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Effect of variable factors on prognostic values after Septoplasty procedure as prospective study

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Background and objectives: ***Septoplasty is conservative approach to nasal septal surgery. In this operation much of the septal framework is retained. Only the most deviated parts are removed. Rest of septal framework is corrected and repositioned by plastic means .This surgery is usually done after the age of seventeen so as not to interfere with nasal skeleton growth, however if the a child has sever deviation causing marked nasal obstruction, septoplasty can be performed to provide a good airway.***

This study was conducted prospectively to confirm the effect of different factors on results of this surgery.

Patients and methods: ***347 patients aged 14-63 years of different types of DNS, namely c-shaped, s-shaped, anterior caudal dislocation, and nasal spur with and without external deformities of the nose, presented with variable pictures of clinical presentation of DNS at ENT department – Althowra central hospital at period in between September 2005 to November 2009 and was operated by septoplasty as closed technique. The outcomes of the surgery were studied in relation to different demographic, anatomical, pathological as well as surgical factors, namely 1) patients age, 2) sex, 3) type of clinical presentation, 4) cause of septal deviation, 5) type of DNS, 6) associated local pathology with deviation 7) recurrent or first attempt of surgery, 8) associated external deformity, and 9) surgical technique which was performed. patients postoperatively were followed for 3-6 months and assessed for outcomes of the surgery which are flap hematoma, flap abscess, flopping of flap, septal perforation, synaechia, degree of improvement, recurrence, atrophic rhinitis, and external nasal deformities.***

Results: ***97% of patients who underwent the septoplasty procedure got improvement of their representing symptoms, they followed from 3-6 months and no post-septoplasty complication discovered among them. On the other hand 1% of the patient developed septal perforation while 2% presented with recurrence as post- operative complication. All these results where correlated with multi-factorial presentations.***

Conclusion: ***Generally speaking septoplasty, technically appear easy, safe, and effective surgery. The technique of the surgery is not only the factor which affecting the surgery results, but there are many other non- technical factors which can be considered as important factors on which the results as well as the sequel of this surgery are dependent.***

Keywords: ***Septoplasty, deviated nasal septum, septo-rhinoplasty, post-septoplasty complications.***

INTRODUCTION

Nasal obstruction is among the most prominent signs of nasal disease. Nasal septal surgery is one of the most common procedures performed by otolaryngologists. The principal benefits of septal surgery are related to improvement in nasal symptoms. In patients with septal

deformity, nasal septoplasty results in significant improvement in disease- specific quality of life, high patient satisfaction. Although many patients receive nasal surgery to improve nasal breathing function, relatively little research has been performed to investigate postoperative outcome of septal surgery.[1] However, septoplasty is poorly taught and should not be considered a simple procedure in which one approach fits all.[2] Past centuries have seen a steady interest in the correction of the dislocated and deviated nasal septum.[3] The reason for this interest is undoubtedly represented by the prominent role of septoplasty in modern nasal surgery. The concept that ''the nose goes as the septum goes'' confirms the importance of septal deviations in the development of dimorphisms of the nasal pyramid and therefore the absolute necessity of correcting septal deformities during rhinoplasty procedures.[4] The importance of septal surgery also has increased in recent decades relative to the extension of septoplasty indications, such as correction of nasal obstruction for an easier transnasal approach to the pituitary fossa or for improved access to the middle meatus in functional endoscopic sinus surgery (FESS).[5]

Furthermore, septal surgery is a major cause of legal controversy for otolaryngologists, plastic surgeons, and maxillofacial surgeons because of the possible morbidity and aesthetic consequences related to this surgical procedure.[6] Aesthetic changes, noted in up to 21% of patients who undergo septoplasty, represent one of the most common causes of reoperation in nasal surgery.[7,8]

Despite the number of septoplasty techniques described in past centuries, controversies still remain about the best approach to the deviated septum.[1-4,9-12] Surgery for deformities of the nasal pyramid and septum during childhood is shrouded with controversies. Every surgical procedure of the nose at this young age may cause developmental arrest.[13] Even the results may not be long lasting in time, as the nose is growing structure. A review of literature showed that there is neither any solution to this problem nor any guidelines for management, yet.[14,15] True incidence of septal deviation in childhood is unknown. Gray reported that in 58% of 2380 children studied a septal deviation was present.[16] Trauma is the most common cause for naso-septal deviation during childhood. Apart from this, cranio-facial growth irregularity may also cause the formation of a ridge between septal cartilage and vomeral bone, often associated with turbino-septal contact. Connate septal deformity due to trauma during intrauterine life or during transit in birth canal has also been reported as a cause for septal deviation, in the literature.[17] Surgical correction of septal deviation is indicated, irrespective of age, if such deformity causes nasal stenosis and oral breathing. Conservative management may worsen the nasal morphology, because deviated nasal septum may exert traction during growth, to normal alar and triangular cartilages not involved in previous trauma. Natural history of nasal trauma in early years demonstrates that, effect of a misdiagnosed trauma can appear during developmental age, and a nasal deformity due to unmanaged fracture becomes worse during growth. Cartilaginous arch involvement may cause narrowing of the nostril and height and/or length asymmetry of nasal pyramid. Delayed management of these alterations requires difficult surgical procedures with not always good results. Moreover the impaired nasal patency may exert negative effect on other systems and organs that play a role in the somatic and psychic development of the little patient. Such effects are seen mainly on the maxillo-facial skeleton and rib cage, but also seen as dysventilatory syndrome of middle ear and paranasal sinuses, vocal tract disorders and difficulty in sleep.[18] This study was conducted prospectively for these aims:

I. To assess the demographic distribution of deviated nasal septum namely age and sex in relation to outcomes of surgery.

II. To present the most common variety of nasal septum deviation and the effect of this factor on outcomes of surgery.

III. To demonstrate the most common possible causes of nasal septum deviation and the effect of this factor on outcomes of surgery.

IV. To show main clinical presentation of nasal septum deviation cases and the degree of their improvement after surgery.

V. To postulate the effect of the performed type of surgical technique on outcomes of surgery.

PATIENTS AND METHODS

347 patients aged 14-63 years of different types of DNS, namely c-shaped, s-shaped, anterior caudal dislocation, and nasal spur with and without external deformities of the nose, presented with variable pictures of clinical presentation of DNS who operated by septoplasty as closed technique. The outcomes of the surgery were studied in relation to different demographic, anatomical, pathological as well as surgical factors, namely 1) patients age, 2) sex, 3) type of clinical presentation, 4) cause of septal deviation, 5) type of DNS, 6) associated local pathology with deviation 7) recurrent or first attempt of surgery, 8) associated external deformity, and 9) surgical technique which was performed. Patients postoperatively were followed for 3-6 months and assessed for outcomes of the surgery which are flap hematoma, flap abscess, flopping of flap, septal perforation, synaechia, degree of improvement, recurrence, atrophic rhinitis, and external nasal deformities. An informed consent was taken from the patients involved in the research prior to their participation.

Data were expressed by using descriptive analysis as means + standard error of mean (s. e. m) and percentages,

test of significance was carried out, using Chi-square test and two way analysis of variance. A probability less than 0.05 was considered as significant, the degree of significance was determined by using level of standard deviation test. Student -t- test was used for dependent sample, as well as contingency coefficient was calculated as measurement of association between nominal variables.

RESULTS

As shown in Table I the deviation of nasal septum was correlated with patients demographic factors namely age and sex. The males were representing higher percentage (61%) among the total presented cases as compared to females who are representing (39%) of total cases, On the other hand 53% of patients were at age 14-18 years and 47% at age >18-63 years. As illustrated in Table II c-shaped verity of deviation was presented with higher percentage (60%) followed by anterior caudal dislocation (23%) as compared to s-shaped and nasal spur which presented with lower percentage, (10%) and (7%) consecutively. As demonstrated in Table III the trauma was commonest cause of deviated nasal septum as compared to congenital predisposition, the posttraumatic deviated nasal septum was constituting (83%) while the deviation of nasal septum due to congenital-developmental predisposition was representing (17%). As can be seen in Table IV the commonest clinical presentation of deviated nasal septum was in form of obstructive symptoms (90%) followed by chronic headache, facial pain, chronic pharyngitis, and facial disfigurement, (39%), (27%), (30%), (29%) consecutively. On the other hand, Table V shown that the effect of demographic factors namely age and sex on the outcomes of the surgery. As can be seen the adult age group shown higher incidence of early as well as late postoperative complications as compared to young age group. In the same manner the males were representing more significant risk of postoperative complications as compared to females (P<0,001).

Table VI demonstrated the relationship between the variety of the deviation and the incidence of occurrence of post-septoplasty complications, the c-shaped variety of deviation was associated with significant higher incidence of postoperative complications , followed by s-shaped as compared to anterior caudal dislocation and nasal spur which showed lower incidence (P<0,001).

In the same time the posttraumatic deviated nasal septum was associated with significant increased risk of post-septoplasty complications as compared to the deviated nasal septum due to congenital- developmental predisposition as can be observed from Table-VII (P<0,001).

Table VIII represented out comes of septoplasty in relation to local co-existing associated pathology namely migraine, chronic hypertrophied turbinates and atrophic rhinitis. It was noted that post-septoplasty persistent headache risk was increased significantly in the presence of migraine (P<0,001). On the other hand the incidence of post-septoplasty persistent nasal obstruction was increased significantly in association with either chronic hypertrophic rhinitis or atrophic rhinitis (P<0,001).

Table IX described the outcomes of septoplasty in relation to performed surgical techniques. It was noted that significant rising of the risk of postoperative complications by remove of septal cartilage as well as application of splints as compared to other cases (P<0,001).

Table I. Demographic factors distribution namely age and sex. (P < 0.05).

Demographic factor	Age		Sex	
	14-18	>18-63	M	F
No.	184	163	213	134
Percent	53	47	61	39

Table II. Type of the deviation.

Type of the deviation	NO.	%
Anterior caudal dislocation	79	23
C- shaped	208	60
S –shaped	37	10
Nasal spur	23	7

Table III. Underlying cause of deviation.

Underlying cause of deviation	NO.	%
Congenital	59	17
Post-traumatic	288	83

Table IV. Variety of clinical presentation.

Clinical presentation	No.	%
Nasal obstruction and mouth breathing	312	90
Snoring	190	55
Recurrent dacryocystitis	7	2
Facial pain	94	27
Chronic headache	135	39
Eustachian tube dysfunction and recurrent attacks of	66	19
Exertional dyspnea	59	17
Chronic sinusitis	87	25
Olfactory and gustatory disorders	45	13
Chronic pharyngitis and tonsillitis	104	30
Facial disfigurement and external deformity	101	29
Malocclusion deformity of teeth	38	11
Recurrent local granuloma	31	9
Recurrent oral opportunistic infections and persistent	10	3
Associated enlarged turbinates	218	63

Table V. Outcomes of septoplasty in relation to demographic factors namely age and sex: (P<0,001).

Outcomes of the septoplasty	Age				Sex			
	14-18		>18-63		M		F	
	NO.	%	NO.	%	NO.	%	NO.	%
Flap hematoma	0	0	3	0.9	2	0.5	1	0.4
Flopping of flap	0	0	0	0	0	0	0	0
Flap infection	1	0.4	1	0.4	1	0.4	1	0.4
Flap necrosis	1	0.4	4	1	4	1	1	0.4
Septal perforation	1	0.4	4	1	4	1	1	0.4
Synechia	0	0	2	0.5	1	0.4	1	0.4
Atrophic rhinitis	1	0.4	4	1	4	1	1	0.4
Persistent obstructive symptoms	2	0.5	6	1.7	6	1.7	2	0.5
Recurrence of deviation	1	0.4	3	0.9	3	0.9	1	0.4
Supra- tip depression deformity	0	0	3	0.9	2	0.5	1	0.4
Persistent headache	0	0	5	1.4	1	0.4	4	1
Persistent facial pain	0	0	5	1.4	1	0.4	4	1
Persistent Eustachian tube dysfunction	1	0.4	1	0.4	2	0.5	0	0

Table VI. Outcomes of septoplasty in relation to type of deviation: (P<0,001).

Outcomes of the septoplasty	Type of deviation							
	Anterior caudal dislocation		C- shaped		S-shaped		Nasal spur	
	NO.	%	NO.	%	NO.	%	NO.	%
Flap hematoma	0	0	3	0.9	0	0	0	0
Flopping of flap	0	0	0	0	0	0	0	0
Flap infection	0	0	2	0.5	0	0	0	0
Flap necrosis	0	0	3	0.9	2	0.5	0	0
Septal perforation	0	0	3	0.9	2	0.5	0	0
Synaechia	0	0	2	0.5	39	0	0	0
Atrophic rhinitis	0	0	3	0.9	2	0.5	0	0
Persistent obstructive symptoms	2	0.5	3	0,9	3	0.9	0	0
Recurrence of deviation	2	0.5	1	0.4	1	0.4	0	0
Supra- tip depression deformity	0	0	1	0,4	2	0.5	0	0
Persistent headache	0	0	5	1.4	0	0	0	0
Persistent facial pain	0	0	5	1.4	0	0	0	0
Persistent Eustachian tube dysfunction	0	0	2	0.5	0	0	0	0

Table VII. Outcomes of septoplasty in relation to cause of septal deviation: (P<0,001).

Outcomes of the septoplasty	Cause of sepal deviation			
	Congenital		Traumatic	
	NO.	%	NO.	%
Flap hematoma	0	0	3	0.9
Flopping of flap	0	0	0	0
Flap infection	0	0	2	0.5
Flap necrosis	0	0	5	1.4
Septal perforation	0	0	5	1.4
Synaechia	0	0	2	0.5
Atrophic rhinitis	0	0	5	1.4
Persistent obstructive symptoms	0	0	8	2
Recurrence of deviation	0	0	4	1
Supra- tip depression deformity	0	0	3	0.9
Persistent headache	0	0	5	1.4
Persistent facial pain	0	0	5	1.4
Persistent Eustachian tube dysfunction	0	0	2	0,5

Table VIII. Outcomes of septoplasty in relation to associated pathology : (P<0,001).

Outcomes of the septoplasty	Total number	Type of associated pathology					
		Hypertrophied turbinates		Atrophic rhinitis		Migraine	
		NO.	%	NO.	%	NO.	%
Flap infection	2	0	0	1	50	0	0
Flap necrosis	5	0	0	3	60	0	0
Septal perforation	5	0	0	3	60	0	0
Synaechia	2	2	100	0	0	0	0
Atrophic rhinitis	5	0	0	3	60	0	0
Persistent obstructive symptoms	8	5	62.5	3	37.5	0	0
Persistent headache	5	0	0	0	0	5	100
Persistent facial pain	5	0	0	0	0	5	100
Persistent Eustachian tube dysfunction	2	2	100	0	0	0	0

Table IX. Outcomes of septoplasty in relation to performed surgical techniques: (P<0,001).

Outcomes of the septoplasty	Total number	Type of performed surgical techniques					
		Remove of septal cartilage or bone		Insertion of splints		Associated rhinoplasty	
		Yes	No	Yes	No	Yes	No
Flap hematoma	3	3	0	0	0	0	3
Flopping of flap	0	0	0	0	0	0	0
Flap infection	2	2	0	2	0	0	2
Flap necrosis	5	5	0	5	0	0	5
Septal perforation	5	5	0	5	0	0	5
Synaechia	2	0	2	0	2	0	2
Atrophic rhinitis	5	5	0	5	0	0	5
Persistent obstructive symptoms	8	5	3	5	3	0	8
Recurrence of deviation	4	0	4	0	4	1	3
Supra- tip depression deformity	3	3	0	0	3	0	3
Persistent headache	5	0	5	0	5	0	5
Persistent facial pain	5	0	5	0	5	0	5
Persistent Eustachian tube dysfunction	2	0	2	0	2	0	2

DISCUSSION

Septonasal deviations are a normal variant in human nasal anatomy. Most do not cause airway problems unless they obliterate at least 50% to 60% of the anterior inferior part of the nasal airway.[10,13-15] At this presenting study, it was found that the largest percentage of presenting cases was among the males of age group 14-18 years. this is logically can be accepted, because this can be explained by the fact that the trauma was the most common cause of deviated nasal septum and this was mainly as the sequel of either road traffic accidents or fighting which common at this sex with this age group. These results were supported by results of other studies which show same findings.[1-5,19]

Regarding verity of septal dimorphism as was shown in this study , the c-shaped deformity followed by anterior caudal dislocation were most common verities. These two verities are commonly predisposed by trauma,[19-23] and because posttraumatic deviated nasal septum was of higher incidence as compared to congenital-developmental cause therefore these two categories c-shaped as well as anterior caudal dislocation were of higher percentage as compared to others. These results were in agreement with other mimic studies.[12-25]

On the other hand this study was presenting the nasal obstruction and mouth breathing as the most common clinical presentation and this was in favor of many studies as mentioned in many literatures. Because the nasal obstruction is considered as main problem associated with deviated nasal septum and other presentations of septal deformity constitute sequel of the nasal obstruction.[1-5,26,27]

Although, the septal surgery is not advisable before age of 18 years because of three main reasons: a) the septal surgery will interfere with the normal development of the nose and create more risk of postoperative nasal deformities. b) it is considered as major surgery which may be not tolerated by patient at this age group. C) there is high chance of recurrence at this developing age group . In the same time it is known that nasal septum plays an important role in the harmonic growth of the face.

Compelled oral breathing due to nasal obstruction during childhood, disrupts the normal development of skull base angle and consequently the normal maxillo-facial growth. This in turn can cause malocclusion and protrusion of maxillary bone, leading to a condition called as class II skeletal deformity, comparable to ''facies adenoidea'' and in this situations early septoplasty is required to be done.[28] This may increase the incidence of complications after septal reconstruction at this age group as compared to adult age group.[18,28] Regarding this aspect our study showed significantly the complications appeared with higher incidence at adult age group as compared to age below eighteen years, this confirm the fact that age doesn't play any important rule in the determination of the incidence of post-septoplasty complications if the proper surgical techniques are conducted.[18] On the other hand it was noted that the postoperative complications are more among the males as compared to females this can be explained by increasing of incidence of deviated nasal septum as result of trauma in between males as compared to females. Same explanation can be used to clarify the reason of higher distribution of postoperative complications at posttraumatic deviated nasal septum i.e. it is well known that technically the septoplasty in posttraumatic cases is more difficult and create risk of flaps injuries, thus flap necrosis at posttraumatic cases is more as compared to congenital – developmental cases because of extensive fibrosis which may make the dissection of muco-perichondrial as well as muco-periosteal flaps more difficult.[29-33]

Our study revealed that the incidence of postoperative complications was more in the cases of c-shaped deformities as compared to other verities of deviated nasal septum. Although s-shaped and nasal spur deformity considered from surgical technique point of view as more difficult and therefore create more risk for postoperative complications by comparison with other verities of deviated nasal septum. This can be correlated to the significant increasing of number of presented cases of c-shaped deformity as compared to others and significantly higher percentage of them were due to traumatic predisposition rather than developmental causes and as we mentioned before that posttraumatic cases are associated with more postoperative complications as compared to other group.[29-33]

On the other hand the degree of postoperative improvement particularly regarding nasal obstruction as well as chronic headache and facial pain is depending mainly upon the presence of co-existing allergic rhinitis, hypertrophied inferior turbinates, atrophic rhinitis, and migraine.[34-37] It was found that in the females, incidence rate of migraine occurrence in relation to cases of chronic headache and facial pain as result of paranasal sinopathy as complications of deviated nasal septum was 1:9.[38,39] Therefore this concept was confirmed by our study which showed that significantly the most of cases with persistent postoperative nasal obstruction they were presented with either hypertrophied inferior turbinates or atrophic rhinitis. By the same manner it was demonstrated that significantly most of the cases with persistent chronic headache and facial pain were females and proved with migraine.

The surgical technique is considered as another important factor which may determine the outcomes of septoplasty.[18-23,40] The main important techniques which usually affecting the results of this surgery are a) whether large amount of cartilage were removed or no? b) whether splints are inserted or no? c) whether septoplasty was associated with other surgical procedures or no namely functional endo- nasal sinus surgery and rhinoplasty ?.[40] These factors were applied at the protocol of our study and their effect on the outcomes of surgery was study. It was confirmed that there was significant increase in the incidence of post-septoplasty flap hematoma, flap infection, flap necrosis and septal perforation after cartilaginous remove. On the other hand it was found that the insertion of splints creates significant raising of risk of flap infection, flap necrosis as well as septal perforation. Thus it was recommended to remove the cartilage as minimal as much as possible and this is going with exact definition of septoplasty procedure in the same time the insertion of splints better to be avoided as much as possible unless there is large raw area which may create risk of development of synaechia .The risk of syaechia generally can be reduced by postoperative close frequent follow up sessions with intranasal suction and clearance to minimize the incidence of local infection and therefore possible local fibrosis.[37-44]

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