

Otorhinolaryngologic, head and neck presentations among patients with chronic renal disease in a developing country

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ABSTRACT

Background: Data on otorhinolaryngology and head and neck diseases in patient with chronic renal disease are rare in developing African countries. This study was aimed to determine the epidemiology and management of otorhinolaryngology and head and neck diseases among chronic renal disease patient seen in our tertiary health-care facility. **Materials and Methods:** This was a prospective, hospital-based study that was conducted in the ear, nose, and throat department in a Nigerian University Teaching Hospital. Informed consent was obtained, and pretested interviewers-assisted questionnaires were administered to each patient. Otoscopy, indirect laryngoscopy, and rhinoscopy were carried out. Renal functions were assessed by routine urine analysis and biochemical tests. Audiological tests were carried out for hearing assessment. Data collected were collated and analyzed using the SPSS software version 20.0. **Results:** The prevalence of chronic renal disease in otorhinolaryngology practice was 1.1%. There were 67.9% male with a male-to-female ratio of 2.1:1. The duration of illness was more than 1 year in 39.6% of our patients. The most common presentation was 58.5% tinnitus, 34.0% neck pain, 28.3% nasal blockage, 28.3% sore throat, 26.4% rhinorrhea/epistaxis, 18.9% pharyngeal wall nodularity, and 15.1% enlarged neck lymph node. The most common affected organ was the ear in 90.6%. Major diagnosis was sensorineural hearing loss, rhinosinusitis, pharyngitis, and cervical adenitis in 58.5%, 30.2%, 20.8%, and 7.5%, respectively. Hearing impairment occurred in 69.8% of the patients, out of which 43.4% were found to be mild hearing loss. Only 19 (35.8%) had dialysis, while 34 (64.2%) of them had conservatively treated. **Conclusion:** The prevalence of chronic renal disease in otorhinolaryngological practice was 1.1%, otological presentation was the most common in 90.6% of patients and 64.2% did well on conservative treatment. Avoidable otorhinolaryngologic complications among patients with chronic renal disease were noted. Periodic otorhinolaryngology referral for review and prompt management of this complication is advised.

Keywords: Chronic renal disease, complication, developing country, dialysis, otorhinolaryngology

Introduction

Chronic renal disease occurred when there is continuing irreversible reduction in nephron numbers and function of glomerular filtration rate of 90 ml/min that can further progress to end-stage renal disease.^[1-3] This occurs when there is persistent kidney damage lasting over several months or years.^[4,5] Main etiology of chronic renal disease in Nigerian includes hypertension, diabetes mellitus,

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chronic glomerulonephritis, preeclampsia/eclampsia, obstructive uropathies, connective tissue disease, analgesic nephropathy, cystic renal diseases, chronic pyelonephritis, Alport's syndrome, tubulointerstitial nephritis, leishmaniasis, schistosomiasis, and human immunodeficiency virus.^[2,6-8]

In chronic renal disease, there is the accumulation of various metabolic waste products in the body tissue and circulatory system. Toxic influence of nitric compounds, electrolyte imbalance, ototoxic drug penetration, immunological alteration, and local chemical reactions, especially due to ammonia leads to various otorhinolaryngological manifestations, namely epistaxis, vertigo, sore throat, candida infection, hearing loss, dry mouth, and sialoadenitis.^[9] Due to irreversible loss of endogenous renal function, patients have to depend permanently upon renal function replacement therapy such as dialysis or renal transplantation. The literature have shown that based on auditory brainstem audiometry findings, the main site of the lesion is cochlear and to some extent, retrocochlear.^[10] The kidney and stria vascularis of the cochlea share physiologic, ultrastructural, and antigenic similarities that could explain the link between chronic kidney disease (CKD) and hearing impairment.^[10] Available studies in Nigeria have shown that the prevalence of CKD ranged between 3.6% and 19.9%.^[11-13]

The high incidence of chronic renal disease of 16.8 per million was reported in children population which is higher than the 9 per million of the age-related population across the world in 2008.^[1,14] In the United States, the incidence of end-stage renal disease continues to grow at 8%–10%. Hospital admissions rate was between 1.6 and 8%.^[13]

Sensorineural hearing loss was reported to be common among patients with chronic renal disease due to damage to sensorineural components of the ear.^[15] Sinonasal presentation in pediatric patients with chronic renal disease was epistaxis and sleep apnea. Chronic renal disease is associated with pharyngeal and laryngeal edema due to lower plasma osmotic pressure induced by metabolic toxin.^[9,16] Superimposed bacteria split this urea-releasing ammonia causing chemical mucositis, ulceration, and submucosal hemorrhage. Their conclusion was that the transient postdialysis hoarseness and the decrease in vocal fold thickness may result from dehydration.^[17]

The literature and the statistical information on the magnitude of otorhinolaryngology, head and neck diseases among Nigerian with chronic renal disease and other developing countries are scarce. This study was aimed to determine the epidemiology and management of otorhinolaryngology and head and neck diseases among chronic renal disease patient seen in our tertiary health-care facility.

Materials and Methods

This was a prospective, hospital-based study that was conducted in the ear, nose, and throat department in a Nigerian university

teaching hospital, over a period of 2 years (January 2018 to December, 2019). Permission to carry out this study was obtained from the hospital ethical and research committee. All patients with the diagnosis of chronic renal disease and gave their consent were enrolled into the study. Excluded from this study were patients with previous history of ear disease, exposure to loud noise, previous history of ear, nose, and throat (ENT) symptoms such as hearing loss, epistaxis, candida infections, salivary gland enlargement, and head trauma. Furthermore, excluded are patient's ages <18 years and those with Type B or C tympanograms. A pretested interviewers assisted questionnaires were administered to each patient. Detailed sociodemographic characteristics including past medical, family, social, and drug history of the patients were documented. General and ear, nose, and throat examination were carried out including mandatory otoscopy, indirect laryngoscopy, and rhinoscopy on all patients with the findings documented. Headlight- and battery-operated hand otoscope was used to examine the external auditory canal and tympanic membraneTM for wax, foreign body, discharge, and TM for retraction or perforation. Those with impacted wax had it removed by ear syringing before continuing with the procedure. Nasal cavity examination was done using 0° and 30° nasal endoscopes. Renal functions of all patients were tested by the routine urine analysis and biochemical tests such as blood electrolytes (sodium, potassium, and calcium) urea and creatinine. Audiological tests that were carried out on our patients for their hearing assessment included tympanometry using a tympanometer and pure-tone audiometry using a diagnostic audiometer. The resulting tympanogram was classified into Type A, As, Ad, B, and C (Jerger's classification system).^[18] The hearing threshold of our patients was classified as follows: normal threshold (≤ 25 dB), mild hearing loss (26–40 dB), moderate hearing loss (41–55 dB), moderately severe hearing loss (56–70 dB), severe hearing loss (71–91 dB), and profound hearing loss (> 91 dB).^[16,19] All those with 25 dBHL or less were considered to have normal hearing thresholds, while those with more than 25 dBHL were considered to have abnormal hearing thresholds. The data collected were collated and analyzed using the Software Statistical Package for the Social Sciences (SPSS) software version 20.0, Chicago II, USA. Descriptive statistics were done by frequency table, percentage, bar chart, and pie chart to express the data.

Ethical clearance for this research was sought for and obtained from the ethical committee of our center.

Results

The total number of patients seen over the study period at the ENT department was 4821, of which 53 had chronic renal disease and met criterion for this study. The prevalence of chronic renal disease in otorhinolaryngology practice was 1.1%. All the studied age group with chronic renal disease had one form of hearing impairment. The peak prevalence value was 21 (39.6%) at the age group of 31–40 years, as shown in Figure 1. Male 36 (67.9%) predominate over 17 (32.1%) females with a male-to-female ratio

of 1:2.1. Urban dwellers were more common than rural dweller in 31 (58.5%) and 22 (41.5%), respectively. Majority (58.5%) had postsecondary education while about half of the patients 26 (49.1%) were civil servant, as illustrated in Table 1. Late presentation to the hospital for specialists' care was common among the patients with about a third of the patients having symptom duration more than 1 year [Figure 2]. Common otologic presentation was tinnitus in 31 (58.5%). Major rhinologic presentation was nasal blockage in 15 (28.3%) and rhinorrhea/epistaxis in 14 (26.4%). About 15 (28.3%) of the patients had sore throat. In head and neck, the most common symptom was 18 (34.0%) neck pain, whereas the most common sign was 8 (15.1%) enlarged neck lymph node, as illustrated in Table 2.

Otologic diseases accounted for 36 (67.9%) with the findings of sensorineural hearing loss in 31 (58.5%). There were 21 (39.6%) rhinological diseases, out of which rhinosinusitis accounted for 16 (30.2%). Throat diseases were noted in 17 (32.1%) patient out of whom pharyngitis accounted for 11 (20.8%). There were 6 (11.3%) head and neck diseases and cervical adenitis was 4 (7.5%), Table 3. Ten patients had associated ear wax which was removed before carrying out audiological tests and one patient had unilateral nasal polyp. Pure-tone audiometry conducted on our patients showed that majority (43.4%) had mild hearing impairment [Table 4].

Hyperkalemia was a major electrolyte disorders found in 49 (92.5%) of the patients. Only 19 (35.8%) of our patients was able to have dialysis done. Conservative treatment was offered to 34 (64.2%). Self-medication (herbs and supplements) was noted in 32 (60.4%) [Figure 3].

Discussion

Chronic renal disease has been documented as a cause of different systemic disorder with various manifestations.^[19] The

Table 1 Sociodemographic features among patient	
Sociodemographic features	Frequency n(%)
Sex	
Male	36(67.9)
Female	17(32.1)
Dwelling	
Urban	31(58.5)
Rural	22(41.5)
Religion	
Christian	47(88.7)
Muslim	6(11.3)
Education level	
Nil formal	1(1.9)
Primary	2(3.8)
Secondary	19(35.8)
Post secondary	31(58.5)
Patient Occupation	
Students/apprentice	2(3.8)
Business	15(28.3)
Artisan	7(13.2)
Civil servant	26(49.1)
Farming	3(5.7)

consequences of accumulation of nitrogenous waste products may lead to a number of systemic diseases which includes otorhinolaryngology, head and neck diseases. Similarities in the histological and biochemical pattern in the cochlea and the kidney have been shown.^[16] There is an intimate relationship between the epithelial structures of stria vascularis and the glomerulus suggesting that any etiological factors that can cause structural damage to the kidney can as well cause similar pathological disorder in the cochlea.^[10]

However, the observed prevalence and manifestations of otorhinolaryngology, head and neck disease among patients with chronic renal disease in this study is low compared with other ear, nose, and throat diseases in the department despite the high prevalence of chronic renal disease. Most of the cases

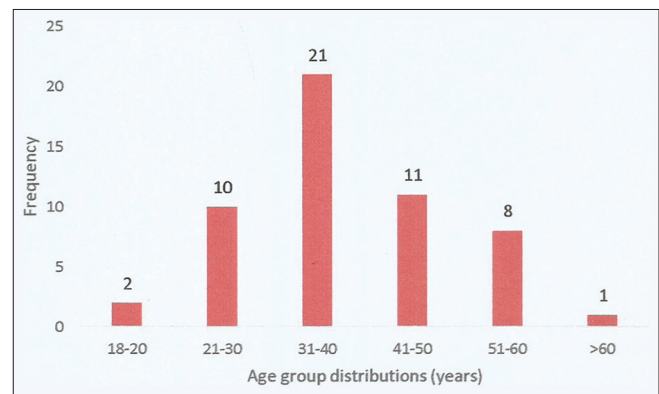


Figure 1: Age group distribution

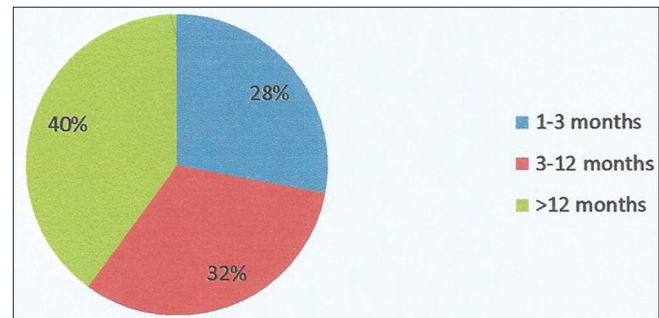


Figure 2: Duration of ORLHN illness

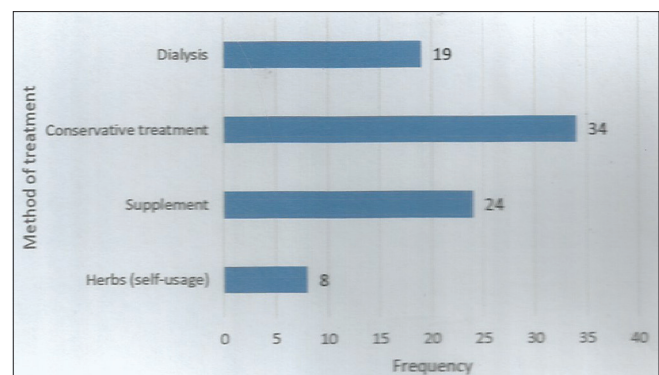


Figure 3: Treatment modalities

Table 2: Otorhinolaryngological presentation among patients

Otorhinolaryngology presentation	Frequency (n)	Percentage
Otologic features		
Tinnitus	31	58.5
Hearing impairment	27	50.9
Earache	9	17.0
Vertigo	11	20.8
Aural fullness	7	13.2
Rhinologic features		
Snoring	12	22.6
Epistaxis	8	15.1
Nasal blockage	15	28.3
Rhinorrhea	14	26.4
Throat features		
Sore throat	15	28.3
Hoarseness	4	7.5
Lump sensation in the throat	14	26.4
Dryness of mouth	6	11.3
Oral candidiasis	3	5.7
Head and Neck features		
Neck pain	18	34.0
Enlarged neck lymph node	8	15.1

Table 3: Otorhinolaryngological diseases among patients

Otorhinolaryngologic disease	Frequency (n)	Percentage
Otologic disease		
Sensorineural hearing loss	31	58.5
**Ear wax	10	18.9
Otitis externa	5	9.4
Rhinologic disease		
Rhinosinusitis	16	30.2
Nasal vestibulitis	5	9.4
**Nasal polyps	1	1.9
Throat disease		
Pharyngitis	11	20.8
Candidiasis	3	5.7
laryngitis	3	5.7
Head and neck disease		
Parotitis	2	3.8
Cervical adenitis	4	7.5

NB: **Associated pathology

Table 4: Audiometric findings among patient

Audiometric findings	Frequency (n)	Percentage
Normal (<25 dB)	16	30.2
Mild (26-40 dB)	23	43.4
Moderate (41-55 dB)	8	15.1
Moderate severe (56-70 dB)	4	7.5
Severe (71-90 dB)	2	3.8
Profound (>90 dB)	0	0

may be subclinical, conservatively managed by renal physician and referred with failed therapy. It was equally discovered that patients are usually referred very late with loss opportunity for the early treatment to prevent avoidable and irreversible complications. Therefore, it is important that our primary health-care physicians should be aware of these changes and familiar with them.

Otorhinolaryngology, head and neck diseases may occur at every stages of kidney disease irrespective of the age of the patient; however, it has been found to be most prevalent in the 4th decade of life.^[20] This is the active adult age group with family and socioeconomic responsibilities, but most of them hardly pay attention to their personal health. Similar to previous study,^[20] male gender predominates the female gender among these patients with chronic renal disease and otologic disorder. The high male prevalence may be due to fear of being widow and influence of the spouse to the care of their husband. Urban dwellers predominate over rural dwellers, and this may be due to increase level of awareness, proximities and affordability of medical facilities. Similarly, patients with a high level of education and high income were found to present more in this study. These factors may influence health seeking behavior of our studied patients.

Main ear disorder among these patients were sensorineural hearing loss and otitis externa similar to report in the previous study.^[21] Only, inner ear pathology and sensorineural hearing impairment were documented in a previous study.^[21] The inner ear pathology in this study was secondary to cochlea-vestibulo toxic effect of electrolytes, urea, and creatinine disorder among the patients. In addition, otitis externa were due to mucosa irritation from uremic deposit which is further worsening with superimposed infection. The most common outer ear infection among these patients was otomycosis. Common otologic clinical manifestations were tinnitus, hearing impairment, and vertigo from inner ear diseases in this study. Audiometric assessment of these patients revealed hearing impairment. Majority of our patients had mild hearing impairment with few severe hearing impairments and none has profound type.^[22,23] This observation is in line with electrolyte, urea creatinine disorder. In this study, hearing impairment is more common among patients with a longer history of otorhinolaryngology and head and neck diseases disorders.

Main rhinologic clinical features among the patients in this study were nasal blockage, rhinorrhea, and snoring. These may be due to uremic deposit in the nasal mucous membrane leading to irritation, catarrh, edema, and nasal blockage. When catarrh is infected, there is associated crust formation, ulceration, and injury from nose picking. There is associated epistaxis which are commonly spontaneous and bilateral from little’s area among the patients.^[9] Similar report was obtained from previous study.^[9] When epistaxis is induced in few patients, it is usually unilateral from nose picking arising from nasal vestibule and inferior turbinates. Rhinosinusitis and nasal vestibulitis are the major sinonasal disease among patients with chronic renal disease in our study. This concurred with other study.^[23]

Pharyngitis and laryngitis are common throat disease among these patients. These may result from uremic deposition in the pharyngeal wall and vocal cord with superimposed

infection (bacteria or fungal). Fungal infection is a precursor of oropharyngeal thrush.^[9] Throat presentation was mainly sore throat, lump sensation in the throat, and nodular changes in the pharyngeal wall. Laryngeal edema and deposit on the vocal cord has been found to be associated with hoarseness of voice.^[24]

Other head and neck diseases were parotitis which are usually bilateral from uremic deposit in the gland.^[25] Cervical adenitis is secondary to superimposed head and neck infection among the patients.

Management of these patients was mainly conservative treatment and dialysis with remarkable improvement. Most of the self-prescribed medications were injurious to the kidney with resultant worsening of the patient condition.

Conclusion

The findings in this study revealed that the prevalence of chronic renal disease in otorhinolaryngological practice was 1.1%, otological presentation was the most common in 90.6% of patients and 64.2% did well on conservative treatment. Avoidable otorhinolaryngologic complications among patients with chronic renal disease were noted. Periodic otorhinolaryngology referral for review and prompt management of this complication is advised. Large population and community study on this subject in developing country is required.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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