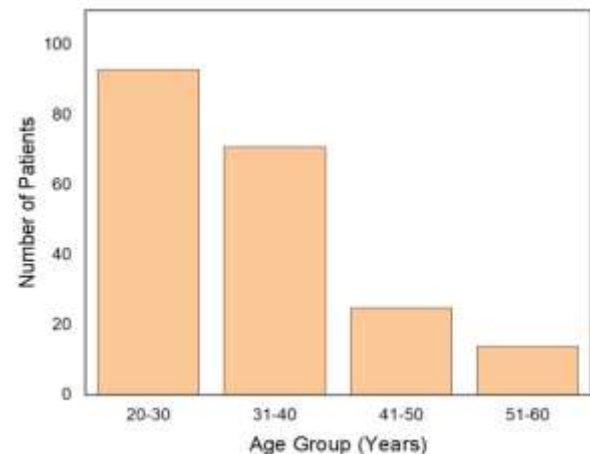


Figure 1: Age distribution of the DNS patients included herein

The age of the patients was further characterized by defining various age groups and analyzing the number of patients therein. The age groups defined were 20-30, 31-40, 41-50, and 51-60 years. Figure 1 depicts this analysis which shows that younger patients were more affected by nasal obstructions due to DNS. Specifically, 93 (46%) patients presented with DNS from the age group of 20-30 years, followed 71 (35%) patients from 30-40 years; 164 (81%) of the total patients were from these two age groups.

After SMR, several complications were observed in the DNS patients included in the study; however, only patients with complaints of septal perforation are discussed herein. Of the total 203 patients, 08 (4%) cases of septal perforation were observed. The age and gender stratification of this subgroup of DNS patients (i.e., with complications of septal perforation) has been depicted in Table 2. It was observed that the septal perforation rate was higher in younger patients, as just the DNS rate.

Table 2: Stratification of septal perforation with age and gender of the patients

| Age group (years) | Septal perforation | |
|----------------------------|--------------------|-----|
| | Yes | No |
| 20-30 | 3 | 90 |
| 31-40 | 3 | 68 |
| 41-50 | 1 | 24 |
| 51-60 | 1 | 13 |
| Gender of the DNS patients | | |
| Male | 4 | 114 |
| Female | 4 | 81 |

DISCUSSION

In this descriptive study, we have presented our experience of SMR for the treatment of patients presented with DNS and postsurgical complications, with particular emphasis on the septal perforation. In particular, 203 patients diagnosed with DNS-through diagnostic procedures such as history of unilateral obstruction and anterior rhinoscopy - were treated with SMR surgery. All patients were assessed for any signs of septal perforation with the help of anterior rhinoscopy. The experience and results of this study may provide critical insights to the relevant health care professionals and academia and improve the patient care.

Comparing the demographic parameters of the DNS patients included herein with previous studies revealed several interesting points. For example, the majority of our patients were of young age (mean age = 30 years); this trend is consistent with that reported from most countries, such as Iran (mean age = 22.44 years), UK (mean age = 29 years), Italy (mean age = 36.5 years), Poland (mean age = 36.08 years) and other studies from Pakistan (9–13). However, the average DNS patient age as high as 47.3 years have also been reported (14). Moreover, the number of male patients was considerably high than female patients (i.e., M:F= 1.39:1); the male-dominated pattern has been reported from many clinics. Previously, a male to female ratios of 1.2:1 (14), 1.32:1 (13), 1.67:1 (15), 4:1 (12), 3.32:1 (10) have been reported in different populations.

The frequency of post-SMR septal perforation observed in this study was 3.9 %. Similar frequency of septal perforation in post-SMR DNS patients from other countries of this region- India, Iran, Turkey- has been reported. However, a somehow different pattern was described in advance countries like US, UK and Germany. It may be noted that the highest septal perforation rate of 6% has been reported from Pakistan in a small cohort of patient (n=50) (16). Septal perforation rate of 5.5% in Turkish patients (n=400) (17) and 4.7 % in Irani patients (n=86) (13) have been reported. The incidence of septal perforation was substantially lower in patient from US (0.9 %) (18), UK (1.7%: n=121) (10), Venezuela (0.7 %: n = 2730 (19) and Germany (0.22%: n = 459) (20). This considerable difference in the incidence of septal perforation appears to support the postulate that the perforation is correlated to the training and experience of the attending surgeon, among other factors.

Septal perforation is a potential complication after SMR and septoplasty and may be prevented by detail analysis of the anatomic conditions before the surgical procedure. Difficulty in visualization of the target tissue- due to severity of DNS, bleeding, inexperience- may result in perforation (17). Also, the probability of septal perforations significantly decreases provided the integrity of mucosal flaps (e.g., mucoperichondrial/ mucoperiosteal) is respected during elevation. The perforation may stem from the contiguous bilateral tears of septal mucoperichondrium. The disruption of septal blood supply (due to devascularization) may also be the cause of perforation, presumably because the underlying cartilage is deprived of nutrients. Application of tight sutures to maintain splint position or quilting sutures may cause ischemia and necrosis and subsequently lead to perforation (21). Moreover, performing inferior turbinate reduction integrated with septoplasty has been reported with higher rates of perforation (22,23). In some patients, substantial electrocauterization in attempt of intraoperative hemostasis may damage the local mucosa. In addition intranasal steroid may sometimes induce mucosal trauma and subsequent perforation.

The treatment of septal perforation (i.e., successful repair) seems more challenging than its prevention. In particular, the prevention of septal perforation can be ensured with gentle elevation of the flaps (i.e., mucoperichondrial/ mucoperiosteal). Moreover, any attempt to avoid septal necrosis- a primary cause of perforation- is critically important. For instance, tight suturing, high pressure due to nasal packing or septal splints should be avoided. Also avoidance of supraperichondrial plane may contribute to the prevention. Adequate postoperative nasal care (e.g., maintaining moisture with saline, use of petroleum jelly or bacitracin) may also help in perforation prevention. Alternatively, a standard procedure for the closure/ treatment of the septal perforation seems controversial; nevertheless, the common features of a successful repair procedure include the use of vascularized tissue, integration of interpositional scaffolding, and tension-free closure. Immediate repair of intra-operative tears is also recommended.

CONCLUSIONS

The role of sub-mucosal resection as a surgical intervention for the management of patients presented with deviated nasal septum has been investigated, with particular emphasis on the post-operative septal perforation. Specifically, a nominal incidence rate of 3.9 % for the septal perforation was observed in this study. Other countries of this region- India, Iran, Turkey- reported similar frequency of septal perforation in post-SMR DNS patients while a somehow different pattern was described in advance countries like US, UK and Germany. The experience share in this study may provide useful insights to the relevant health care professionals and improve the patient care.

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