ORIGINAL ARTICLE ASIAN JOURNAL OF MEDICAL SCIENCES

Deciphering nasal septum deviation: Computed tomography insights into age and gender trends for optimized clinical care

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Submission: 24-05-2024 Revision: 03-06-2024 Publication: 01-08-2024

ABSTRACT

Background: Deviation of the nasal septum (DNS) is defined as any deviation of the septum from the midline and is one of the most common variations of the sinonasal anatomy. **Aims and Objectives:** The purpose of this study was to observe the prevalence of DNS and its relation with age, gender, and sidedness. **Materials and Methods:** Sinonasal computed tomographic images of 100 subjects obtained from the Department of Radiodiagnosis, King George's Medical University, Lucknow, UP, in the period August 2013–July 2014 were analyzed to determine the prevalence of DNS and its relation with age, gender, and sidedness. **Results:** Of a total of 100 subjects, normal midline nasal septum was seen in 27 subjects whereas 73 subjects (73%) displayed a deviation in its position. The prevalence of nasal septal deviation (NSD) was significantly higher in females (84.21%) as compared to males (66.13%) (P = 0.048). We also compared the prevalence of NSD in different age groups and found it to be higher in subjects aged >46 years (83.33%) as compared to other age groups but this difference was not found to be statistically significant (P = 0.619). **Conclusion:** Nasal septum deviation was found to be more frequent in females and observed deviations were more toward the left side as compared to the deviations of the septum toward the right. No correlation between age intervals and prevalence of DNS was found.

Key words: Deviated nasal septum; Computed tomographic images; Sinonasal region

Access this article online

Website: http://nepjol.info/index.php/AJMS

DOI: 10.3126/ajms.v15i8.66147

E-ISSN: 2091-0576

P-ISSN: 2467-9100

INTRODUCTION

Deviated nasal septum (DNS) contributes to the symptoms of nasal obstruction and affects the esthetic nasal features and occasionally, snoring.[1] It is a common finding observed in clinical examinations of the nose and in radiological scans of the head region, with a prevalence reaching as high as 89.2% in the general population.[2] Septal deviation causes lateral compression of the middle turbinate and uncinate process pushing them into the infundibulum causing obstruction of osteo-meatal complex and in the normal mucus flow, thus resulting in sinusitis.[3] Patients suffering from nasal obstruction caused by nasal septal deviation (NSD) are frequently corrected by the procedure named septoplasty by otorhinolaryngologist.[2] DNS has been defined as any deviation of the septum from midline.[4,5] The criteria for considering septum to be deviated varied among different authors. Some authors considered nasal septum to be deviated only when it was more than 4 mm deviated from midline while some authors considered DNS as any visually detectable NSD from the midline.[3]

Aims and objectives

The aim of the present study is to determine the overall prevalence of DNS using coronal and axial computed tomography (CT). Objective of the study was to compare the prevalence of DNS in relation to age and gender.

MATERIALS AND METHODS

Sinonasal computed tomographic images of 100 subjects (62 males and 38 females) were collected from the

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Department of Radiodiagnosis, King George's Medical University, Lucknow, UP, in between August 2013 and July 2014 and were analyzed for the presence of DNS.

All patients including male and female, who were 15–60 years of age, undergoing CT of sinonasal region, were included in the present study. Any person with obscured or altered sinonasal anatomy due to inflammatory disease, previous surgery, facial trauma, and paranasal sinus neoplasms was excluded.

Coronal sections were taken with the patients in prone position with neck extended and the plane perpendicular to the axial plane. Axial sections were taken with the patient in the supine position and the plane of data acquisition parallel to hard palate. The sections were 5-mm thick. Any visually detectable divergence of the septum from the midline was considered as the NSD.[6] The nasal septum situated in midline was considered to be normal.

RESULTS

Out of total 100 subjects studied, normal midline nasal septum was seen in 27 subjects whereas 73 subjects (73%) displayed a deviation in its position. Midline septum was found (Figure 1a) higher proportion of males (33.87%) as compared to females (15.79%). DNS was observed in the majority (73%) of subjects. The left-sided DNS was more common (45%) (Figure 1b) as compared to the right (28%) (Figure 1c).

Out of 62 male study subjects, deviated septum was found in 41 whereas it was found deviated in 32 females out of 38. Females displayed a significantly higher prevalence of septal deviation (84.21%) as compared to males (66.13%) (P=0.048). Majority of subjects were found to have predominance of left-sided deviation (61.64%) as compared to the right (38.36%) but this difference was statistically insignificant (P=0.402). Female subjects contributed more to the group with left-sided deviation (47.37%) as compared to male subjects (43.55%) but the difference was not statistically significant (P=0.709). Right-sided deviation could be demonstrated in 36.84% females as compared to 22.58% males but this difference was statistically non-significant (P=0.123) (Table 1a and Figure 2).

In the present study, a midline normal septum was found in higher proportion of subjects aged ≤25 years (32%) followed by 26–35 years (30%), 36–45 years (28.57%), and >46 years (16.67%). Deviated septum was found in a higher proportion in older subjects aged >46 years (83.33%) as compared to other age groups but this difference was not found to be statistically significant (P=0.619). Left-sided NSD was more common in subjects aged 36–45 years (57.14%) followed by >46 years (54.17%), 26–35 years (43.33%), and ≤25 years (28.00%) but this difference was not found to be statistically significant (P=0.170). The presence of right-sided NSD was found in higher proportion in younger subjects ≤25 years (40.00%) as compared to other groups but this difference was not found to be statistically significant (P=0.285) (Table 1b and Figure 3).

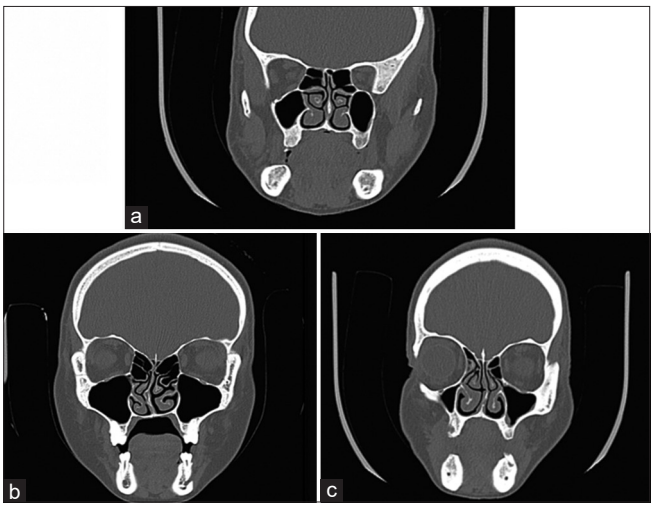

Figure 1: (a) Coronal computed tomography image showing nasal septum (red arrow) in midline, (b) Coronal computed tomography image showing deviated nasal septum (red arrow) toward left side, (c) Coronal computed tomography image showing deviated nasal septum (red arrow) toward right side

DISCUSSION

In the current study, DNS was observed with a prevalence rate of 73%. The reported prevalence of this particular variation in the literature ranges from 14.1% to 80%. We found a much higher prevalence of deviated septum as compared to many other studies (Table 2).

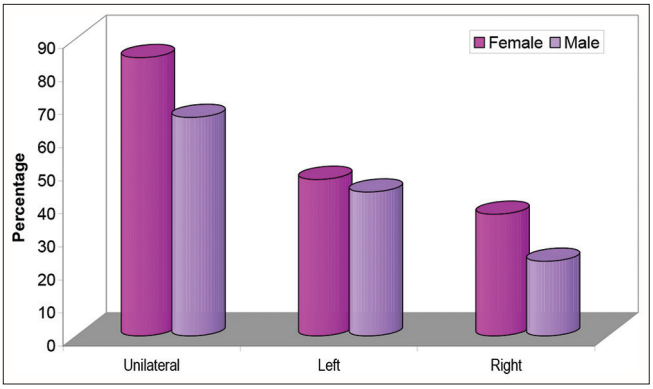

Figure 2: Bar diagram showing gender-wise comparison of the prevalence of nasal septal deviation

Table 1a: Gender-wise comparison of presence of normal nasal septum and nasal septal deviation (n=number of subjects, %=percentage of subjects)

Nasal septum	Females (n=38)*		Males (n=62)*		Statistical significance	
	No.	%	No.	%	Chi-square	"P" value
Normal septum (Midline)	6	15.79	21	33.87		
Deviated nasal septum						
Left	18	47.37	27	43.55	0.139	0.709
Right	14	36.84	14	22.58	2.377	0.123
Total	32	84.21	41	66.13	3.908	0.048

*(n=number of subjects, %=percentage of subjects)

Table 1b: Age-wise comparison of prevalence of normal nasal septum and nasal septal deviation (n=number of subjects, %=percentage of subjects)

Nasal septum	<25 years (n=25)*		26-35 years (n=30)*		36-45 years (n=21)*		>46 years (n=24)*		Statistical significance	
	No.	%	No.	%	No.	%	No.	%	Chi-square	"P" value
Normal (Midline)	8	32	9	30	6	28.57	4	16.67		
Deviated nasal septum										
Left	7	28.00	13	43.33	12	57.14	13	54.17	5.019	0.170
Right	10	40.00	8	26.67	3	14.29	7	29.17	3.788	0.285
Total DNS	17	68.00	21	70.00	15	71.43	20	83.33	1.781	0.619

DNS: Deviated nasal septum

Table 2: Prevalence of DNS in computed tomography study of different populations

Author (year)	Population	Number of subjects	DNS %
Pérez-Piñas et al.[7]	Spanish	110	80
Danese et al.[8]	French	112	42
Dutra and Marchiori[9]	Brazilian	71	14.1
Talaiepour et al.[10]	Iranian	143	63
Lerdlum and Vachiranubhap[11]	Thai	133	56
Badia et al.[12]	United Kingdom	100	20
Mazza et al.[13]	Italian	100	26
Mamatha et al.[14]	Indian	40	65
Present study	Indian	100	73

DNS: Deviated nasal septum

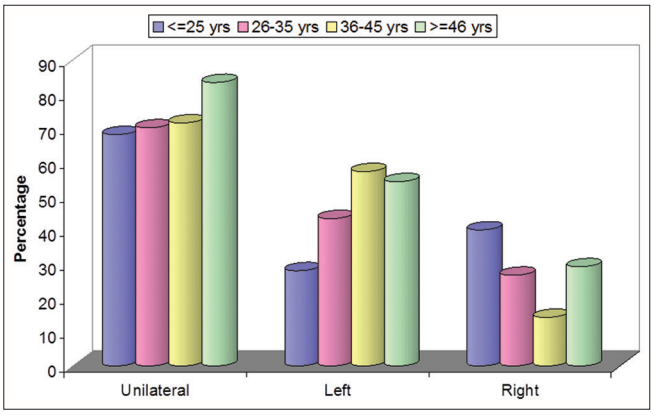

Figure 3: Bar diagram showing age-wise comparison of the prevalence of nasal septum deviation

In the present study, there was preponderance of left-sided (61.64%) deviation as compared to the right (38.36%) but the difference was found to be insignificant (P=0.402) Predominance of left-sided deviation has also similarly been documented in the past.[7]

Some previous studies have reported a difference in the prevalence but no correlation was found between the prevalence of NSD and gender[15] yet, in the present study, we observed higher prevalence of NSD in females (84.21%) as compared to males (66.13%) and the difference was statistically significant (P=0.048). In contrast to our study, past literatures have reported higher incidence of DNS in males than females (Table 2) with an approximate ratio of 2:1.[16]

We also compared the prevalence of NSD in different age groups and found deviation to be higher in subjects aged >46 years (83.33%) as compared to other age groups but this difference was not found to be statistically significant (P=0.619) similar to the findings of Midilli et al.[17]

In our study, we found the nasal septum deviated from the midline in a large proportion of study subjects.

Limitations of the study

Although the study provided a valuable exploration for the incidence of DNS in different age groups and in both

genders. But, the generalization of this observation may be limited due to small sample size. Additionally, while computed tomography provides valuable insights, other factors influencing nasal septum deviation may not have been fully explored.

CONCLUSION

In the present study, DNS was found in majority (73%) and its prevalence was significantly higher (P=0.048) in females (84.21%) as compared to males (66.13%). Left-sided deviation was more frequently seen in 61.64% as compared to the right side though the difference was insignificant. Furthermore, older subjects aged ≥46 years displayed insignificantly higher proportion of NSD (83.33%) as compared to other age groups.

ACKNOWLEDGMENT

We express our sincere gratitude to the Department of Radiodiagnosis, King George's Medical University UP, Lucknow, India, for providing sinonasal computed tomographic images to make this anatomical research possible. Their invaluable contribution enhances our knowledge and improves patient care.

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Authors' Contributions:
SS- Definition of intellectual content, literature survey, prepared first draft of manuscript, implementation of study protocol, data collection, data analysis, and manuscript preparation; **GS-** Concept, design, clinical protocol, manuscript preparation, editing, and preparation of figures; **NS-** Design of study, statistical analysis and interpretation, and submission of article; **JC-** Review manuscript, coordination and manuscript revision; **GT-** Review manuscript and literature survey.

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Source of Support: Nil, **Conflicts of Interest:** None declared.