ORIGINAL ARTICLE

Determine the Diagnostic Accuracy of CT Scan for Diagnosing Nasal Septal Perforation Taking Histopathology as a Gold Standard

ABDUL LATIF KAKAR[1], RIZWANA REHMAN BAZAI[2], ASMATULLAH ACHAKZAI[3], *MUHAMMAD ARIF ACHAKZAI[4], JAHAN ZAIB KAKAR[5]*
[1]Assocaite Professor, ENT, Head & Neck Surgery
[2]Assitant Professor, Department of Diagnostic Radiology,
[3,4]Assistant Professors, ENT, Head & Neck Surgery
[5]Assitant Professor of Neurosurgery, Civil Hospital Quetta
Correspondence to Dr. Abdul Latif Kakar Email:kakar617@gmail.com Cell 0333-7859657

ABSTRACT

Aim: To examine the accuracy of CT-scan in diagnosing nasal septal perforation
Study Design: Prospective/Observational
Place & Duration of Study: Departments of Diagnostic Radiology and ENT, Head & Neck Surgery, Civil Hospital Quetta from 1st January 2019 to 30th June 2019.
Methods: One hundred and five patients of both genders clinically diagnosed to have nasal septal perforation were included. Patient's detailed demographic including age and sexes were recorded after written consent. All patients were underwent CT Scan for diagnosing nasal septal perforation. Biopsy of the lesion was performed.
Results: There were 67 patients were males while 38 patients were females with mean age 33.6±9.15 years. Eighty eight (83.81%) patients were diagnosed to have nasal septal perforation by CT scan and 86 (81.90%) patients had nasal septal perforation by histopathology. In patients with nasal septal perforation, we observed sensitivity, specificity, PPV and NPV with respect to CT was 92.32%, 82.35%, 96.51% and 73.68% respectively. Accuracy rate of CT-scan was 97.73%.
Conclusion: CT scan plays an important role in diagnosing nasal septal perforation after histopathological examination. The accuracy rate of CT scan was 97.73%.
Keywords: Nasal septal perforation, CT scan, Histopathology

INTRODUCTION

The nasal septum consists of the cartilage, the bone septum and the mucosal layer covering it. The bone septum consists of the vomer, the lamina perpendicular of the ethmoid bone and the maxillary crest. As a result of necrosis of the septum due to damage to these layers, there is a gap between the two nasal cavities. Therefore, the nasal airflow is disturbed and leads to deterioration in the quality of life of the patient[1].

Although the incidence of septal perforation is reported to be around 1%, it is actually much more. Septal perforations may occur due to iatrogenic, trauma, drug use (steroids, cocaine, etc.) and cauterization. The most common cause of septum surgery is secondary to infection[2].

The diagnosis of nasal septal perforation is generally ascertained after assimilating information gathered from a variety of sources including the patient's history, physical examination of the nose and anterior rhinoscopy, nasal endoscopy, and imaging.[3] Clinical inquiry from patients usually lacks sensitivity and specificity, especially as an isolated diagnostic tool in detecting nasal septal perforation, possibly due to the presence of numerous co-existing and confounding pathologies. Anterior rhinoscopy and nasal endoscopy performed in the decongested state can diagnose the location and severity of nasal septal deviations, but it is an uncomfortable test that is subject to significant inter-rater variability[4-7].

Received on 24-07-2019
Accepted on 17-11-2019

Imaging studies such as CT scans and MRIs can provide accurate three-dimensional diagnosis of nasal septal perforation but are typically utilized in the clinical arena to assess paranasal pathology (i.e. sinusitis) rather than isolated nasal septal perforation.[8,9] Many of previous studies reported that the use of CT-scan plays an important role in diagnosing nasal septal perforation with accuracy rate 88 to 98%[10].

The present study was conducted aimed to examine the accuracy of CT scan for diagnosing nasal septal perforation and taking histopathology as a gold standard.

MATERIALS AND METHODS

This study was conducted at Departments of Diagnostic Radiology and ENT, Head & Neck Surgery, Civil Hospital Quetta from 1st January 2019 to 30th June 2019. A total 105 patients of both genders with ages 15 to 50 years, clinically diagnosed to have nasal septal perforation were included. Patient's detailed demographic including age and sex were recorded after taking informed written consent. Etiology of nasal septal perforation was recorded. Patients who were not interested to give consent were excluded from study. All of the patients were examined by three dimensional computed tomography scan for diagnosing nasal septal perforation. Lesion was obtained from all the patients to perform biopsy for histopathology examination. Accuracy of the CT-scan with respect to histopathology examination was recorded. Sensitivity, specificity, PPV and NPV values were obtained to examine the accuracy. Data was analyzed by SPSS 24.

RESULTS

There were 67 patients were males while 38 patients were females. 20 (19.05%) patients were ages <20 years, 32 (30.48%) patients were ages 20 to 30 years, 30 (28.57%) patients had ages 31 to 40 years and 18 (17.14%) patients were ages 41 to 50 years (Table 1). The most common etiology of nasal septal perforation was trauma found in 40 (38.10%) patients followed by infection, drug abuse, septoplasty and others in 34 (32.38%), 18 (17.14%), 8 (7.62%) and 5 (4.76%) patients respectively (Table 2). Eighty eight (83.81%) patients were diagnosed to have nasal septal perforation by CT scan and 86 (81.90%) patients had nasal septal perforation by histopathology. In patients with nasal septal perforation, we observed sensitivity, specificity, PPV and NPV with respect to CT was 92.32%, 82.35%, 96.51% and 73.68% respectively. Accuracy rate of CT-scan was 97.73% (Table 3)

Table 1: Demographic information of the patients

Variable	No.	%age
Gender		
Males	67	63.81
Females	38	36.19
Age (years)		
<20	20	19.05
20 -30	32	30.48
31 – 40	30	28.57
41 – 50	18	17.14

Table 2: Causes of nasal septal perforation

Causes	No.	%age
Trauma	40	38.1
Infection	34	32.38
Drug Abuse	18	17.14
Septoplasty	8	7.62
Other	5	4.76

Table 3: Diagnosis of Nasal septal perforation by Histopathology and CT scan

Histopathology	CT scan		Total
	+ ve	- ve	
Positive	83	3	86
Negative	5	14	19
Total	88	17	105

Sensitivity = 83/(83+5) x 100 = 92.32%
Specificity = 14/(14+3) x 100 = 82.35%
PPV = 83/(83+3) x 100 = 96.51%
NPV = 14/(14+5) x 100 = 73.68%

DISCUSSION

Nasal septal perforation is one of the malignant disorder found all over the world. Many of previous studies demonstrated that early and accurate diagnosis is an essential elements for the management of nasal septal perforation.[11,12] Present study was conducted to determine the accuracy of CT scan for diagnosing nasal septal perforation and taking histopathology as a gold standard. Several studies reported that the lesion examination concluded more accurate results as compared to other diagnostic tools[14,15].

In present study 105 patients clinically diagnosed to have nasal septal perforation were included. Majority of patients 63.81% patients were males as compared to females 36.19%. We found the age groups 21 to 40 years were the most common groups as mostly patients 61.05% were ages between these groups. These results showed similarity to multiple previous studies in which male patients population was high 60 to 75% as compared to females[16,17] A study conducted by Nitin et al[18] reported maximum patients were of age group 21-30 years (30.32%) with mean age of 35.48±16.15 years.

In this study, we found trauma was the most common cause of septal perforation 38.1%. 32.38% patients were infectious and 17.14% patients were drug abused. We found 7.62% patients had nasal septal perforation caused by septoplasty. These results were comparable to some other studies[19,20].

In our study 83.81% patients had positive results by CT-scan while 17 patients showed negative results and 81.90% patients had positive results regarding nasal septal perforation by histopathology examination. We observed sensitivity, specificity, PPV and NPV with respect to CT was 92.32%, 82.35%, 96.51% and 73.68% respectively. Accuracy rate of CT-scan was 97.73%. These results showed similarity to some other studies in which the accuracy rate of CT-scan varies 92 to 98% with high sensitivity and specificity[21,22].

CONCLUSION

Nasal septal perforation is a common clinical entity encountered in general otolaryngology. Early and accurate diagnoses are the main tools for providing better management. We concluded from this study that CT scan plays an important role in diagnosing nasal septal perforation after histopathological examination. The accuracy rate of CT scan was 97.73%.

REFERENCES

1. Pereira C, Santamaría A, Langdon C, López-Chacón M, Hernández-Rodríguez J, Alobid I. Nasoseptal Perforation: from Etiology to Treatment. Curr Allergy Asthma Rep 2018;18(1):5.
2. Lanier B, Kai G, Marple B, Wall GM. Pathophysiology and progression of nasal septal perforation. Ann Allergy Asthma Immunol 2007;99(6):473-80.
3. Quinn JG, Bonaparte JP, Kilty SJ. Postoperative management in the prevention of complications after septoplasty: a systematic review. Laryngoscope. 2013;123(6):1328-33.
4. Naghibi S, Zojaji R, Hesari MK, Hashemi AH. Sinus CT scan and functional endoscopic sinus surgery findings in chronic sinusitis: a comparative study. Iranian J Radiol 2008; 5(S1): 13-8.
5. Bhattacharyya N, Lee LN. Evaluating the diagnosis of Chronic rhinosinusitis based on clinical guidelines and endoscopy 2010. Otolaryngol Head Neck Surg 2010; 143(1): 147-51.
6. Whiting P, Rutjes AWS, Westwood ME, Mallett S, Deeks JJ, Reitsma JB, Leeflang MM, Sterne JA, Bossuyt PM: QUADAS-2 Group. QUADAS-2: a revised tool for the quality assessment of diagnostic accuracy studies. Ann Inter Med 2011, 155 (8): 529-36.
7. Cho GS, Kim JH, Jang YJ: Correlation of nasal obstruction with nasal cross- sectional area measured by computed tomography in patients with nasal septal deviation. Ann Otol Rhinol Laryngol 2012; 121(4): 239-45.
8. Mamikoglu B, Houser S, Akbar I, Ng B, Corey JP: Acoustic rhinometry and computed tomography scans for the diagnosis

of nasal septal deviation, with clinical correlation. Otolaryngol Head Neck Surg 2000, 123(1): 61-8.
9. Tahamiler R, Alimoglu Y, Canakcioglu S: Comparison of odiosoft-rhino and rhinomanometry in evaluation of nasal patency. Rhinology 2011, 49 (1): 41-5.
10. Tastan E, Aydogan F, Aydin E, et al. Inferior turbinate composite graft for repair of nasal septal perforation. Am J Rhinol Allergy 2012;26:237-42.
11. Sedaghat AR, Busaba NY, Cunningham MJ, Kieff D: Clinical assessment is an accurate predictor of which patients will need septoplasty. Laryngoscope 2013, 123: 48-52.
12. Moore M, Eccles R: Objective evidence for the efficacy of surgical management of the deviated septum as a treatment for chronic nasal obstruction: a systematic review. Clin Otolaryngol 2011, 36: 106-13.
13. Lumsden A, Shakeel M, Ah-See KL, Supriya M, Ah-See KW, Ram B. Management of nasal septal perforation: Grampian experience. Austin J Otolaryngol 2015; 2(4): 1041.
14. Sapmaz E, Toplu Y, Somuk BT. A new classification for septal perforation and effects of treatment methods on quality of life. Braz J Otorhinolaryngol 2018.
15. Ozdemir S, Celik H, Cengiz C, Zeybek ND, Bahador E, Aslan N. Histopathological effects of septoplasty techniques on nasal septum mucosa: an experimental study. Eur Arch Otorhinolaryngol 2019;276(2):421-7.
16. Kridel RWH, Delaney SW. Acellular human dermal allograft as a graft for nasal septal perforation reconstruction. Plast Reconstr Surg 2018;141(6):1525-7.
17. Coordes A, Loose SM, Hofmann VM, Hamilton GS, Riedel F, Menger DJ, Albers AE. Saddle nose deformity and septal perforation in granulomatosis with polyangiitis. Clin Otolaryngol 2018;43(1):291-9.
18. Nitin V. Deosthale, Bhanupratap Singh, Sonali P. Khadakkar, Vivek V. Harkare, Priti R. Dhoke, Kanchan S. Dhote, Parulsobti, Suraj Giri. Effectiveness of nasal endoscopy and C.T. scan of Nose and Paranasal Sinuses in Diagnosing Sino-Nasal Conditions". Journal of Evolution of Medical and Dental Sciences 2014; 3(14): 3695-3703.
19. Xu M, He Y, Bai X. Effect of temporal fascia and pedicle inferior turbinate mucosal flap on repair of large nasal septal perforation via endoscopic surgery. ORL J. Otorhinolaryngol. Relat Spec 2016; 78(6): 303-7.
20. Hardison SA, Marcum KK, Lintzenich CR. Severe necrosis of the palate and nasal septum resulting from intranasal abuse of acetaminophen. Ear Nose Throat J 2015;94:E40–42.
21. Apuhan T, Yildirim YS, Ozaslan H. The developmental relation between adenoid tissue and paranasal sinus volumes in 3-dimensional computed tomography assessment. Otolaryngol Head Neck Surg 2011;144(6):964–71.
22. Likness MM, Pallanch JF, Sherris DA, Kita H, Mashtare TL Jr. Ponikau JU. Computed tomography scans as an objective measure of disease severity in chronic rhinosinusitis. Otolaryngol Head Neck Surg 2014; 150(2):305–11.