



ORIGINAL RESEARCH PAPER

ENT

STUDY ON EFFICACY OF ENDOSCOPIC SEPTAL SURGERY OF DEVIATED NASAL SEPTUM AS TREATMENT FOR CHRONIC NASAL OBSTRUCTION

KEY WORDS: DNS, NOSE score, septoplasty, chronic nasal obstruction

Dr Yashveer J. K.	Associate Professor, Department of Otorhinolaryngology, Gandhi Medical College and Associated Hamidia Hospital, Bhopal, India
Dr Ruchi*	Resident, Department of Otorhinolaryngology, Gandhi Medical College and Associated Hamidia Hospital, Bhopal, India. *Corresponding Author
Dr Smita Soni	Professor and HOD Department of Otorhinolaryngology, Gandhi Medical College & Associated Hamidia Hospital, Bhopal, India.

ABSTRACT

INTRODUCTION: The deviated nasal septum is the most common cause of nasal obstruction. Apart from nasal obstruction, a severely deviated septum can cause epistaxis, headache, and sinusitis attributable to contact with lateral nasal wall. Nasal obstruction is currently the main indication to perform septoplasty. The endoscopic septoplasty is a straightforward direct tailored approach to septal anatomic deformity, allowing minimally invasiveness.

METHODS: The study was conducted in Department of Otorhinolaryngology, GMC, Bhopal over the period of one and half year. All the patients with symptomatic nasal obstruction were selected and underwent endoscopic septal correction, the outcome of the surgery was observed in the follow up period of 7th day, 1st month, 3rd month of surgery by means of NOSE score and diagnostic nasal endoscopy.

RESULTS: In our study it was observed that there is significant improvement in NOSE score and diagnostic nasal endoscopy findings at the end of 1st month and 3rd month of endoscopic septal correction with the p value <0.01. It is an adjunct to many nasal surgeries such as functional endoscopic sinus surgery, endonasal dacryocystorhinostomy.

CONCLUSIONS: Endoscopic septal correction is a conservative surgery of nose in patients with chronic nasal obstruction due to deviated nasal septum with precise resection of only the deviated part of the nasal septum specifically posterior deviation and in revision cases, maintaining the functional anatomy and physiology of nose with least postoperative complications. It is a preliminary step to other major surgeries of the nose.

INTRODUCTION

The Deviated nasal septum is the most common cause of nasal obstruction. Apart from nasal obstruction, a severely deviated septum can cause epistaxis, headache, and sinusitis attributable to contact with lateral nasal wall.¹ The detailed physical examination and imaging can diagnose septal deviation causing nasal obstruction.²

In India approximately 20% of the general population has a deviated nasal septum, and 25% of these patients report difficulty breathing.³ Various surgical techniques have been implicated regarding the treatment of deviated septum, but none have completely improved the nasal airway. The following criteria should be met by an ideal septal correction: relief from nasal obstruction; conservative procedure; should not compromise osteomeatal complex and must have scope for revision surgery, if required later.⁴

Septoplasty is a surgical procedure that aims to make the deviated nasal septum straight. Nasal obstruction is currently the main indication to perform septoplasty. Nasal obstruction is identified as patient discomfort expressed as a sensation of insufficient airflow through the nose.⁵

Annual septoplasty rates, however, differ between countries. In England more than 20,000 septoplasties, i.e., 3.8 septoplasties per 10,000 inhabitants, were performed in 2012 and 2013. In Netherlands, 10,000 septoplasties, i.e., 6.0 septoplasties per 10,000 inhabitants were performed as a single procedure or in conjunction with turbinate surgery in 2010.⁶ Approximately 260,000 cases are performed annually in India, making septoplasty one of the most frequently performed surgeries by an otolaryngologist.⁷

The endoscopic septoplasty is a straightforward direct tailored approach to septal anatomic deformity, allowing minimally invasiveness.⁸ It allows limited septal flap dissection and removal of a small cartilaginous and/or bony deformity. Better illumination and visualization help to increase the precision of the surgical procedure with limited

exposure of the septal flap.⁹ It is an adjunct to functional endoscopic sinus surgery¹⁰ and is helpful in the correction of posterior septal deformities¹¹ and revision cases¹². Endoscopic surgery is an excellent teaching tool as the entire procedure can be viewed on the monitor.¹³

At present the efficacy of septoplasty in adults with nasal obstruction and a deviated nasal septum remains uncertain. In order to determine the efficacy of septoplasty, objective measurements do not always correlate with subjective tests.¹⁴ Hence, in present study we tried to evaluate the patients with nasal obstruction with the help of endoscopic examination and functional benefits assessed by NOSE (nasal obstruction septoplasty effectiveness) questionnaire.

AIMS AND OBJECTIVES

- To assess the efficacy of endoscopic septoplasty for chronic nasal obstruction due to deviated nasal septum.
- To observe the pattern and decline in symptoms post operatively.
- To study the advantages and disadvantages of endoscope in septal surgeries.

Materials And Methods

Study Design:

- Prospective observational study

Study Centre:

- Department of Otorhinolaryngology and Head and Neck surgery, Gandhi Medical College and Hamidia Hospital, Bhopal.

Sample Size:

- 150 patients with chronic nasal obstruction due to deviated nasal septum.

DURATION OF STUDY:

- January 2019 to June 2020

Patients' Selection:

- All the patients presenting to OPD of Department of

Otorhinolaryngology of Gandhi Medical College, Bhopal with chronic nasal obstruction due to deviated nasal septum on clinical examination.

Inclusion Criteria

- Patients with chronic nasal obstruction due to deviated nasal septum.
- Patients with headache, epistaxis and ear discharge associated with significant deviated nasal septum.
- Patient with nasal mass causing significant deviation of septum.
- Patients with deviated nasal septum having chronic rhinitis and not responding to medical management

Exclusion Criteria

- Patient with history of allergic rhinitis and bronchial asthma.
- Patient with history of any sinonasal malignancy.
- Patients with septal perforation.
- Patient with associated adenoid hypertrophy.
- Congenital abnormalities of maxillofacial skeleton.
- Patients with primary nasal valve collapse/dysfunction.
- Patients less than 10 years of age.

METHOD

- After complete clinical examination and diagnostic nasal endoscopy patients with deviated nasal septum were selected for septal correction. Selected patients were asked to complete the Nasal Obstruction Symptom Evaluation (NOSE) Questionnaire along with diagnostic nasal endoscopy. X – Ray PNS was done in all patients and CT PNS was done in a few selected cases. Endoscopic septal correction was done under LA/GA. Post-operatively NOSE score were taken on 7th day, 1st month, 3rd months along with diagnostic nasal endoscopy.

Follow Up:

- At each follow up visit, subjective and objective assessment was done. Subjective assessment was done by NOSE QUESTIONNAIRE asking about nasal congestion, nasal blockage, trouble breathing, trouble sleeping unable to get enough air through nose during exercise and exertion. Objective assessment was done by diagnostic nasal endoscopy and anterior rhinoscopy.

Statistical Analysis

IBM SPSS ver. 20 software is used for all the data analysis. Frequency distribution and cross tabulation was used to prepare the tables. Quantitative data was expressed as mean and standard deviation whereas categorical data was expressed as number and percentage. Two means were compared using student paired t test whereas percentage was compared using chi square test. A p value of <0.05 was considered as significant.

Observation & Results

Table 1: Distribution Of Patients As Per Age At Presentation

Age group	Frequency	Percent
10-20	33	22.0
21-30	66	44.0
31-40	25	16.7
41-50	15	10.0
51-60	8	5.3
>60	3	2.0
Total	150	100.0

Table 1: Shows the distribution of patients as per age at presentation. It was found that deviated nasal septum was more prevalent in the age group of 21-30 years (44%) followed by 31-40 years (16.7%) and 10-20 years (22%). There were 15 (10% patients with deviated nasal septum who had age between 41-50 years. 8 (5.3%) had age between 51-60 years whereas only 3 (2%) patients had age >60 years.

Table 2: Distribution Of Patients According To Symptoms

Parameters		No. of patients	Percentage
Nasal Obstruction	Right	74	49.3
	Left	62	41.3
	B/L	14	9.3
Nasal discharge	Right	3	2
	Left	3	2
	B/L	2	1.3
Nasal Mass	No	149	99.3
	RT	1	0.7
Headache	No	101	67.3
	Yes	49	32.7
Epistaxis	No	143	95.3
	Yes	7	4.7
Ear discharge	No	131	87.3
	RT	14	9.3
	LT	5	3.3
Watering from eyes	RT	2	1.33

Table 2: Shows the distribution of patients according symptoms. It was found that majority had right nasal obstruction [74 (49.3%)] followed by left nasal obstruction [62 (41.3%)]. 8 (5.3%) patients had nasal discharge, out of which 3 (2%) patients had right side nasal discharge and 3 (2%) patients had left side nasal discharge 2 (1.3%) patients had b/l nasal discharge. Only one patient had presented with nasal mass [1 (0.7%)]. Headache was reported by 49 (32.7%) whereas epistaxis was seen in 7 (4.7%) and ear discharge was recorded in 19 (12.6%) patients out of which 14 (9.3%) had right ear discharge and 5 (3.3%) had left ear discharge. 2 (1.33%) patients had watering from eyes.

Table 3: Preoperative Findings In Diagnostic Nasal Endoscopy

DNE findings	Pre op	Percentage
DNS to Rt	67	44.67
DNS to Lt	61	40.67
Spur	18	12.00
S shaped septum	2	1.33
DNS with significant inferior turbinate hypertrophy	3	2.00
Septum midline	0	0.00
DNS with polypoidal nasal mass	10	6.67
DNS with discharge	21	14.00
DNS with depressed nasal bone	2	1.33
Total	150	100.00

Table 3: Shows the preoperative findings in diagnostic nasal endoscopy. It was found that most common finding in diagnostic nasal endoscopy was deviated nasal septum to right side [67 (44.67%)] followed by deviated nasal septum to left side [61 (40.67%)], nasal spur [18 (12%)], polypoidal nasal mass with deviated nasal septum [10 (6.7%)] and 21 (14%) had nasal discharge along with deviated nasal septum.

Table 4: Endoscopic Septal Correction As A Preliminary Approach To Other Surgeries

Surgeries	No of patients	Percentage
Endoscopic septal correction only	111	74.0
Endoscopic spurectomy	18	12.0
Endoscopic septal correction with FESS	11	7.3
Endoscopic septal correction with Polypectomy	3	2.0
Endoscopic septal correction with Fracture nasal bone reduction	2	1.3
Endoscopic septal correction with DCR	2	1.3
Endoscopic septal correction with turbinate reduction	3	2.0

Table 4: Shows the endoscopic septal correction done for an approach to other surgeries. It was found that endoscopic septal correction was performed in 111(74%), endoscopic spurectomy in 18 (12%), other major surgeries performed along with endoscopic septal correction were FESS (functional endoscopic sinus surgery) 11 (7.33%), Polypectomy in 3 (2%), Fracture nasal bone reduction in 2 (1.3),DCR in 2 (1.33%), turbinate reduction (3 (2%).

Table 5: Diagnostic Nasal Endoscopy At The End Of 1st Month Of Surgery

DNE findings	1 st month Post Op	Percentage
DNS to Rt	1	0.7
DNS to Lt	1	0.7
Spur	0	0.0
S shaped septum	0	0.0
Septum midline	148	98.7
Polypoidal nasal mass	0	0.0
Total	150	100.0

Table 5: Diagnostic nasal endoscopy findings at the end of 1st month of surgery. It was found that septum was midline in [148 (98.7%)] and 1(0.7%) had septum deviated to right and 1(0.7%) had septum deviated to left. Majority of patients had achieved midline septum after surgery.

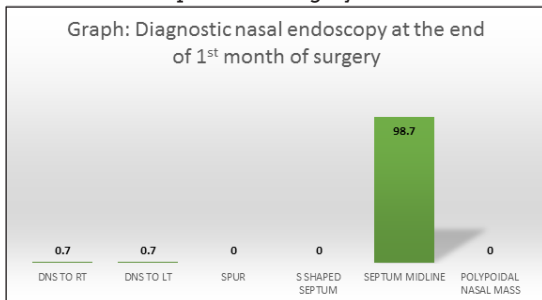
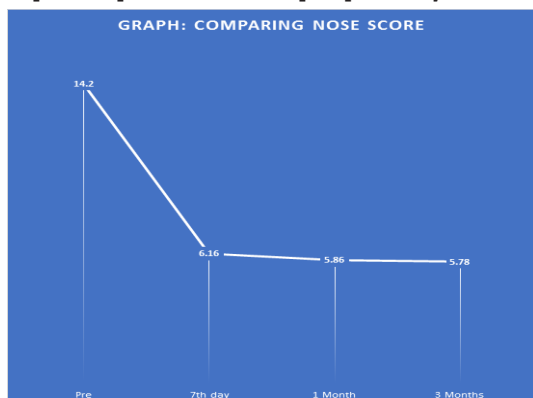


Table 6: Comparing Nose Score

Time line	Mean value
Pre op	14.20±3.34
Post op 7 th day	6.16±1.22
1 Month	5.86±1.13
3 Months	5.78±1.28

Paired t test was used to compare two means. P value; pre-operative vs post-operative 7th day; <0.001, pre-operative vs 1 month; <0.001, pre-operative vs 3rd month; <0.001, 1 month vs 3 month; 0.921, 7th day vs 1 month; 0.782

Table 6: Shows the comparing NOSE score. It was found that mean score of nasal obstruction was improved from 14.20±3.34 at preoperative to 6.16±1.22 on 7th day, 5.86±1.13 at 1 month, 5.78±1.28 at the end of 3 months. This highlights the decreasing trend in trouble during exercise score postoperatively as compared to preoperative time and also shows the decreasing trend in symptoms from 7th day postoperative period to 3rd month preoperatively.



DISCUSSION

Septoplasty is one of the most frequently performed surgical procedures by otorhinolaryngologist for chronic nasal obstruction in patients with deviated nasal septum. The technique of septoplasty has evolved a great deal with better understanding of anatomy and physiology of nasal septum. The advent of endoscope in 21st century has brought a drastic change in the outcome of endoscopic septal correction with least complications.

Our study evaluated the effectiveness of endoscopic septal correction subjectively by NOSE score and through clinical evaluation of the deviated nasal septum by diagnostic nasal endoscopy.

Table 7: Comparison Of Age Distribution Of Dns With Other Studies.

Study	Age at presentation (in years)	Percentage (%)
Study 1 Shrestha I et al, 2015 ¹⁵	21-30	31.7%
Study 2 Bavneet Kour et al, 2019 ¹⁶	31-40	55%
Study 3 Mandal S et al, 2020 ¹⁷	31-40	38%
Our study	21-40	44%

Table 8: Comparison Of Distribution Of Symptoms In Deviated Nasal Septum With Other Studies.

Study	Main symptom (Nasal obstruction)	Nasal discharge	Head ache	Epis taxis	Facia l pain	Nasal mass	Hypo smia
Bothra R et al, 2009 ¹⁸	90%	-	-	-	-	-	-
Iqbal K et al, 2011 ¹⁹	100%	-	-	-	-	-	-
Mogam ad M et al 2017 ²⁰	100%	73%	85%	-	30%	-	5%
Our study	100%	14%	32.7 %	4.7 %	0%	0.7%	0%

Table 9: Comparison Of Preoperative Findings In Diagnostic Nasal Endoscopy With Other Studies.

Study	Diagnostic nasal endoscopic findings in preoperative period				
	DNS TO RT	DNS TO LT	SPUR	DNS WITH POLYP	DNS WITH DISCHARGE
Joshi RR 2019 ³	52%	38%	7%	-	-
Our study	45%	42%	11%	5.33%	14%

In our study 111(74%) patients underwent endoscopic septal correction alone and endoscopic spurectomy is done in 18 (12%), other major surgeries done along with endoscopic septal correction are FESS in 11 (7.33%), Polypectomy in 3 (2%), Fracture nasal bone reduction in 2 (1.3%), DCR in 2 (1.33%) and turbinate reduction (3 (2%). Similarly, in Dayama R et al study, 50% cases selected for endoscopic correction, endoscopic septoplasty alone was performed in 36% cases, 8% cases in conjunction with FESS and 6% cases in conjunction with DCR.²¹ Similar views were expressed in the studies conducted by Cantrell H et al and Hwang et al.^{22, 23} In Nawaiseh S et al study out of a total of 60 cases, 37 were performed in conjunction with endoscopic sinus surgery. In 23 cases, endoscopic septoplasty was performed alone as the primary procedure.²⁴

Table 10: Endoscopic Septal Correction As A Preliminary Step To Other Surgeries.

Study	Endoscopic septal correction alone /spurectomy	FESS	DCR	Polypectomy

Nawaiseh S et al, 2010 ²⁴	38%	61%	-	-
Dayama R et al, 2018 ²¹	36%	8%	6%	-
Our study	86%	7%	1%	2%

The total mean NOSE score was improved from 14.20±3.34 preoperative to 6.16±1.22 on 7th day, 5.86±1.13 at 1 month, 5.78±1.28 at the end of 3 months. This study highlights the decreasing trend in NOSE score from pre-operative to post-operative period. Ankita Singh et al observed that the mean preoperative and post-operative NOSE scores was 17.25 and 1.88 respectively. The mean decline in was 15.37 (89%) at p<0.05).²⁵

In Bonaparte JP et al study, the mean preoperative and post-operative NOSE scores was 13.3±4.06 and 4.12±4.6.²⁶ Gulati et al, in their comparative study enrolling 50 cases stated that 90.5% cases reported improvement of their nasal obstruction by the endoscopic method.²⁷

Table 11- Comparison Of Nose Score Between Preoperative Period And Postoperative Period At The End Of Three Months Of Endoscopic Septoplasty.

Study	Total NOSE score pre-op	Total NOSE score post-op (at the end of three months)	Mean decline
Ankita Singh et al, 2018 ²⁵	17.25	1.88	15.37
Bonaparte JP et al, 2018 ²⁶	13.3±4.06	4.12±4.6	9.18
Our study	14.20±3.34	5.78±1.28	8.42

Our study has some limitations in terms of short study duration, follow up period and small sample size, the reason of which is few patients did not follow up after surgery. Inclusion criteria were too wide. For better results a more controlled study with large sample size should be conducted.

Conclusion

Endoscopic septal correction is a minimally invasive procedure includes precise resection of only the deviated part of the nasal septum maintaining the functional anatomy and physiology of nose with least postoperative complications. It is a tailored made approach according to need of the patient intraoperatively and it is a preliminary step to other other major surgeries of the nose helps to facilitate adequate visualization and space for endoscopic instrumentation.

The idea of using an endoscope is important in cases requiring limited septoplasty i.e. those with isolated spurs or ridges and require their removal before ESS. Endoscopic surgery is an excellent teaching tool as the entire procedure can be viewed on the monitor.

Intra-op Pictures Of Endoscopic Septal Correction



Figure 1: Showing infiltration given just anterior to spur.



Figure 2: Showing Incision 1cm Behind Caudal Border Of Septal Cartilage.

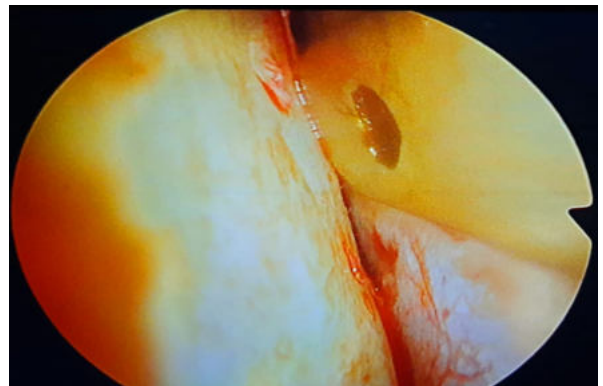


Figure 3: Shows Mucoperichondrial Flap Elevation.

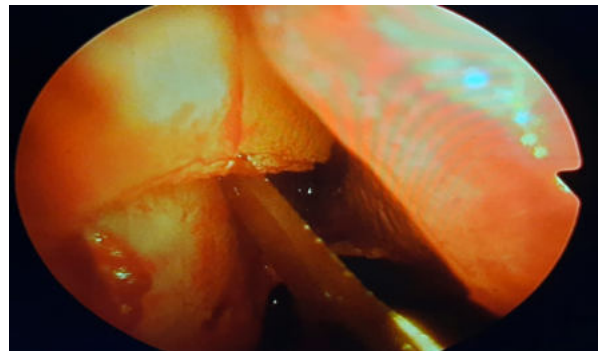


Figure 4: Showing Scoring Of Remaining Part Of Septal Cartilage.

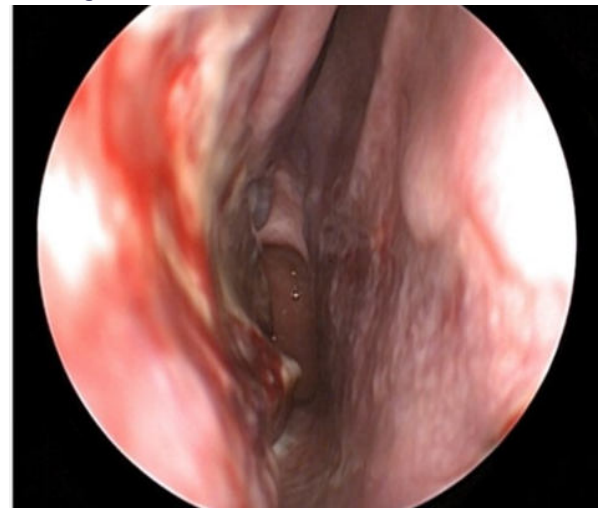


Figure 5: Diagnostic Nasal Endoscopy At The End Of 1st Month Of Surgery.

REFERENCES

1. Pannu KK, Ishwin SC, Kaur P. Evaluation of benefits of nasal septal surgery on nasal symptoms and general health. *Indian J Otolaryngol Head Neck Surg* 2009;61:59-65.
2. Dinis PB, Haider H. *Septoplasty: Long-term evaluation of results*. *Am J Otolaryngol* 2002;23:85-90.
3. Joshi RR, Riley CA, Kacker A. Complication Rates Following Septoplasty With Inferior Turbinate Reduction. *Ochsner J* 2019;19(4):353-6.
4. Elbanhawy OA, Khalil YA, Abdelshafy IA, Badr MM. Endoscopic-aided septal surgery. *Menoufia Med J* 2015;28:935-40
5. Jessen M, Malm L. Definition, prevalence and development of nasal obstruction. *Allergy* 1997;52(40 Suppl):3-6.
6. van Egmond MMHT, Rovers MM, Hendriks CTM, van Heerbeek N. Effectiveness of septoplasty versus nonsurgical management for nasal obstruction due to a deviated nasal septum in adults: study protocol for a randomized controlled trial. *Trials* 2015;16 (500):2-10.
7. Bhattacharya N. Ambulatory sinus and nasal surgery in the United States: demographics and perioperative outcomes. *Laryngoscope* 2010.;120(3):635-8.
8. Ranjan GA, Rahul G, Jayman R. Endoscopic septoplasty: A novel technique-A case series of 19 cases. *Clin Rhinol* 2009;2:11-3
9. Bothra R, Mathur NN. Comparative evaluation of conventional versus endoscopic septoplasty for limited septal deviation and spur. *J Laryngol Otol* 2009;123:737-41
10. Sathyaki DC, Geetha C, Munishwara GB, Mohan M, Manjuanth K. A comparative study of endoscopic septoplasty versus conventional septoplasty. *Indian J Otolaryngol Head Neck Surg* 2014;66:155-61
11. Giles WC, Gross CW, Abram AC, Greene WM, Avner TG. Endoscopic septoplasty. *Laryngoscope* 1994;104:1507-9
12. Getz AE, Hwang PH. Endoscopic septoplasty. *Curr Opin Otolaryngol Head Neck Surg* 2008;16:26-31
13. Chung BJ, Batra PS, Citardi MJ, Lanza DC. Endoscopic septoplasty: Revisionist of the technique, indications, and outcomes. *Am J Rhinol* 2007;21:307-11
14. Kahveci OK, Miman MC, Yucel A, Yucedag F, Okur E, Altuntas A. The efficiency of Nose Obstruction Symptom Evaluation (NOSE) scale on patients with nasal septal deviation. *Auris Nasus Larynx* 2012;39(3):275-9.
15. Shrestha I, Pokharel M, Dhakal A, Amatya RCM. Study to Compare and Evaluate Traditional vs. Endoscopic Septoplasty. *Kathmandu Univ Med J* 2015;50(2):109-14.
16. Kour B, Budhiraja G, Dolma K, Guram D. A comparative study of conventional septoplasty versus endoscopic septoplasty. *Adesh Univ J Med Sci Res* 2019;1(1):27-30.
17. Mandal S, Jana S. A comparative study of endoscopic and conventional septoplasty. *Int J Med Res Rev* 2020;8(01):1-6.
18. Bothra R, Mathur NN. Comparative evaluation of conventional versus endoscopic septoplasty for limited septal deviation and spur. *J Laryngol Otol* 2009;123:737-41
19. Iqbal K, Khan MI, Amanullah A. Submucosal resection vs septoplasty: complications and functional outcome in adult patients. *Gomal J Med Sci* 2011 Jan-Jun;9(1):23-27.
20. Mogarnad M, Mohta V. A Study on Clinical Profile of Deviated Nasal Septum and to determine the Efficacy of the Surgery. *Clin Rhinol An Int J* 2017;10(2):70-73.
21. Dayama R, Nirwan S. An Endoscopic Approach to the Deviated Nasal Septum: A Prospective Study. *IJSR*. 2018;7(9):2319-7064.
22. Cantrell H. Limited Septoplasty for endoscopic sinus surgery. *Otolaryngol Head Neck Surg* 1997;116:274-7
23. Hwang PH, McLaughlin RB, Lanza DC. Endoscopic septoplasty: indications, technique and results. *Otolaryngol Head Neck Surg* 1999;120:678-82.
24. Sufian Nawaiseh, Nemer Al-Khtoum. Endoscopic Septoplasty: Retrospective analysis of 60 cases. *JPMA* 2010;60(10):796.
25. Ankita Singh, Nalini Bhat, Pallavi Bhandarkar, Ram Singh. A Comparative Study of Conventional versus Endoscopic Septoplasty. *Bengal Journal of Otolaryngology and Head Neck Surgery* 2018;26.
26. Bonaparte JP, Campbell, R. A prospective cohort study assessing the clinical utility of the Cottle maneuver in nasal septal surgery. *J of Otolaryngol - Head & Neck Surg* 2018;47:45.
27. Gulati SP, Raman W, Neetika A, Ajay G. Comparative evaluation of endoscopic with conventional septoplasty. *Indian J Otolaryngol Head Neck Surg* 2009; 61(1):27-9.