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**Original Research Article**

# The impact of pre-operative computed tomography scan in patients underwent septoplasty on the postoperative complications

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## ABSTRACT

**Background:** Deviated nasal septum (DNS) is one of the most frequent causes of nasal obstruction in adults. An anterior rhinoscopy (AR), which is usually the first diagnostic procedure in the evaluation of obstructive nasal pathologies, is often inadequate in the assessment of the posterior nasal cavity and the gold standard method for the evaluation of paranasal anatomy and inflammatory paranasal sinus pathologies is paranasal sinus computed tomography (PNS CT). Aim was to validate the recommendation of pre-operative computed tomography scan in minimizing post-septoplasty complications.
**Methods:** A retrospective record based study was conducted including all patients with clinically diagnosed DNS and undergone surgical intervention at Khamis Mushayet General Hospital. Data extracted included patients demographic data, and post-operative recorded complications and history of preoperative CT scan for evaluating and grading DNS.
**Results:** A total sample of 60 patients' undergone septoplasty for DNS. Patients who undergone preoperative CT were 30. The remaining 30 patients didn't undergone pre-operative CT for evaluation of DNS. The most diagnosed complication was nasal obstruction (28.3%) followed by external nose deformity (20%). Exact of 47% of patients had postoperative nasal obstruction didn't undergone pre-operative CT. About 42% of those who had postoperative nasal deformity didn't undergone CT while 33% of patient who had post-operative bleeding and septal perforation didn't undergone CT.
**Conclusions:** In conclusion, the study revealed that preoperative CT showed insignificant efficacy in relieving nasal obstruction or minimizing postoperative complications.

**Keywords:** Computed tomography, Septoplasty, Surgical intervention, Deviated septum, Complications

## INTRODUCTION

Over 200,000 otolaryngic intervention performed every year in the United States, septoplasty is one of the most common.[1] 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.[3] Direct visualization of septal deviation on physical examination, with anterior rhinoscopy and endoscopy are the main used assessment methods.[4] To avoid postoperative dissatisfaction, surgeons used a variety of methods, but sometimes, regardless of the surgical technique, nasal obstruction can persist.[5] More severe cases which show sinonasal symptoms indicating more extensive sinonasal disease usually need further

evaluation with a dedicated sinus computed tomography (CT) scan.[6] CT has a role in determining the site and type of the surgery.[7] CT usually preferred to evaluate the nasal septum.[8] Otolaryngologists mostly use CT in selecting surgical candidates, especially as it is usually needed in the context of chronic rhinosinusitis, was an objective evidence to approve septal surgery.[9] Also, pre-operative CT can be applied for proper assessment of the nasal anatomy and detection of ancillary sinonasal pathologies.[10] However, this modality has additional costs, besides those patients are exposed to harmful radiation, and may provide a different assessment of septal deviation than a dynamic three-dimensional physical examination. It is therefore necessary to examine guidelines for its appropriate use before septoplasty.[11,12] The current study aimed to validate the recommendation of pre-operative computed tomography scan in minimizing post-septoplasty complications.

## METHODS

After getting approval from IRB, a retrospective record based study was conducted including all patients with clinically diagnosed nasal septum deviation and undergone surgical intervention at Khamis Mushayet General Hospital during the period from January 2017 to end of May 2019. 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 patients demographic data and post-operative complications for the surgery such as nasal obstruction, nasal deformity, loss of smell sensation, and all others. History of undergoing preoperative CT scan for each case was included within the data either directly in the file or by phone calling is missing in their records.

### *Sampling technique*

The two groups were compered regarding post-operative complications and all statistical tests were performed with statistical package for the social sciences (SPSS) software.

### *Inclusion criteria*

All patients with deviated nasal septum of both gender.

### *Exclusion criteria*

Files with incomplete data were excluded if personal contact with the patient failed.

### *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 considered to be statistically significant. Frequency and percent were used to describe the frequency distribution of the different collected variables including patient's demographic data and post-operative complications. Cross tabluation was used to show the post-operative complications distribution in relation patients' history of undergoing CT scan using exact probability tests.

## RESULTS

A total sample of 60 patients' undergone septoplasty for DNS. Patients who undergone preoperative CT were 30 and type I deviation was diagnosed among 5% of the patients, type II among 16.7%, type III (13.3%), type IV (10%), and type VII (5%). The remaining 30 patients didn't undergone pre-operative CT for evaluation of DNS. Half of the patients were males and 70% aged below 30 years. About 53% of those who didn't undergone CT before surgery were males while 66.7% to type I DNS were males and 33.3% of type VII. Also, 70% of those who didn't undergone CT aged below the age of 30 years compared to 66.7% of type I DNS and all type VII subgroup (Table 1).

Figure 1 shows the distribution history of undergoing pre-operative CT according to different recorded post-operative complications. The most diagnosed complication was nasal obstruction (28.3%) followed by external nose deformity (20%), dental anaesthesia (13.3%), and smell disturbance (11.7%). Exact of 47% of patients had postoperative nasal obstruction didn't undergone pre-operative CT. Also, 42% of those who had postoperative nasal deformity didn't undergone CT while 33% of patient who had post-operative bleeding and septal perforation didn't undergone CT. All cases with septal hematoma were not exposed to undergo pre-operative CT.

**Table 1: Distribution of patients' pre-operative CT classification of DNS according to their age and gender.**

| Personal data | CT classification | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No CT | | Type I | | Type II | | Type III | | Type IV | | Type VII | |
| | N | % | N | % | N | % | N | % | N | % | N | % |
| **Gender** | | | | | | | | | | | | |
| Male | 16 | 53.3 | 2 | 66.7 | 4 | 40.0 | 4 | 50.0 | 3 | 50.0 | 1 | 33.3 |
| Female | 14 | 46.7 | 1 | 33.3 | 6 | 60.0 | 4 | 50.0 | 3 | 50.0 | 2 | 66.7 |
| **Age (in years)** | | | | | | | | | | | | |
| <30 | 21 | 70.0 | 2 | 66.7 | 7 | 70.0 | 6 | 75.0 | 3 | 50.0 | 3 | 100.0 |
| >30 | 9 | 30.0 | 1 | 33.3 | 3 | 30.0 | 2 | 25.0 | 3 | 50.0 | 0 | 0.0 |

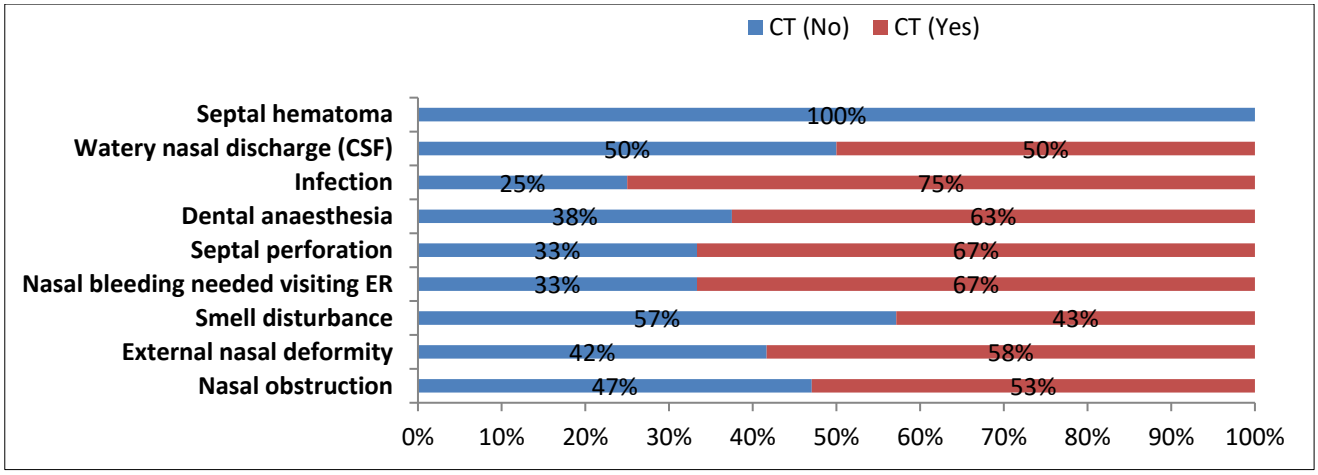


**Figure 1: Distribution of pos-septoplasty complications according to undergoing pre-operative CT among patients.**

The most recorded postoperative complication among patients who didn't undergone pre-operative CT was nasal obstruction (26.7%) compared to 66.7% of those who had type I DNS and 33.3% of those who had type VII with no statistical significance (p=0.291). Also, 16.7% of patients who didn't undergone preoperative CT had postoperative nasal deformity compared to 66.7% of type I DNS and 33.3% of type VII (p=0.049). Smell disturbance was recorded among 13.3% of patients who didn't undergone preoperative CT compared to 66.7% of type I DNS and none of type VII (p=0.141) (Table 2).

**Table 2: Distribution of post-septoplasty complications according to CT classification among cases.**

| Post-operative complications | CT classification | | | | | | | | | | | | P value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No CT | | Type I | | Type II | | Type III | | Type IV | | Type VII | | |
| | N | % | N | % | N | % | N | % | N | % | N | % | |
| **Nasal obstruction** | 8 | 26.7 | 2 | 66.7 | 4 | 40.0 | 0 | 0.0 | 2 | 33.3 | 1 | 33.3 | 0.291 |
| **Nasal bleeding needed visiting ER** | 1 | 3.3 | 0 | 0.0 | 1 | 10.0 | 0 | 0.0 | 1 | 16.7 | 0 | 0.0 | 0.676 |
| **Septal perforation** | 1 | 3.3 | 0 | 0.0 | 1 | 10.0 | 0 | 0.0 | 1 | 16.7 | 0 | 0.0 | 0.676 |
| **External nasal deformity** | 5 | 16.7 | 2 | 66.7 | 0 | 0.0 | 1 | 12.5 | 3 | 50.0 | 1 | 33.3 | 0.049* |
| **Infection** | 1 | 3.3 | 0 | 0.0 | 2 | 20.0 | 0 | 0.0 | 1 | 16.7 | 0 | 0.0 | 0.374 |
| **Smell disturbance** | 4 | 13.3 | 2 | 66.7 | 0 | 0.0 | 1 | 12.5 | 0 | 0.0 | 0 | 0.0 | 0.044* |
| **Watery nasal discharge (CSF)** | 1 | 3.3 | 0 | 0.0 | 1 | 10.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0.840 |
| **Dental anaesthesia** | 3 | 10.0 | 0 | 0.0 | 4 | 40.0 | 1 | 12.5 | 0 | 0.0 | 0 | 0.0 | 0.141 |
| **Septal hematoma** | 1 | 3.3 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0.961 |

p: exact probability test, * p<0.05 (significant)

## DISCUSSION

CT scan is the most modality used for the assessment of the nasal and paranasal disorders.[13] It is very helpful to evaluate the anatomy of the deviated part either cartilaginous, bony part or both.[12,14] Many cases are complained of significant nasal septal deviation that may need to be evaluated preoperatively to help the surgeon and to classify the deviation to approach the deviated part easily and to avoid undesirable tear and destruction.[15] No definitive guideline to recommend preoperative computed tomography and still depends on surgeon prefer. In this study, we would like to analyze and study the impact and the role of CT preoperatively for mapping the surgery approach to minimizing the postoperative complications.

A series of 60 patients underwent septoplasty, group A with preoperative computed tomography while group B without computed tomography. The comparison was done between two groups regarding the postoperative complications to distinguish the significance of preoperative CT.

The study revealed that the most recorded postoperative complications in the two groups were nasal obstruction, external nose deformity, and smell disturbance. These complications were insignificantly more recorded among the group of patients who undergone preoperative CT except for smell disturbance. Post-operative infection was significantly tripled among patients who undergone preoperative CT (3:1) while septal perforation and

postoperative bleeding were doubled (2:1). Septal hematoma was recorded only among those who didn't undergone CT.

Regarding distribution of postoperative complication by the grading of DNS and those who did not exposed to preoperative CT, The most recorded for both was nasal obstruction but it was recorded among 26% of those who did not undergone CT compared to two thirds of those with type I DNS and one third of those who diagnosed with type VII DNS. Smell disturbance was recorded among 13% of patients with no CT compared to two thirds of those with type I DNS. Type I DNS were the most case who experienced postoperative complication even more than type VII and more than patients who had no preoperative CT.

***Limitations***

The limitation of the study was that it was based on one center.

## CONCLUSION

In conclusion, the study revealed that preoperative CT showed insignificant efficacy in relieving nasal obstruction or minimizing postoperative complications. Patients who were exposed to preoperative CT scan showed more postoperative complications. Patients who were exposed to radiation, costs time and money with no cost benefit recorded.

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