

Radiological Assessment of Deviated Nasal Septum Based on Mladina's Classification and Relation to Symptomatology and Post Septoplasty Complications in Khamis Mushait, Saudi Arabia



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Submission: July 17, 2020; Published: August 10, 2020

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Abstract

Background: The septum is the cartilage in the nose that separates the nostrils. Typically, it sits at the center and divides the nostrils evenly. However, in some people, this isn't the case. Many people have an uneven septum, which makes one nostril larger than the other. Severe unevenness is known as a deviated septum. It can cause health complications such as a blocked nostril or difficulty breathing. An uneven septum is very common. According to the American Academy of Otolaryngology - Head and Neck Surgery, 80 percent of all septum are deviated to some degree.

Aim: To identify the most common radiological classification with relation to clinical presentation and post-operative complications of deviated nasal septum and their relation to the deviation severity.

Methodology: A retrospective record-based approach was used targeting all patients with clinically diagnosed DNS and undergone surgical intervention at Khamis Mushait General Hospital. Data extracted included patient's demographic data, clinical signs and symptoms; radiological grading of DNS based on Mladina's classification. Other data included post-operative recorded complications were considered.

Results: The study included 28 patients with DNS. Type II was diagnosed among 35.7% of the cases followed by type III and IV. As for pre-operative signs and symptoms of DNS, nasal obstruction was the main complaint as it was recorded among 92.9% of the cases followed by snoring (67.9%). Nasal obstruction was the most recorded complication (32.1% of the cases) followed by external nose deformity (21.4%).

Conclusions: In conclusion, more than one third of the cases had type II deviation followed by type III and type IV equally. Type II & IV are the most sever types respectively according to clinical presentation and post-operative complications.

Keywords: Nasal septum deviation; Deviated septum; Classification; Radiological assessment; Signs; Symptoms; Surgery; Complications

Abbreviations: DNS: Deviated Nasal Septum; CSF: Cerebrospinal Fluid

Background

Deviated nasal septum (DNS) is a physical disorder of the nose, involving a displacement of the nasal septum. Some displacement is common, affecting 80% of people, mostly without their knowledge [1]. A deviated septum occurs when the thin wall between nasal passages is displaced to one side. Among many people, the nasal septum is off-center or deviated narrowing one nasal passage [2]. Severely deviated nasal septum blocks one side

of the nose and reduces airflow, causing difficulty of breathing [3]. The continued exposure of a deviated septum to the dryness due to airflow through the nose may sometimes contribute to crusting or bleeding in some cases [4]. A nasal blockage or congestion can occur from a deviated nasal septum, from swelling of the tissues lining the nose or from both [5]. Some people are born with a deviated septum. Other people develop a deviated septum

after injury or trauma to the nose. Recurrent or repeated sinus infections can also be a sign of a deviated septum. Other symptoms include frequent nose bleeds, facial pain, headache, postnasal drip, loud breathing, and snoring during sleep. A deviated septum may also cause sleep apnea, a serious condition in which a person stops breathing during sleep. Among some cases, symptoms of a deviated septum may be relieved with medications. If not, a surgical procedure called septoplasty may be needed to repair a crooked septum and improve breathing.

Methodology

A retrospective record-based approach was used for a total number of 26 out of 120 cases had CT scan studies were taken targeting all patients with clinically diagnosed with deviated nasal septum and undergone surgical intervention at Khamis Mushait General Hospital during the period from January, 2017 to end of May, 2019. We excluded revision surgery, rhinoplasty cases, sinus surgery and those with incomplete records or those who do not have preoperative CT study. We contacted them and obtained a verbal consent to participate in this study. All medical files were reviewed, and clinical data were extracted using pre-structured data extraction sheet to minimize data extraction error. Files with incomplete data were excluded if personal contact with the patient failed. Data extracted included patient’s demographic data, clinical signs, and symptoms; clinical grading of DNS based on Mladina’s classification. Other data included post-operative recorded complications such as nasal obstruction, nasal deformity, loss of smell sensation, and all others [6-10].

Data Analysis

After data were collected it was revised, coded, and fed to statistical software IBM SPSS version 22. The given graphs were constructed using Microsoft excel software. All statistical analysis was done using two tailed tests and alpha error of 0.05. P value less than or equal to 0.05 was statistically significant. Frequency and percent were used to describe the frequency distribution of the different collected variables including DNS grade, signs and symptoms, and post-operative complications. Crosstabulation was used to show the clinical presentation of the different DNS grade and post-operative complications recorded with each grade [11-16].

Results

The study included 28 patients with DNS whose ages ranged from 18 to 40-year-old. As for the degree of DNS, type II was diagnosed among 35.7% of the cases followed by type III and type IV (21.4% for each) while 10% had either type I or type VII (Figure 1). As for pre-operative signs and symptoms of DS (Figure 2), nasal obstruction was the main complaint as it was recorded among 92.9% of the cases followed by snoring (67.9%), nasal discharge (60.7%), frontal headache (60.7%), post nasal drip (57.1%) while epistaxis was recorded among 25% of the cases. Table 1 illustrates the relation between the degree of DNS and the most common complaint. Nasal obstruction was the most frequent for all types of DNS as it was recorded for all cases except for type II (90%) and type III (83.3%). Among type I, the most second complaint was snoring (100%) followed by nasal discharge, frontal headache, and smell disturbance (66.7% for each) [17-21].

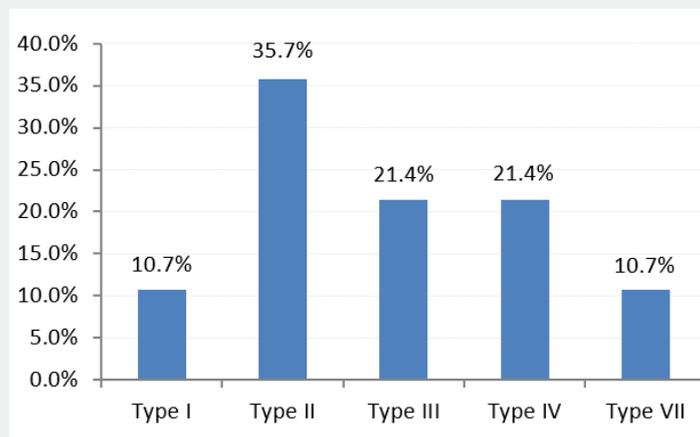


Figure 1: Degree of deviated nasal septum among the study patients based on mladina’s classification.

As for type II, the most second reported complaint was snoring (80%) followed by nasal discharge (70%). Considering type III, the second most frequent complaint were nasal discharge, postnasal drip, and throat discomfort (50% for each). Regarding type IV, the second most reported complaint was frontal headache (83.3%) which also the same for type VII DNS.As for post-operative complications (Table 2), nasal obstruction was the most recorded

complication (32.1% of the cases) followed by external nose deformity (21.4%), dental anesthesia (17.9%), smell disturbance and infection (10.7% for each). As for complications distribution according to DNS type, nasal obstruction, external nose deformity, and smell disturbance were the most recorded for type I DNS. For type II, nasal obstruction and dental anesthesia were the most frequent post-operative complications (40% for each). As for

cases with type III, smell disturbance and dental anesthesia were recorded among 16.7% of the cases. Considering type IV, 50% of the cases had post-operative external nose deformity while it was recorded among 33.3% of type VII with nasal obstruction (33%) [22-24].

Discussion

Nasal septal deviation is a common condition of the patients who visit ENT surgeons [24]. Treating nasal septum deviation is the primary indication for septoplasty mainly if symptomatic with nasal obstruction, with postoperative patient satisfaction rates on the order of 95% [2]. Septoplasty decision is based on medical history and clinical assessment of septal deviation [16] and other indications. Direct visualization of septal deviation on physical examination, with anterior rhinoscopy and endoscopy are the main used assessment methods. So far, there is no universally accepted classification of deviated nasal septum; the classification is useful for assessment of the patient and to plan the treatment [24]. Mladina’s classification is the relevant and recent one and, he suggested that the classification should be followed and included in data of chronic rhinosinusitis that final elucidation of real role and importance of septal deviations is clearer.

Mladina’s Classification

Type 1: midline septum or Mild deviation.

Type 2: Anterior vertical, C-Shaped.

Type 3: Posterior vertical, C-Shaped.

Type 4: S- shaped deviation.

Type 5: Horizontal spur.

Type 6: Horizontal spur with deep groove on the concave side.

Type 7: Combination [24]

The current study aimed to analyze the clinical presentation, radiological Mladina’s classification and postoperative complications among those patients undergone septoplasty. The study revealed that more than one third of the cases had type II deviation (35.7%) followed by type III and type IV equally (21.4%) then type I and type VII with same incidence (10.7%), type V and VI were not recorded among our patients. In another study, of 970 patients, 50.3% had deviated nasal septum according to the Guyuron’s and Mladina’s classifications, type 2 (41.4%) and type 1 (35.4%) were most common, respectively [23]. The most recorded symptoms among the cases were nasal obstruction and snoring for all types while the least one is epistaxis (Figure 2). The nasal obstruction, snoring & nasal discharge are more common presented among those patients are having type I and II. The frontal headache is most common among type IV then type VII patients.

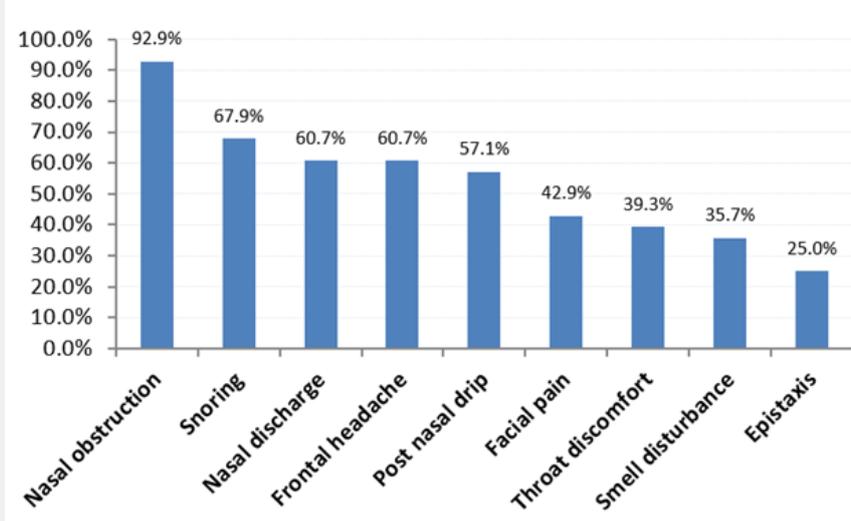


Figure 2: Signs and symptoms of deviated nasal septum among the study cases.

Postnasal drip, facial pain & epistaxis are most common among type II and IV patients. The throat discomfort is common among the patients those having type II & III while smell disturbance among type I & VII patients (Table 1). Based upon that, type II is the most sever type which is having the highest incidence of presentation of nasal discharge, postnasal drip, facial pain and throat discomfort among all the types of patients moreover is

having the second highest incidence of nasal obstruction, snoring and epistaxis. Type IV is the second sever one which is having the highest incidence of frontal headache and epistaxis while has the second highest incidence of postnasal drip and facial pain. Regarding the post-septoplasty complications, we found that the most complications in general are the nasal obstruction then external nasal deformity while the least one is watery discharge

(CSF leak) (Table 2). Post-septoplasty hematoma has not been recorded among our patients. Type II is the most one has more complications compared to the other types, Dental anesthesia & infection are having highest incidence although watery discharge

(CSF leakage) occurred only in type II. Other complications were the second highest rate like nasal obstruction, bleeding, and septal perforation.

Table 1: Distribution of pre-operative signs and symptoms of deviated nasal septum according to its severity.

| Pre-Operative Signs and Symptoms | Mladina's Classification | | | | | | | | | |
|----------------------------------|--------------------------|---------|---------|--------|----------|--------|---------|---------|----------|---------|
| | Type I | | Type II | | Type III | | Type IV | | Type VII | |
| | No | % | No | % | No | % | No | % | No | % |
| Nasal obstruction | 3 | 100.00% | 9 | 90.00% | 5 | 83.30% | 6 | 100.00% | 3 | 100.00% |
| Nasal discharge | 2 | 66.70% | 7 | 70.00% | 3 | 50.00% | 4 | 66.70% | 1 | 33.30% |
| Frontal headache | 2 | 66.70% | 6 | 60.00% | 2 | 33.30% | 5 | 83.30% | 2 | 66.70% |
| Epistaxis | 0 | 0.00% | 3 | 30.00% | 0 | 0.00% | 4 | 66.70% | 0 | 0.00% |
| Smell disturbance | 2 | 66.70% | 3 | 30.00% | 1 | 16.70% | 2 | 33.30% | 2 | 66.70% |
| Postnasal drip | 1 | 33.30% | 7 | 70.00% | 3 | 50.00% | 4 | 66.70% | 1 | 33.30% |
| Snoring | 3 | 100.00% | 8 | 80.00% | 2 | 33.30% | 4 | 66.70% | 2 | 66.70% |
| Facial pain | 1 | 33.30% | 6 | 60.00% | 1 | 16.70% | 3 | 50.00% | 1 | 33.30% |
| Throat discomfort | 0 | 0.00% | 5 | 50.00% | 3 | 50.00% | 3 | 50.00% | 0 | 0.00% |

Table 2: Distribution of post-operative complications of deviated nasal septum according to its severity.

| Post-Operative Complications | Total (%) | Mladina's Classification | | | | | | | | | |
|---|-----------|--------------------------|--------|---------|--------|----------|--------|---------|--------|----------|--------|
| | | Type I | | Type II | | Type III | | Type IV | | Type VII | |
| | | No | % | No | % | No | % | No | % | No | % |
| Nasal obstruction | 9 (32.1%) | 2 | 66.70% | 4 | 40.00% | 0 | 0.00% | 2 | 33.30% | 1 | 33.30% |
| Nasal bleeding that make patient visit ER or clinic | 2 (7.1%) | 0 | 0.00% | 1 | 10.00% | 0 | 0.00% | 1 | 16.70% | 0 | 0.00% |
| Septal perforation | 2 (7.1%) | 0 | 0.00% | 1 | 10.00% | 0 | 0.00% | 1 | 16.70% | 0 | 0.00% |
| External nose deformity | 6 (21.4%) | 2 | 66.70% | 0 | 0.00% | 0 | 0.00% | 3 | 50.00% | 1 | 33.30% |
| Infection and Septal abscess | 3 (10.7%) | 0 | 0.00% | 2 | 20.00% | 0 | 0.00% | 1 | 16.70% | 0 | 0.00% |
| Smell disturbance | 3 (10.7%) | 2 | 66.70% | 0 | 0.00% | 1 | 16.70% | 0 | 0.00% | 0 | 0.00% |
| Watery discharge (CSF leak) | 1 (3.6%) | 0 | 0.00% | 1 | 10.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| Dental anesthesia | 5 (17.9%) | 0 | 0.00% | 4 | 40.00% | 1 | 16.70% | 0 | 0.00% | 0 | 0.00% |
| Septal hematoma | 0 (0.0%) | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |

The second more sever one is type IV which had bleeding and septal perforation that occurred as highest incidence among all types followed by external nasal deformity then infection and abscess as second highest incidence. Based on the previous discussion, Type II is the most sever type according to clinical presentation and post-operative complications followed by type IV. In other studies, they found Type III and type V are the types of septal deviations associated with more severity and complications of deviated nasal septum and more presented in patients with Sino nasal disease. [20,24] Our study shows how sever each type clinically and post-operatively and to make awareness Intraoperatively for more selective and prophylactic septoplasty. The etiology behind the variety of post-operative complications

may result from pathology itself, patients' factor, type of surgery, surgeon experience, availability of good instrumentations or postoperative care, however it opens a gate for more studying to give further understanding.

Conclusion

In conclusion, more than one third of the cases had type II deviation followed by type III and type IV equally. Type II & IV are the most sever types respectively according to clinical presentation and post-operative complications. However, studies with larger samples are required to support the finding in our study.

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DOI: [10.19080/GJO.2020.23.556104](https://doi.org/10.19080/GJO.2020.23.556104)

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