Original Research Article

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Relation between deviated nasal septum and paranasal sinus pathology

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ABSTRACT

Background: Deviated nasal septum is a very common finding in ENT clinic, most of the times, as incidental findings without any related symptom. Sometimes it present in association with suspiciously related sinusitis. Our study is to identify the possible association between deviated nasal septum and sinusitis, so that we can consider septoplasty alone a first surgical management for these cases without any sinus procedure or not.

Methods: A cross sectional case-control study. SPSS.v22 used for data analysis. We used Kuhn-Kinnedy staging system for sinus pathology and applied it on the osteomeatal complex (OMC) and all paranasal sinuses. Those patients with deviated septum were studied for sinus disease especially maxillary and anterior ethmoid sinuses, and those with sinus disease were studied for deviated septum.

Results: We studied 238 patients, 120 males and 118 females, of them 164 (control) found to have central septum (68.9%) and 74 (cases) found to have deviated nasal septum (31.1%), 42 to the right and 32 to the left. 104 candidates (43.7%) found to have sinus disease. All findings were almost equal in both genders. Of the total sample, 40% of those with central septum found to have patent OMC and normal sinus mucosa equally. Of those who have DNS (74 candidates), OMC found to be opacified in 13.5% in the ipsilateral side, and 27% bilaterally. In those with DNS maxillary sinus was diseased in 20.3% ipsilaterally, 21.2% contralaterally, and 18.5% bilaterally. Anterior ethmoid sinuses were similarly affected in 40.5% ipsilateral and contralateral to DNS.

Conclusions: According to our finding, no significant association between deviated nasal and paranasal sinusitis. Attributing sinuses disease to deviated nasal septum may lead to over treatment of the patient and unnecessary surgery.

Keywords: Deviated septum, Sinusitis, Septoplasty

INTRODUCTION

Sinusitis affects 1 in 7 adults with annual incidence of about 50 million individuals. It is the fifth most common diagnosis for which antibiotics are prescribed.¹

Deviated nasal septum is a very common finding in ENT clinic presenting in up to 62% of the population, where it is role in sinuses pathology still uncertain.²

In the literature, some authors stated that there is no definite role or contribution of deviated nasal septum in the pathogenesis of sinusitis, and no significant difference between sinusitis in those who has DNS and those who does not.^{3,4} Other authors reported almost the reverse, stating that deviated nasal septum can be associated with significant sinonasal disease, especially a C-shaped DNS which showed statistically significant correlation with sinus disease.⁵⁻⁸

In our society, Southern region of Saudi Arabia, no study tackled the impact of deviated or deformed nasal septum on the function of paranasal sinuses and it is relation to sinusitis. Herein we conducted this study to assess the possible association between deviated nasal septum and sinusitis, so that we can consider septoplasty alone as first surgical management for these cases without any sinus procedure or not.

METHODS

A cross sectional study, by reviewing the records of 284 adult patients who have been evaluated in rhinology clinic for several reasons, between July 2011 to December 2012 in Asir Central Hospital, and were investigated with computed tomography (CT) and have no previous history of sinonsasal surgeries. The Lund-Mackay staging system was used to assess the osteomeatal complex (OMC) and all paranasal sinuses disease staging, if present. The sample divided into two groups, group one are those with normal nasal septum, and group two are those with deviated septum. The relation between the sinuses disease and the status of the nasal septum studied and the two groups findings compared. The final conclusion is correlated with literature review. SPSS.v22 is used for data analysis.

Inclusion criteria

Inclusion criteria were all adult rhinology clinic patient who underwent CT scan for nose and paranasal sinuses with cuts equal or less than 1.5 mm and has no past history of sinonasal surgery.

Exclusion criteria

Exclusion criteria were all patients with incomplete records, those who have history of sinonasal surgery and those with diffuse or destructive disease affecting the septum.

RESULTS

A total of 238 patients met our inclusion criteria, 120 males and 118 females, of them 164 (control) found to have central septum (68.9%) and 74 (cases) found to have deviated nasal septum (31.1%), 42 to the right and 32 to the left (Table 1).

Various sinuses pathology was present in 20-42% of the candidates, least in sphenoid sinus, and highest in maxillary sinuses.

Of those who have normal nasal septum, 56.7% found to have patent OMC, 29.3% have bilateral opacification of OMC. The diseased mucosa of OMC was almost the same in those who have DNS. And therefore no impact of DNS on OMC (Figure 1).

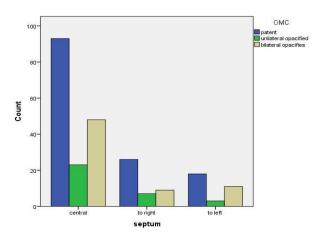


Figure 1: The incidence of osteomeatal complex disease and its correlation to the status of the septum.

The frontal sinus was normal in average of 70% of those who have normal nasal septum and less likely to be affected by DNS, as it is normal in 76-79% of those who have DNS.

The maxillary sinus was normal in average of 55.5% of those with normal nasal septum. With DNS to the right side, the sinus was normal in 64.3% in the right sinus and 61.9%% in left sinus. With DNS to the left, the right sinus was normal in 53.1% and the left sinus was normal in 50%.

Anterior ethmoid sinuses (Ant Eth) were normal in average of 59.5% of those with normal nasal septum. With deviated septum, equal incidence of bilaterally normal anterior ethmoid sinuses, 57.1% in case of right side deviation and 62.5% in left side deviation (Table 2 and 3).

Tabl	e 1	The	incidence	of	deviated	nasal	septum	and	gende	r distribution.
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Septum *sex cross tabulation									
			S	ex	— Total				
			Male	Female	Total				
	Central Deviated	Count	82	82	164				
Contum		% of total	34.5%	34.5%	68.9%				
Septum		Count	38	36	74				
	Devialed	% of total	16.0%	15.1%	31.1%				
Total		Count	120	118	238				
10141		% of total	50.4%	49.6%	100.0%				

Table 2: The relation between diseased right anterior ethmoid sinuses and deviated nasal septum.

Septum *Rt Ant Eth cross tabulation									
			Rt Ant Eth	Rt Ant Eth					
			No pathology	Partial opacification	Complete opacification	- Total			
	Central	Count	97	25	42	164			
		% within septum	59.1%	15.2%	25.6%	100.0%			
Septum	To right	Count	24	7	11	42			
Septum		% within septum	57.1%	16.7%	26.2%	100.0%			
	To left	Count	20	7	5	32			
	10 left	% within septum	62.5%	21.9%	15.6%	100.0%			
Total		Count	141	39	58	238			
Total		% within septum	59.2%	16.4%	24.4%	100.0%			

^{*}Rt Ant Eth- Right anterior ethmoid sinuses.

Table 3: The relation between diseased left anterior ethmoid sinuses and deviated nasal septum.

Septum *Lt Ant Eth cross tabulation									
			Lt Ant Eth			- Total			
			No pathology	Partial opacification	Complete opacification	Total			
	Central	Count	98	29	37	164			
		% within septum	59.8%	17.7%	22.6%	100.0%			
Septum	To right	Count	24	9	9	42			
Septum		% within septum	57.1%	21.4%	21.4%	100.0%			
	To left	Count	20	6	6	32			
	10 left	% within septum	62.5%	18.8%	18.8%	100.0%			
Total		Count	142	44	52	238			
1 Otal		% within septum	59.7%	18.5%	21.8%	100.0%			

^{*}Lt Ant Eth- Left anterior ethmoid sinuses.

Table 4: The relation between diseased right posterior ethmoid sinuses and deviated nasal septum.

Septum *Rt Post Eth cross tabulation									
			Rt Post Eth						
			No pathology	Partial opacification	Complete opacification	- Total			
	Central	Count	106	23	35	164			
		% within septum	64.6%	14.0%	21.3%	100.0%			
Septum	To right	Count	27	6	9	42			
Septum		% within septum	64.3%	14.3%	21.4%	100.0%			
	To left	Count	22	6	4	32			
	10 left	% within septum	68.8%	18.8%	12.5%	100.0%			
Total		Count	155	35	48	238			
Total		% within septum	65.1%	14.7%	20.2%	100.0%			

^{*}Rt Post Eth- Right posterior ethmoid sinuses.

Table 5: The relation between diseased left posterior ethmoid sinuses and deviated nasal septum.

Septum *Lt Post Eth cross tabulation									
			Lt Post Eth	Lt Post Eth					
			No pathology	Partial opacification	Complete opacification	- Total			
	Central	Count	106	26	32	164			
		% within septum	64.6%	15.9%	19.5%	100.0%			
Septum	To right	Count	28	8	6	42			
Septum		% within septum	66.7%	19.0%	14.3%	100.0%			
	To left	Count	21	7	4	32			
	10 1611	% within septum	65.6%	21.9%	12.5%	100.0%			
Total		Count	155	41	42	238			
Total		% within septum	65.1%	17.2%	17.6%	100.0%			

^{*}Lt Post Eth- Left posterior ethmoid sinuses.

Posterior ethmoid sinuses (Post Eth) were normal in 64.6% of those with normal nasal septum. With DNS to the right side, the sinus was normal in 64.3% in the right sinus and 66.7%% in left sinus. With DNS to the left, the right sinus was normal in 68.8% and the left sinus was normal in 65.6% (Table 4 and 5).

The sphenoid sinus was normal in average of 78% of those with normal nasal septum. With DNS to the right side, the sinus was normal in 78.6% in the right sinus and same percentage in left sinus. With DNS to the left, the right sinus was normal in 71.9% and the left sinus was normal in 75%.

DISCUSSION

Although the exact incidence of deviated nasal septum is variable among the studies, it is well known that it is a very common finding either symptomatic or as incidental findings without any related symptom. Gray found it to be 30% in children and 80% in adults. Yan der Veken et al found that deviated nasal septum incidence is up to 70% with increasing incidence with age. Ozkurt et al found it to be 65% with relatively more male predominance. Sinusitis may be attributed to deviated nasal septum once it is there. Therefore we conducted this study to study the incidence of deviated nasal septum in southern region of Saudi Arabia and to evaluate the correlation between deviated nasal septum and sinusitis, so that we can consider septoplasty alone a first surgical management for these cases without any sinus procedure or not.

In our study the DNS was there in 68.9% with almost equal incidence in male and female (50.4% and 49.6% respectively).

Regarding the correlation between DNS and chronic sinusitis, three theories are there to explain this relation, one mechanical, and two dynamic theories. The mechanical theory attributed the sinusitis to the stagnation of the secretions because of narrow of the osteomeatal complex by the DNS. The dynamic theories attributed the sinusitis to the impairment of the mucociliary function of the nasal mucosa and the affection of airflow by the DNS causing mucosal mucosal dryness and the pressure of air flow changes within the sinuses. ¹²⁻¹⁴

Many studies have been conducted to evaluate the reality of such correlation between sinusitis and DNS. Moorthy et al found that the DNS can be associated with significant sinonasal disease even in absence of any nasal symptoms, especially an "S" shaped. Poorey et al reemphasized the concept that septal deviation causes obstruction at OMC which results in an increased incidence and severity of bilateral chronic sinus disease. But the problem in this two studies is the randomization of the samples, as all the samples are patients with DNS, but either symptomatic or not. Ozkurt et al who studied a

well randomized sample of larger group of cases and concluded that the presence of DNS creates a risk factor for chronic rhinosinusitis.¹¹

In our study the frontal, maxillary and sphenoid sinuses, the diseased sinus was more with left side deviation of the septum whatever the side of the diseased sinus. Both anterior and posterior ethmoid sinuses was at least radiologically affected by the side of deviated septum.

CONCLUSION

The DNS showed no impact on frontal, maxillary and sphenoid sinuses. The anterior and posterior ethmoid sinuses found to be relatively affected by DNS. DNS to left, in general, was associated with higher incidence of sinuses disease than central and DNS to right.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

REFERENCES

- Rosenfeld RM, Piccirillo JF, Chandrasekhar SS, Itzhak Brook I, Kumar KA, Kramper M, et al. Clinical Practice Guideline (Update): Adult Sinusitis. Otolaryngol Head Neck Surg. 2015;152(2):1–39.
- 2. Lloyd G. CT of the paranasal sinuses: study of a control series in relation to endoscopic sinus surgery. J LaryngolOtol. 1990;104:477–81.
- 3. Collet S, Bertrand B, Cornu S, Eloy P, Rombaux P. Is septal deviation a risk factor for chronic sinusitis? Review of literature. Acta Otorhinolaryngol Belg. 2001;55(4):299-304.
- 4. Harar RPS, Chadha NK, Rogers G. The role of septal deviation in adult chronic rhinosinusitis: a study of 500 patients. Rhinology. 2004;42:126-30.
- Shoib SM, Viswanatha B. Association between Symptomatic Deviated Nasal Septum and Sinusitis: A Prospective Study. Res Otolaryngol. 2016;5.1:1-8
- Rao JJ, Kumar ECV, Babu KR, Chowdary VS, Singh J, Rangamani SV. Classification of nasal septal deviations-relation to sinonasal pathology. Indian J Otolaryngol Head Neck Surg. 2005;57(3):199-201.
- Rehman A, Hamid S, Ahmad M, Rashid AF. A
 prospective study of nasal septal deformities in
 Kashmiri population attending a tertiary care
 hospital. Int J Otolaryngol Head Neck Surgery,
 2012;1:77-84.
- 8. Moorthy PNS, Kolloju S, Madhira S, Jowkar AB. Clinical study on deviated nasal septum and its associated pathology. Int J Otolaryngol Head Neck Surg. 2014;3(2):75.

- 9. Lindsay PG. Deviated nasal septum incidence and etiology. Annals Otol Rhinol Laryngol. 1978;87(3):3-20.
- van der Veken PJ1, Clement PA, Buisseret T, Desprechins B, Kaufman L, et al. CT-scan study of the incidence of sinus involvement and nasal anatomic variations in 196 children. Rhinology, 1990;28(3):177-84.
- 11. Ozkurt FE, Akdag M, Keskin I, Iskenderoglu AY, Orhan T. Relation Between the Nasal Septal Deviation and Chronic Rhinosinusitis. Int J Basic Clin Stud. 2014;3(1):25-30.
- Brown S. Anatomy of nose and paranasal sinuses.
 In: Lund VJ, H Stammberger, Scott Brown Otolaryngology, Basic Sciences. Volume 5. 7th

- edition. Butterworth-Heinemann Oxford; 2008: 1318.
- 13. Poorey VK, Gupta N. Endoscopic and computed tomographic evaluation of influence of nasal septal deviation on lateral wall of nose and its relation to sinus diseases. Indian J Otolaryngol Head Neck Surg. 2014;66(3):330-5.
- 14. Drake-Lee A. The Physiology of the Nose and Paranasal Sinuses. Chapter 106, 7th edition. Scott Brown's Otolaryngology; 2008: 11-15.

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