

Original research article

A clinical study of ENT manifestations in diabetes mellitus patients

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Abstract

Background: Diabetes is one of the most challenging health problems in this century. Various ENT manifestations are known to occur in diabetes. In this study, we have enlisted different ENT manifestations seen among people suffering from diabetes.

Aim: Aim of this study is evaluation of different ENT manifestations seen among people suffering from diabetes.

Materials and methods: This is a prospective study which was conducted in department of otorhinolaryngology, in a tertiary care hospital, India, over a period of one year. 300 patients with pre-existing or newly diagnosed diabetes mellitus as per the National Diabetes Data Group and World Health Organization issued diagnostic criteria with or without ENT symptoms were examined and findings were documented.

Results: Among the 300 patients, 228 had ENT manifestations (76%) ranging from inflammatory to non-inflammatory associations. SNHL was the most common non-inflammatory condition. Among the inflammatory conditions, furuncle was the commonest association.

Conclusion: Awareness regarding such associations will help in early interventions resulting in less complications and better quality of life.

Keywords: Diabetes mellitus, ENT manifestations, SNHL

Introduction

Diabetes Mellitus (DM) is a potential epidemic in India with more than 62 million diagnosed cases ^[1]. India (31.7 million) topped the world with the highest number of people with diabetes mellitus followed by China (20.8 million) in 2000 ^[2]. In 2016, an estimated 1.6 million deaths were directly caused by diabetes. At present, approximately 463 million adults (20-79 years) were living with diabetes; by 2045 this number is predicted to rise to 700 million ^[3].

Diabetes is beginning to appear much earlier in life in India, meaning that chronic long-term complications are becoming more common. Various ENT manifestations are known to occur in diabetes. These are secondary to micro and macro-vascular disease, neuropathies as well as immunodeficiency secondary to impaired leukocyte/ phagocyte function ^[4].

General considerations for otolaryngologists as surgeons revolve around the immunodeficiency and the decreased ability of diabetics to heal their surgical wounds and their increased susceptibility to infection. Although several studies have shown specific ENT manifestations in people suffering from diabetes, there are not many studies which enlist all the ENT manifestations in a single study.

In our study, we have enlisted different ENT manifestations seen among people suffering from diabetes coming to our tertiary care hospital with emphasis on the incidence, clinical presentation and management wherever possible.

Material and Methods

About 300 patients with pre-existing or newly diagnosed diabetes mellitus as per The National Diabetes Data Group and World Health Organization issued diagnostic criteria, from the OP/IP section of the tertiary care centre with or without ENT symptoms over a period of one year were examined. Both symptomatic as well as asymptomatic patients were included. Patients with other pre-existing immunocompromised conditions like HIV, malignancy and other congenital or acquired immunosuppressive syndromes, renal failure patients, patients on corticosteroids or other immunosuppressive therapy, Patients with hearing loss directly attributed to any other cause like

ototoxicity, prolonged exposure to noise, head or ear trauma were excluded from the study. Patients were explained about the study and consent was taken. Detailed history of the patients was taken regarding various ENT complaints. History of treatment, if any, was also noted. All the patients were subjected to general physical and ENT clinical examination. Patients with abnormal tuning fork tests were subjected to pure tone audiometry (Interacoustics AC 40). Any other necessary investigations such as laboratory tests like culture sensitivity, blood sugar levels, FNAC and radiological investigations like CT scan, X-ray, MRI and diagnostic procedures like video laryngoscopy and nasal endoscopy were done in addition when needed to arrive at a specific diagnosis. The various ENT manifestations observed in these patients were documented. Simultaneously, the clinical features of such manifestations were observed and the management was planned wherever indicated.

Statistical analysis: All statistical analyses were performed using version 22 software. A value of $p < 0.05$ was considered statistically significant.

Result

Out of the 300 patients, 170 were males and 130 were females. M: F ratio was 1.3: 1 Out of the 300 patients; we had patients ranging from 25 years to above 80 years the distribution of age is shown below. (Table no. 1)

Table 1: Age distribution

Age group	No. of patients	Percentage (%)
25-39	67	23%
40-49	100	33%
50-59	66	22%
60-69	39	13%
70-79	15	5%
>80	13	4%
Total	300	100%

ENT manifestations

Among the 300 patients, 228 had ENT manifestations (76%). 72 patients (24%) were clinically normal. Among the various manifestations, SNHL was the most common, seen in 84 cases out of the 300 diabetic patients (28%). 30 had acute otitis externa (10%). 12 had nasal vestibulitis (4%), 9 had fungal sinusitis (3%), 2 cases of deep neck space infections were seen (0.7%). 1 case of pinna perichondritis was also seen (0.3%).

Other manifestations like CSOM was seen in 24 cases (8%), 30 patients had deviation of nasal septum (10%), 20 patients had acute pharyngitis/laryngitis, seven patients had benign vocal cord lesions (2.3%), 5 patients had chronic dacryocystitis and 1 case each of parotid Warthin's tumour and infected preauricular sinus was seen (0.3%). However, in these patients, there was no evidence to show that the associated conditions were due to diabetes per se. (Table no. 2)

Table 2: ENT Manifestations

ENT manifestation	No. of cases	Percentage (%)
Deafness	84	28%
CSOM	24	8%
Acute otitis externa	30	10%
Malignant otitis externa	3	1%
Pinna perichondritis	1	0.3%
Deviated nasal septum	30	10%
Nasal vestibulitis	12	4%
Chronic Dacryocystitis	5	1.7%
Fungal sinusitis	9	3%
Acute laryngitis/pharyngitis	20	6.7%
Vocal cord lesions	7	2.3%
Deep neck space infection	2	0.7%
Others	1	0.3%
Clinically normal	72	24%
TOTAL	300	100%

Ear

Out of the 300 patients examined, we found deafness in 84 patients (28%). 38 of the 84 patients (45%) came with complaints of hearing loss whereas the remaining 46 of the 84 patients (54%) were detected to have hearing loss clinically and then subjected to PTA. (Table no. 3)

Table 3: SNHL Distribution

Hearing loss	No. of cases	Percentage (%)
Bilateral	62	74%
Right	14	17%
Left	8	9%
Total	84	100%

A total of 24 cases (8%) had CSOM. All had complaints of ear discharge. 14 patients had pathology in the right ear (58%), 6 had in the left ear (25%) and 4 had bilateral CSOM (17%). On audiometric evaluation all had some degree of conductive hearing loss, 8 (33%) had mixed hearing loss and 4(17%) patients had SNHL in the opposite ear. Patients with diabetes were seen to be more frequently prone to middle ear infections. Postsurgical wound healing was also delayed in these patients.

A total of 30 patients had acute otitis externa. 19 of them had fungal debris in their ears (63%). Their most common complaint was ear itching and ear blockade. 6 had furuncle in their EAC and 5 had congested EAC 3 cases of malignant otitis externa were found. All 3 cases came with complaints of ear pain and facial weakness. 2 patients had involvement of left ear, 1 had right ear involvement. All 3 patients had perforation of tympanic membrane. One case of pinna perichondritis was seen.

Nose

12 patients had nasal vestibulitis (4%). All had complaints of pain in the tip of the nose, mean duration was 2 days. On examination furuncle was present in the columellar region. 7 had right sided nasal vestibulitis (58%) and five had left sided involvement (42%).

9 patients had fungal sinusitis (4 males and 5 females). All had complaints of headache and nasal obstruction. One of the cases had necrosis and erosion of the hard palate and nasal septum. One patient had severe bone erosion involving maxilla, ethmoid and skull base along with blindness. Both were cases of invasive fungal sinusitis. 2 cases had fungal ball, and in 1 case of granulomatous fungal sinusitis was seen. Maxillary sinus was the most commonly involved sinus.

On examination, 30 patients had deviation of nasal septum (10%). Only 8 among them had complaints of nasal obstruction (26%). 16 had DNS to left, 9 had DNS to right and 5 had isolated nasal spur.

5 patients had chronic dacryocystitis. All had complaints of increased watering of eye, occasionally Mucopurulent. 2 had already undergone external DCR earlier. Left side was involved in 3 cases and 2 on the right side.

Throat

20 patients had acute laryngitis/pharyngitis (6.7%).7 had complaints of only throat pain, 5 had complaints of throat pain along with change in voice whereas 8 patients had no complaints.

7 patients were found to have benign vocal cord lesions (2.3%). All the patients presented with hoarseness of voice. 3 patients had vocal nodule (42%), 2 had vocal polyp (29%) and 2 had vocal cord cyst (29%).

Discussion

Diabetes mellitus (DM) is the most common chronic disorders of modern time and remains unique because of its multisystem ramifications. Chronic manifestations of DM are secondary to micro and macrovascular disease, neuropathies (including peripheral, autonomic radiculopathy and mononeuropathy) as well as immunodeficiency secondary to impaired leukocyte/ phagocyte function [5].

General considerations for otolaryngologists as surgeons revolve around the immuno deficiency and the decreased ability of diabetics to heal their surgical wounds and their increased susceptibility to infection. SNHL is commonly seen in diabetics, and this is due to neuropathy and microangiopathy. There are a number of physiologically plausible theories about the underlying mechanism responsible for hearing loss occurring with diabetes [6]. Retrospective studies also show that as many as 50 percent of patients with diabetes have some manifestations of auditory dysfunction, and analysis of diabetic temporal bones has been found to contain PAS positive lesions of the capillaries in the stria vascularis [7].

Diabetics are particularly prone to certain infections. Malignant otitis externa, commonly due to Pseudomonas aeruginosa, typically presents in the older diabetic with severe otalgia, otorrhea, fever and leukocytosis. Granulation tissue at the bony-cartilaginous junction is a classical sign, and cranial nerve findings including facial nerve paralysis, as well as involvement of V, X, XI, XII are all poor prognostic indicators.

Another infection specific to diabetics and other immunocompromised hosts is invasive fungal sinusitis (rhinocerebral mucormycosis). Presentation with fever, facial swelling, black eschar in the nasal cavity, gradually progressing orbital swelling, eye pain and diminished vision is very typical. The oral cavity always should be examined for invasion through the hard palate from the sinuses. Changes seen on sinus CT or plain radiographs are usually nonspecific and usually indistinguishable from bacterial sinusitis, although they may show bony erosion or soft-tissue invasion. Biopsy and culture are critical for the

diagnosis. Management requires appropriate antifungal therapy and aggressive surgical debridement [8]. In our study of 300 patients, 228 patients had some kind of ENT manifestation, which was 76 % of the total. Thus, only 24% of the patients were clinically normal. This showed that majority of the diabetics had ENT related pathologies. This is supported by Gazzaz ZJ *et al.*, in whose study 100 cases of diabetes were examined. 92 among them had ENT manifestations. Commonest manifestation was rhinitis (19%) followed by sensorineural hearing loss (12%). CSOM was seen in 11% patients and otomycosis in 9% of the cases. 7% had pharyngitis and 4% had sinusitis [9].

In the study by Khanna S *et al.*, among 62 patients, 53 had ENT manifestations. The most common presentation was found to be furunculosis in 30 patients (48.3%) followed by vestibulitis with nasal cellulitis in 12 patients (19.3%). 9 patients (14.5%) of Neck abscess were noted, 7 patients (11.2%) of Chronic suppurative otitis media were seen. 3 patients (4.8%) of Malignant otitis externa were noted and 1 patient (1.6%) with ulcer over the dorsum of the nose was seen [10].

Bainbridge *et al.*, in their study concluded that Age-adjusted prevalence of low-or mid-frequency hearing impairment of mild or greater severity in the worse ear was 21.3% (Cumulative Index (CI), 15.0% to 27.5%) among 399 adults with diabetes compared with 9.4% (CI, 8.2% to 10.5%) among 4741 adults without diabetes [11]. Kurien *et al.*, in their study compared Hearing threshold of 30 diabetic patients and 30 healthy controls. Statistical analysis showed that the diabetics are more deaf than the non-diabetic population, (p value <0.05) [12]. This was also shown by Taylor and Irwin *et al.*, [13].

J.R. Cullen and M.J. Cinnamon studied Forty-four diabetics, who were compared with 38 controls. Analysis of variance showed the diabetics to be significantly deafer than the control population [14].

A total of 30 patients in our study had acute otitis externa (10%).19 of them had fungal debris in their ears (63%). H.S. Satish, Viswanatha B, Manjuladevi. M did a prospective study on 200 patients who were clinically diagnosed with otomycosis. Among them 32 were diabetic patients. Most common complaint was of ear itching, blockade and also pain [15].

3 cases of malignant otitis externa were found in our study. All three came with complaints of ear pain and facial weakness.2 had involvement of Left ear, one had involvement of Right ear. Robert Doro Ghazi *et al.*, In their study have reported 21 cases of invasive external otitis and have reviewed 31 cases from the literature. 19 of these 21 patients were diabetics. 6 out of 9 had facial nerve deficits [16].

In our study 12 patients had nasal vestibulitis (4%). Maryanne Luzar *et al.*, studied about staphylococcus aureus nasal carriage and infection in patients on continuous ambulatory peritoneal dialysis. They have found that nasal carriage of staphylococcus aureus was more frequent among patients with diabetes (77%) than among those without diabetes (36%) [17].

9 patients in our study had fungal sinusitis (3%). Parikh *et al.*, in their study reviewed 43 patients of invasive fungal sinusitis, among which 10 patients were diabetic. 4 out of 10 (40%) diabetic patients died of Invasive Fungal Sinusitis and 66% of survivors had persistent neurological or visual morbidity [18].

2 patients in our study had neck space infection (0.7%).1 patient was diagnosed to have Right retropharyngeal abscess (50%). The other patient was diagnosed to have Right supraclavicular abscess. Sethi SC and Stanley RE *et al.*, have discussed deep neck space infections in 55 patients, among whom 23 had retropharyngeal abscess. In these 4 were diabetics [19].

Most common manifestation in the throat was acute pharyngitis/laryngitis, which accounted to 20 cases (6.7%).7 patients had benign vocal cord lesions on examination (2.3%). All patients presented with hoarseness of voice. 3 patients had vocal nodule (42%), 2 had vocal polyp (29%) and 2 had vocal cord cyst (29%). Among the incidental findings, 30 patients had deviated nasal septum. (10%) but only 8 among them had complaints of nasal obstruction (26%). These could not be attributed to diabetes, but they are part of associated ENT conditions.

Findings like CSOM, laryngitis/pharyngitis, perichondritis, dacryocystitis, could not be the proven consequences or complication of DM, but its predominance may be related with the prevalence of uncontrolled DM in the study subjects. The immune- compromised status of subjects with uncontrolled DM renders them more prone to any acute or chronic inflammatory viral or bacterial infections.

However, it has to be kept in mind that there are certain drawbacks with the present study. This is only an observational, institutional based study and not community based study. Which would be more appropriate. Hence, certain associations may seem to be more common. We have not included the oral manifestations, which are also very common.

Conclusion

From our study we can conclude that

- 1) Diabetes is widely rampant in the current population. There is a large volume of patients presenting with diabetics to the hospital.
- 2) Although majority of the patients had symptoms, a good number of the diabetics were asymptomatic and they were diagnosed to have certain ENT manifestations after we did our clinical examination.
- 3) We observed that more than 3/4th of the diabetics had specific ENT manifestations. With such a large number of positive ENT manifestations, it is prudent that all the diabetics need to be subjected to ENT examination

- 4) Deadly manifestations like malignant otitis externa, invasive fungal sinusitis and deep neck space infections were seen among the diabetes in our study. These conditions have high mortality and morbidity and require appropriate management in a tertiary care centre

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Conflicts of interest: None.

References

1. Joshi SR, Parikh RM. India-diabetes capital of the world: now heading towards hypertension. J Assoc. Physicians India. 2007;55:323-4.
2. Kaveeshwar SA, Cornwall J. The current state of diabetes mellitus in India. Australas Med J. 2014;7(1):45-48.
3. Kumar A, Goel MK, Jain RB, Khanna P, Chaudhary V. India towards diabetes control Key issues. Australas Med J. 2013;6(10):524-31.
4. Agarwal MK, Jha AK, Singh SK. Otorhinolaryngological studies in diabetics. Indian J Otolaryngol Head Neck Surg. 1998 Apr;50(2):116-121.
5. Amos AF, McCarty DJ, Zimmet P. The rising global burden of diabetes and its complications: estimates and projections to the year 2010. Diabet Med. 1997;14:S185.
6. Ren H, Wang Z, Mao Z, Zhang P, Wang C, Liu A, *et al.*, Hearing Loss in Type 2 Diabetes in Association with Diabetic Neuropathy. Archives of Medical Research. 2017;48(7):631-7.
7. Parhiscar A, Har-EL G. Deep neck abscess: a retrospective review of 210 cases. The Annals of otology, rhinology & laryngology. 2001;110(11):1051-4.
8. Gillespie M Boyd, Bert W O'Malley Jr., Howard W Francis. An approach to fulminant invasive fungal rhinosinusitis in the immunocompromised host. Arch Otolaryngol Head Neck Surg. 1998;124(5):520-6.
9. Gazzaz ZJ, Makhdom MN, Dhafar KO, Maimini O, Farooq MU, Rasheed A. Patterns of Otorhinolaryngological Disorders in Subjects with Diabetes. Int. Med J Malaysia. 2011;10(2):15-8.
10. Khanna S, Singh MP, Sunil KC. Understanding and treatment of serious ENT complications in Diabetes Mellitus-A study. J Indian Med Assoc. 2016;114:15-8.
11. Bainbridge KE, Hoffman HJ, Cowie CC. Diabetes and hearing impairment in the United States: audiometric evidence from the National Health and Nutrition Examination Survey 1999 to 2004. Ann Intern Med. 2008;149:1-10.
12. Kurien M, Thomas K, Bhanu T. Hearing threshold in patients with diabetes mellitus. The Journal of Laryngology & Otology. 1989;103(2):164-168.
13. Taylor I, Irwin J. Some audiological aspects of diabetes mellitus. The Journal of Laryngology & Otology. 1978;92(2):99-113.
14. Cullen JR, Cinnamon MJ. Hearing loss in diabetics. The Journal of Laryngology & Otology. Cambridge University Press. 1993;107(3):179-82.
15. Satish HS, Vishwanatha B, Manjuladevi M. A clinical study of otomycosis. IOSR Journal of Dental and Medical Sciences. 2013;5(2):57-62.
16. Doroghazi RM, Nadol Jr JB, Hyslop Jr NE, Baker AS, Axelrod L. Invasive external otitis: Report of 21 cases and review of the literature. The Am J of Med. 1981;71(4):603- 614.
17. Luzar MA, Coles GA, Faller B, Slingeneyer A, Dah GD, Briat C, *et al.*, Staphylococcus aureus nasal carriage and infection in patients on continuous ambulatory peritoneal dialysis. New England Journal of Medicine. 1990;322(8):505-9.
18. Parikh SL, Venkatraman G, Del Gaudio JM. Invasive fungal sinusitis: a 15-year review from a single institution. Am J Rhinol. 2004;18(2):75-81.
19. Sethi DS, Stanley RE. Deep neck abscesses-changing trends. J Laryngol Otol. 1994;108(2):138-43.