ORIGINAL RESEARCH PAPER

Otorhinolaryngology

A COMPARATIVE STUDY BETWEEN CONVENTIONAL SEPTOPLASTY & ENDOSCOPIC SEPTOPLASTY

KEY WORDS: Deviated Nasal Septum(DNS), Septoplasty, Endoscope

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ABSTRACT

Deviated Nasal Septum (DNS) is one of the major cause that ENT patients presents with chronic nasal obstruction which on certain cases needs surgical correction by Septoplasty opration. Both the older Conventional & the newer Endoscopic approach are frequently used for septoplasty with each having its advantages & disadvantages. A prospective study is carried out on both the surgical techniques at Department of ENT, Tripura Medical College & Dr. BRAM Teaching Hospital, Agartala, Tripura. Conclusion - Endoscopic Septoplasty being more sophisticated newer intervention technique with certain limitations & fewer complications.

INTRODUCTION:

- Nasal obstruction is the most common complaint in rhinologic practice and a deviated nasal septum is the most common cause of nasal obstruction. The evaluation of septal deviation causing nasal obstruction depends heavily on physical examination and imaging.[1]
- Treatment is mainly surgical, if deviated nasal septum is symptomatic and assessment is made of the patient's subjective symptoms and degree of septal deviation before operation.[2]
- The more modern mucosal sparing procedure, performed with a headlight and nasal speculum, was first described by Freer [3] & Killian.[4] This was again modified by Cottle in 1948 when he described a more conservative approach which involved sparing cartilage where possible.[5] Little changed in septoplasty technique until the introduction of nasal endoscope to the procedure. Endoscopic septoplasty is a relatively new technique. It was first described in 1991 by Lanza et al [6] and Stammberger et al.[7]
- There are two basic goals of septal surgery that are intrinsically tied to each other.
- The first is to promote optimum nasal airflow distribution, which does not necessarily mean to create an overall straight septum, but to aim for an approximate symmetric flow domain in both sides of the nasal cavity. This is of particular importance at the isthmus nasi, which has to be considered as the bulk flow formation structure.[8] By that, it creates up to 80% of the entire inspiratory nasal resistance.[9] Consequently, the isthmus area requires the most attention in diagnosis and surgery.
- The second general goal of septal surgery is to maintain or to provide sufficient structural support for the cartilaginous nasal framework and, thus, for the soft tissue envelope as well.[10]

AIM:

- To compare the outcomes of conventional septopasty with that of endoscopic septoplasty.

OBJECTIVES:

- To compare the advantages & disadvantages of conventional septoplasty with that of endoscopic septoplasty.
- Evaluation of conventional septoplasty with that of endoscopic septoplasty in terms of post-operative complications.

METHOD & MATERIALS:

(i) STUDY TYPE: Prospective Study.

(ii) STUDY DESIGN: Longitudinal Study Design.

(iii) STUDY DURATION: 19 months (1st October 2017 to 30th April 2019)

(iv) STUDY AREA: Department of ENT, Tripura Medical College & Dr. BRAM Teaching Hospital, Agartala, Tripura West, Pin – 799014.

(v) STUDY POPULATION: Patients presenting with symptomatic deviated nasal septum to the Department of ENT, Tripura Medical College & Dr. BRAM Teaching Hospital & undergone septoplasty operation.

(vi) SAMPLE SIZE: The sample size calculate to 40 ineach group (total 80) by the following formula-

$$n = \frac{(p^0 q^0 + p^1 q^1)[z(1-\alpha/2)+z(1-\beta)]^2}{(p^0 - p^1)^2}$$

$$= \frac{((0.6*0.4)+(0.875*0.125))[(1.96+0.84)]^2}{(0.6-0.875)^2}$$

$$= \frac{((0.24+0.109375)](7.84)]}{(-0.275)^2}$$

$$= \frac{(0.349375*7.84)}{(0.075625)}$$

$$= \frac{2.7391}{0.075625}$$

$$= 36.2195041322$$

= approximately value taken as 40.

= So, Total 80 (40 in each group) will be included in the study.

$$z\left(1-\frac{\alpha}{2}\right) = 1.96$$

$$z(1-\beta) = 0.84$$

$p^{0\,[1]}$ = Proportion of outcome of headache relieved among conventional septoplasty group = 60% = 0.6

$q^{0\,[1]}$ =(1-p0)= 0.4

$p^{1\,[1]}$ = Proportion of outcome of headache relieved among endoscopic septoplasty group = 87.5%= 0.875

$q^{1\,[1]}$ = (1-p1) = 0.125

(vii) SAMPLING TECHNIQUE: Convenience sampling procedure.

(viii) SELECTION CRITERIA:

⇨ **INCLUSION CRITERIA**

- Age more than 18 years & upto 65 years of age.
- Patients with symptomatic deviated nasal septum.
- Traumatic deviated nasal septum.

⇨ **EXCLUSION CRITERIA**

- Age less than 18 years & age more than 65 years.
- Patients with asymptomatic deviated nasal septum.
- Patients with acute nasal infection.
- Patients with pregnancy, diabetes, hypertension or any systemic diseases
- Previous surgery like septoplasty and submucous resection.
- Perforated nasal septum and insufficient nasal valve.
- Granulomatous conditions of nose and sinuses.
- Craniofacial malformation.
- Patient not willing to give consent for the thesis study.
- Associated with other nasal pathologies like nasal polyp, sinusitis, Allergic Rhinitis, etc

(ix) STUDY TOOLS: Pre-designed proforma to be used

during clinical examination. Others – Investigation reports(blood reports, x-ray reports, etc.) and instruments (0° 4mm rigid endoscope by Karl Storz company, Freer's elevator, Luc's forceps, Merocel, etc& all other instruments of septoplasty).

(x) DATA COLLECTION: Cases were attended in the Department of ENT, TMC & Dr. BRAM Teaching Hospital, were studied irrespective of sex, race, religion, & socio-economic status after prior informed & written consent.

(xi) STATISTICAL ANALYSIS: Data collected was entered in Microsoft Excel and analyzed by SPSS version 20.0 software.

(xii) ETHICAL CLEARENCE: Prior ethical clearance was taken from the concerned ethical clearance committee of the institute

METHOD OF STUDY:

- The patients presenting with symptomatic deviated nasal septum to the Department of ENT at Tripura Medical College and Dr. BRAM Teaching Hospital, Hapania, Agartala were considered for the study subject & were selected for the study after taking prior informed & written consent.
- Selected patients were divided randomly (by lottery method) into two groups each of 40 members. Pre-operatively all patients were assessed thoroughly after admission by history taking & complete Ear, Nose & Throat examination. Routine investigations were done for all the selected patients. X-ray PNS (Water's view) & NCCT PNS (for selected cases) were done for all patients.
- Both subjective & objective examination of all patients by Cold spatula test was done followed by anterior rhinoscopy & nasal endoscopy & details were noted pre-operatively. Pre-operatively posterior rhinoscopy was done where ever possible (depending on patient's co-operation).
- After completing necessary investigations, anaesthetic fitness were taken for all patients. All the patients with prior anaesthetic clearance & consent for surgery were put up for surgery accordingly.
- Among the 40 members of each group, one group was subjected to Conventional Septoplasty (Group A) and another group was subjected to Endoscopic Septoplasty (Group B). Post-operatively all patients were given anterior nasal packing either with merocel(hydroxylated polyvinyl acetate) or with ribbon gauze impregnated with soframycin(framycetin).
- Patients were put on appropriate antibiotics atleast for a week along with analgesics, anti-histaminines & decongestants, haemostaticagents (tranexamic acid).

Fig 1: Conventional Septoplasty

- Nasal packs were removed 48 hours (2nd post-operative day) after surgery. Nasal decongestant drops (3 times daily) were advised for a week.
- All patients were discharged between 3rd post-operative day & 7th post-operative day with above mentioned advice & advised to review on 14th post-operative day, at 1 month & at 3 months. Nasal splints were removed on 7th post-operative day. Patients were regularly followed up on 3rd post-operative day, 7th post-operative day, 14th post-operative day, at 1 month & at 3 months.
- At each follow-up visit, subjective & objective assessments were done. Subjective assessment was done by asking about nasal obstruction, headache, post nasal discharge & hyposmia. Objective assessments were done by cold spatula test & nasal endoscopy.
- All Patients were followed up for a minimum of 3 months post-operatively. Subjective assessment of improvement in symptoms was assessed at the 3rd day, 7th day, 14th day, 30th day and 90th day post-operatively by using a prepared proforma.
- Post-operatively advantages & disadvantages of both conventional septoplasty & endoscopic septoplasty were assessed after collecting the data from post-operative examinations of all patients.
- Also data regarding post-operative complications associated with both the conventional septoplasty & endoscopic septoplasty were assessed to evaluate both the procedures.

Fig 2: Endoscopic Septoplasty

RESULTS & OBSERVATION:

80 patients with symptomatic deviated nasal septum were selected & were randomized into two groups of 40 each. One group underwent conventional & the other underwent endoscopic septoplasty. The results & observation are as follow:-

Age-group	Average of Age (Years)	StdDev of Age (Years)
11-20	18	1
21-30	26	3
31-40	35	3
41-50	46	3
51-60	53	2
Grand Total	30	10

Table 1- Age distribution.

Age-group	CS	ES
11-20	18	18
21-30	25	27
31-40	35	35
41-50	45	47
51-60	53	
Grand Total	30	30

Table 2 – Mean-age as per Age-group

Age-group	Type of Septoplasty CS	ES	Grand Total	percentage(%)
11-20	12(30%)	7(7.5%)	19	23.75
21-30	11(27.5%)	15(37.5%)	26	32.5
31-40	10(25%)	16(40%)	26	32.5
41-50	4(10%)	2(2%)	6	7.5
51-60	3(7.5%)	0(0%)	3	3.75
Grand Total	40	40	80	100

Table 3 – Distribution of septoplasty patients according to age-group

- **AGE DISTRIBUTION**

Sex	Type of Septoplasty C	E	Grand Total	Percentage(%)
Female	14(35%)	17(42.5%)	31	38.75
Male	26(65%)	23(57.5%)	49	61.25
Grand Total	40	40	80	100

Table 4 – Sex distribution.

- **SEX DISTRIBUTION:**

Symptoms		Type of Septoplasty C	E	Grand Total	percentage(%)
Nasal Block	Absent	0(0%)	0(0%)	0	0
	Present	40(100%)	40(100%)	80	100
Nasal Discharge	Absent	37(92.5%)	32(80%)	69	86.25
	Present	3(7.5%)	8(20%)	11	13.75
Headache	Absent	20(50%)	19(47.5%)	39	48.75
	Present	20(50%)	21(52.5%)	41	51.25
PND	Absent	39(97.5%)	37(92.5%)	76	95
	Present	1(2.5%)	3(7.5%)	4	5
Hyposmia	Absent	37(92.5%)	38(95%)	75	93.75
	Present	3(7.5%)	2(5%)	5	6.25
Epistaxis	Absent	38(95%)	40(100%)	78	97.5
	Present	2(5%)	0(0%)	2	2.5

Table 5 – Presentation of symptom

- **SYMPTOMATOLOGY**

Signs		Type of Septoplasty C	E	Grand Total	percentage(%)
DNS Side	Right	19(47.5%)	17(42.5%)	36	45
	Left	18(45%)	16(40%)	34	425
	B/L	3(7.5%)	7(17.5%)	10	12.5
DNS Location	Anterior	12(30%)	12(30%)	24	30
	Posterior	15(37.5%)	21(52.5%)	36	45
	Ant & Post	13(32.5%)	7(17.5%)	20	25
Spur	Present	19(47.5%)	14(35%)	33	41.25
	Absent	21(52.5%)	26(65%)	47	58.75
Mucous Discharge	Present	2(5%)	5(12.5%)	7	8.75
	Absent	38(95%)	35(87.5%)	73	91.25
Tubinates	B/L-ITH	3(7.5%)	6(15%)	9	11.25
	L-ITH	18(45%)	17(42.5%)	35	43.75
	L-MTH	1(2.5%)	2(5%)	3	3.75
	R- MTH	0(0%)	0(0%)	0	0
	R-ITH	18(45%)	15(37.5%)	33	41.25
PNS Tenderness	Present	0(0%)	0(0%)	0	0
	Absent	40(100%)	40(100%)	80	100

Table 6 – Pre-operatively Anterior Rhinoscopy, Diagnostic Nasal Endoscopy findings & PNS Tenderness (on palpation)

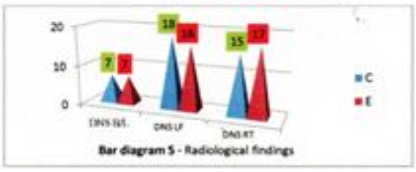
- **PRE-OPERATIVELY ANTERIOR RHINOSCOPY, DIAGNOSTIC NASAL ENDOSCOPY & PNS TENDERNESS (ON PALPATION)**

RADIOLOGICAL FINDINGS BY X-RAY PNS & CT-PNS

As regard to radiological findings by x-ray PNS & CT-PNS, majority of the patients presented with left sided DNS with a total of 34 patents (42.5%) followed by right sided DNS with a total of 32 patients (40%). Bilaterally DNS was present among 14 patients (17.5%).

Findings	C	E	Grand Total	Percentage
DNS B/L	7(17.5%)	7(17.5%)	14	17.5
DNS LF	18(45%)	16(40%)	34	42.5
DNS RT	15(37.5%)	17(42.5%)	32	40
Grand Total	40	40	80	100

Table 7 – Radiological findings

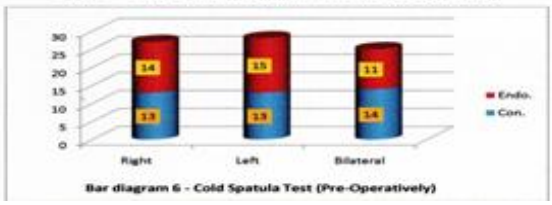


Bar diagram 5 - Radiological findings

- **Radiological Findings by X-Ray PNS & CT-PNS**

		Pre-Operation Type of Septoplasty C	E	Grand Total	percentage(%)
CST	Right	13(32.5%)	14(35%)	27	33.75
	Left	13(32.5%)	15(37.5%)	28	35
	Bilateral	14(35%)	11(27.5%)	25	31.25

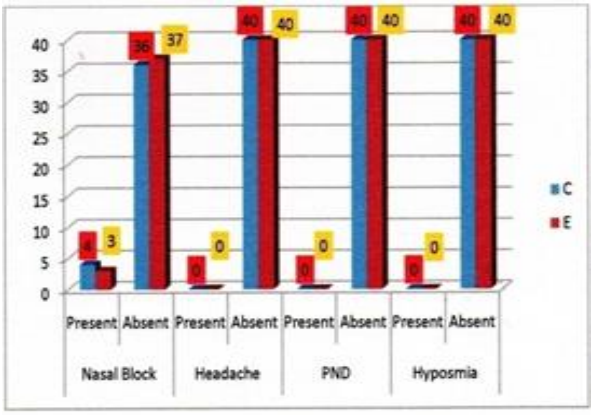
Table 8 – Cold spatula test examination done pre-operatively



Bar diagram 6 - Cold Spatula Test (Pre-Operatively)

- **Cold Spatula Test Examination Pre-Operatively**

Pre-operatively patients were examined with Cold Spatula test & mist formation was compared on both sides to assess the nasal airway patency. It was found that 27 patients (33.75%) had decreased fogging on right side & 28 patients (35%) had decresed fogging on left side. Bilaterally patency of nasal airway was reduced in 25 patients (31.25%).



Bar Diagram 7: Subjective Assessment (Post-Operatively)

- **POST OPERATIVE SUBJECTIVE ASSESSMENT**

		Post-Operation Type of Septoplasty C	E	Grand Total	percentage(%)
CST	Right	3(7.5%)	2(5%)	5	6.25
	Left	1(2.5%)	1(2.5%)	2	2.5
	Equal on Bothsides	36(90%)	37(92.5%)	73	91.25

Table 10 – Cold-Spatula test examination done post-operatively

- **POST-OPERATIVE COLD SPATULA TEST FINDINGS**

Findings		Type of Septoplasty C	Type of Septoplasty E	Grand Total	percentage(%)
Persistent Deviation	No Deviation	36(90%)	37(92.5%)	73	91.25
	Right Side	3(7.5%)	2(5%)	5	6.25
	Left Side	0(0%)	0(0%)	0	0
Discharge in Middle Meatus	Present	0(0%)	0(0%)	0	0
	Absent	40(100%)	40(100%)	80	100
SYNECHIAE	PRESENT	1(2.5%)	1(2.5%)	2	2.5
	ABSENT	39(97.5%)	39(97.5%)	78	97.5
OTHERS		0(0%)	0(0%)	0	0

Table 11– Nasal Endoscopy post-operatively

POST-OPERATIVE NASAL ENDOSCOPY FINDINGS

Outcome		Type of Septoplasty C	%	E	%	Total
Complications	NO COMPLICATIONS	34	85	36	90	70
	PERSISTENT SEPTAL DEVIATION	1	2.5	1	2.5	2
	MUCOSAL TEAR	0	0	0	0	0
	EXTERNAL DEFORMITY	0	0	0	0	0
	Bleeding	2	5	1	2.5	3
	Bleeding with DEVIATION	2	5	1	2.5	3
	Synechiae	1	2.5	1	2.5	2
	OTHERS	0	0	0	0	0
Total		40	100	40	100	80

Table 12 – Frequency of complications

COMPLICATIONS

Results						
	No Complications	Deformity	Bleeding	Bleeding with Deformity deformity	Synechiae	Row Totals
Conventional septoplasty	34 (35.00) [0.03]	1 (1.00) [0.00]	2 (1.50) [0.17]	2 (1.50) [0.17]	1 (1.00) [0.00]	40
Endoscopic septoplasty	36 (35.00) [0.03]	1 (1.00) [0.00]	1 (1.50) [0.17]	1 (1.50) [0.17]	1 (1.00) [0.00]	40
Column Totals	70	2	3	3	2	80

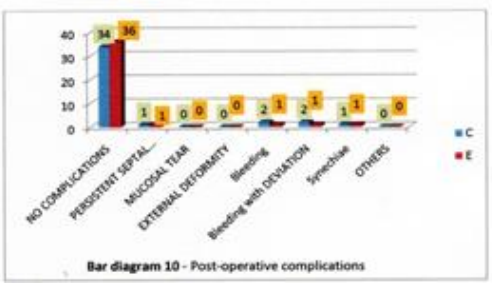
Table 13 – Check whether two operative procedures are same or not by statistical test

The chi-square statistic is 0.7238. **The *p*-value is .942361.**

Here,P-value is less than 0.10.So,we accept the alternative Hypothesis
Or we reject the Null Hypothesis.

Interpretation:- There have a significant Difference between two Procedures in terms of Complications **at 10% level of Significance.**

Finally,we can say that Endoscopy method is superior than Conventional Method because 5% more cases have no Complications after Endoscopy than conventional method(from Table 12).



Bar diagram 10 - Post-operative complications

STATISTICAL ANALYSIS

- **Null hypothesis:** There have no difference between Conventional & Endoscopy methods.
- **Alternative hypothesis:** There have difference between Conventional & Endoscopy methods.

DISCUSSION:

➢ The present study was conducted from 1st October 2017 to 30th April 2019 for a duration of 19 months among 80 patients who presented with symptomatic deviated nasal septum & underwent septoplasty at the Department of ENT at Tripura Medical College & Dr. BRAM Teaching Hospital, Hapania, Agartala, Tripura.

➢ Out of 80 patients, one group of 40 patients underwent conventional septoplasty& the rest 40 patients underwent endoscopic septoplasty& the final results of both groups were assessed.

AGE DISTRIBUTION:

In the present study, more number of patients were belonging to 21-30 yrs age group (3rd decade) & 31-40yrs age group (4th decade), each having 26 patients (32.5%) followed by 11-20yrs age group as 19 (23.75%). Less were from 41-50yrs age group numbering as 6 patients (7.5%) & from 51-60yrs age group it was the least accounting to 3 patients (3.75%). So , the values of the present study is in concordance with Gulati et al (2009), Basavaraj et al (2011), Jain et al[12] (2011), Dr. Santosh Prasad Kesari et al[13], Rao[14] and his colleague study showing preponderance around the 3rd decade of life.

SEX DISTRIBUTION:

Like Leela Jain et al[15], Kalpana Th et al[11]& majority of the available literature, the present study also shows male preponderance with 49 males (61.25%) & 31 females (38.75%) were involved in the ratio of 1.6:1.

SYMPTOMATOLOGY:

Like majority of the available literature, the most common presentation with deviated nasal septum is nasal obstruction which is same as in my study. The second common presentation in my study is headache which is similar to study of Dipak Ranjan Nayak et al.[16] However, study of Magdy A. Salama[17] shows anterior nasal discharge as second most common complaint followed by headache as third common complaint. In study of Magdy A.salama,[17] Epistaxis was present among 7% patients, while in my present study it was the least common complaint accounting for 2.5% patients only.

ANTERIOR RHINOSCOPY & NASAL ENDOSCOPIC FINDINGS:

In the present study, 30% of the conventional septoplasty group had anterior DNS (involving cartilage) which was similar to study of Kapil Kumar Singh et al[18]& in concordance with the study of M. Gupta & G. Motwani.[19]

RADIOLOGICAL FINDINGS OF NOSE:

As regard to radiological findings by x-ray PNS & CT-PNS, majority of the patients presented with left sided DNS with a total of 34 patents (42.5%) followed by right sided DNS with a total of 32 patients (40%). Bilaterally DNS was present among 14 patients (17.5%). Presence of right sided DNS was highest for Akansha et al[20] while in the present study left sided DNS was the highest incidence. S-shaped DNS (having B/L DNS) was 48% for Akansha et al[20],while in the present study , B/L DNS accounted for the least with 17.5%.

POST-OPERATIVE ASSESSMENT:

Overall 73 patients (91.25%) were clinically relieved from nasal block which was less than the studies done by D.C. Sathyaki et al[21]&Sindwani& Wright[22] (2003). 90% patients in conventional group & 92.5% patients in endoscopic group showed improvement for nasal block which shows better results for endoscopic group which is similar to study of Harley et al (2003).

COMPLICATIONS:

➢ In the present study, all the patients were routinely assessed regarding both intra-operative & post-operative complications. 3 patients (3.75%) had bleeding (hemorrhage), among which 2 patients (5%) were from conventional septoplasty group & 1 patient (2.5%) from endoscopic septoplasty group which was similar to the study made by Bothra and Mathur (2008) in regard to more number of patients with post-operative hemorrhage were from conventional septoplasty group.

➢ 2 patients (5%) from the conventional septoplasty group & 1 patient(2.5%) from endoscopic septoplasty group had both bleeding(hemorrhage) & septal deviation. 2 patients (2.5%) had persistent septal deviation(deformity) post-operatively, 1 each from conventional septoplasty group & endoscopic septoplasty group, while Gupta and

Motwani[19] (2008) & Sandeep Kaushi et al[23] showed post-operative residual septal deviation more for conventional septoplasty group. 1 patient of each group showed synechae formation.. Park et also observed that the synechiae were formed in significantly less number in patients of endoscopic septoplasty group as compared to conventional group which is similar to the findings of my study.

- Staistically, the present study showed that there have a significant ($p<0.10$) differencebetween conventional septoplasty method and endoscopic septoplasty method by chi-square test at 10% level of significance. Here the chi-square statistic is 0.7238. The p-value is .942361 which was less than 0.10.

CONCLUSION:

- Correction of nasal septal deviation by Conventional Septoplasty method is a time-tested procedure. However Endoscope assissted Septoplasty technique is a definite advantageous technique over conventional method involving better visualization & magnification of the surgical field with lesser post-operative complications.

- In Conventional Septoplasty cases, there remains a possibility of either under-correction or overcorrection of the deformity giving rise to residual (persistent) deviation or nasal structural deformity. However, with experience, septoplasty in Conventional method can be done in lesser duration.

- Of course manipulation of endoscope with one hand & frequent fogging of the endoscope tip remain a little disadvantageous for Endoscopic Septoplasty method.

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