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Epidemiological, clinical and aetiological aspects of otalgia at the Renaissance University Hospital

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Abstract

Background: Otalgia is a frequent reason for medical consultation. In Africa, few studies have been devoted to the epidemiology and aetiology of otalgia. To our knowledge, no study has been carried out in Chad.

Aims: The objective of this study is to describe the epidemiological, clinical and aetiological aspects of otalgia in Chadian hospitals.

Methods: This was a prospective, descriptive and analytical study conducted at the Renaissance University Hospital from January to August 2020. All the patients that were consulting in the ENT department for otalgia were included. Data was analysed using SPSS version 26. The chi-square test was used to compare the results.

Results: 88 (22.3%) of the 395 patients suffered from otalgia. Their sex ratio was 1:1 (M:F). Their average age was 30.4 ± 19.5 years. The median age was 31.5 years with extremes from 1 to 70 years. Children (1–18 years) represented 30.7% of the cases. The average time of consultation was 27.8 ± 35.0 days. Otalgia was associated with deafness in 33% of the cases and 29.5% of the patients have used cotton swabs. Otogenic otalgia in 73.9% of the cases was significantly more frequent in children (92.6% versus 65.6%, $P = 0.008$). Otogenic otalgia was related to otitis externa, chronic otitis media and Eustachian tube dysfunction in 44.6%, 21.5%, and 13.9% of cases respectively. The aetiologies of the referred otalgias were angina and rhinopharyngitis (30.4%), trigeminal neuralgia (21.7%) and oral cavity, pharyngeal and laryngeal cancer (21.7%).

Conclusion: Otalgia is a frequent reason for medical consultation at any age regardless of sex. However, ear infections are more frequent in children. Referred otalgias predominate in adults, dominated by pharyngeal infections, trigeminal neuralgia and oral cavity, pharyngeal and laryngeal cancers.

Keywords: Otalgia, Epidemiology, Clinical, Aetiology

Background

Otalgia, or ear pain, is a troublesome otological symptom. It is a frequent reason for consultation [1]. The prevalence of this symptom varies from country to country [1, 2]. It is related either to a pathology of the external or middle ear (otodynia or otogenic otalgia) or to a

locoregional pathology (reflex otalgia or referred otalgia) [2].

According to several authors, otogenic otalgia is more frequent than reflex otalgia and also appears to be more frequent in children than in adults [1, 3]. Their aetiology does not seem to differ according to gender [1]. The pathologies that express themselves through otalgia are numerous, variable, benign or sometimes serious [4, 5].

In Africa, few studies have been devoted to the epidemiology and aetiology of otalgia. To our knowledge, no study has been carried out in Chad. The aim of this study

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was to describe the epidemiological, clinical and aetiological aspects of otalgia in Chadian hospitals. This study will contribute to better management of the different pathologies that cause otalgia.

Methods

This was a prospective, descriptive and analytical study carried out at the ENT department of the Renaissance University Hospital from January to August 2020. Every patient of any gender and age consulting for otalgia was included. Patients older than 18 years were considered adults. Patients who refused to participate in the study, those who no longer had otalgia at the time of consultation, and those who could not provide clear information about their disease were excluded from the study.

The parameters studied were epidemiological (age, sex), clinical (medical and surgical history), characteristics of the otalgia (laterality, mode of onset, intensity, evolution, associated signs, time of consultation) and diagnostic (aetiology of the otalgia, topography of the lesion).

All patients were interviewed to characterise their otalgia and to get their medical history. An ENT and general physical examination was performed in all patients. Otoscopy was systematically performed using an ENT microscope (Leica brand), which examined the auricle, the mastoid region, the external auditory canal and the tympanic membrane. Acoumetry was performed using a 512 Hz tuning fork for a brief assessment of hearing. The rest of the examination included the oral and oropharyngeal cavity, anterior rhinoscopy with a headlamp, examination of the skin of the neck and face and examination of the cranial nerves.

Tympanometry completed the examination in case of tympanic membrane remodelling without perforation. Audiometry was indicated in case of suspected hearing loss.

In the case of otorrhoea, a swab was taken if the patient had not taken antibiotics 2 weeks before.

Any lesion suspected of being malignant in the oral cavity, pharynx or larynx was subjected to histological sampling, either by biopsy or by resection.

When the otoscopy has found a lesion in the ear causing the otalgia, it was termed otodynia or otogenic otalgia; otherwise, it was termed reflex or referred otalgia.

All statistical analyses were performed using SPSS Statistics 26 (IBM, Chicago USA). Qualitative data was presented as a percentage. Quantitative variables were summarised as either mean with standard deviation or median with extreme values. The aetiologies of otalgia were described according to age group and sex. Adults and children were compared according to the proportion of otodynia and reflex otalgia using a chi-square test. The

difference was significant when the significance level was < 5%.

All the patients had given an informed consent to participate in the study and for the data to be published. In the case of minors, parental consent was obtained. The study had been authorised by the ethics committee of the Renaissance University Hospital. The study complied with the 2013 Declaration of Helsinki.

Results

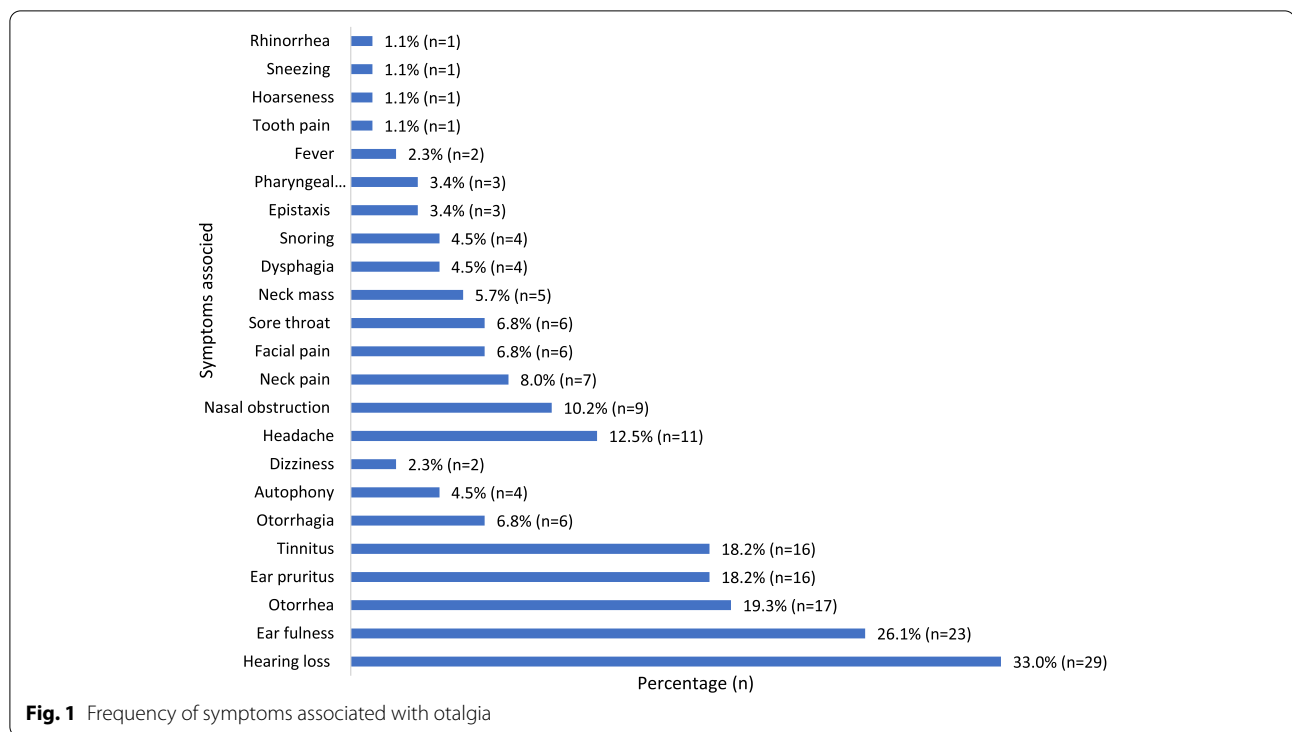
During the study period, out of 395 patients seen in ENT consultations, 88 patients with otalgia were recorded, which was a hospital frequency of 22.3%. Among these 88 patients, there were 47 men and 41 women (sex ratio M:F = 1:1). The mean age was 30.4 years old \pm 19.5 years. The median age was 31.5 years old with extremes from 1 to 70 years. Children were involved in 27 cases (30.7%) and adults in 61 cases (69.3%).

30 patients (34.1%) had no specific medical history while 26 patients (29.5%) had used cotton swabs. The distribution of patients according to their medical history and clinical characteristics of otalgia are presented in Table 1.

Deafness and ear fullness were associated with otalgia in 33.0% and 26.1% respectively. Figure 1 shows the

Table 1 Distribution of patients according to their history and clinical characteristics of otalgia

	Clinical variables	n	%
Medical history	Use of cotton swabs	26	29.5
	Use of ear drops	15	17.0
	Earwash	14	15.9
	Rhinopharyngitis	9	10.2
	Recurrent ear infections	8	9.1
	Allergic rhinitis	6	6.8
	Smoking	5	5.7
	Alcohol use	4	4.5
	Acoustic trauma	4	4.5
	Recurrent sore throat	3	3.4
	Diabetic	1	1.1
	Arterial hypertension	1	1.1
	Site of otalgia	Right ear	32
Left ear		32	36.4
Bilateral		24	27.3
Mode of onset of otalgia	Progressive	52	59.1
	Sudden	36	40.9
Severity of otalgia	Moderate	50	56.8
	Strong	34	38.6
	Low	4	4.6
Evolution of otalgia	Intermittent	47	53.4
	Permanent	41	46.6



symptoms associated with otalgia. The mean time from start of symptoms until medical review was 27.8 ± 35.0 days; the median time was 11.5 days with extremes of 2 to 120 days. The frequency of otodynia was 73.9% ($n=65$) and that of reflex otalgia was 26.1% ($n=23$).

Otitis externa, chronic otitis media and Eustachian tube dysfunction accounted for 44.6% ($n=29$), 21.5% ($n=14$) and 13.9% ($n=9$) of otodynia cases respectively. The different causes of otalgia are listed in Table 2. Otitis externa consisted of 12 cases of ear canal eczema (18.5%), 11 cases of otomycosis externa (16.9%), 5 cases of bacterial otitis externa (7.7%) and 1 case of chondritis of the auricle (1.5%). Chronic otitis media included 9 cases of seromucosal otitis media (13.8%), 3 cases of chronic open eardrum otitis media (4.6%), and 2 cases of chronic cholesteatomatous otitis media (3.1%). Among the causes of reflex otalgia, 30.4% were pharyngeal angina/pain and rhinopharyngitis ($n=7$), 21.7% trigeminal neuralgia ($n=5$) and 21.7% oral cavity, pharyngeal and laryngeal cancer ($n=5$). The histological aspects of these cancers were undifferentiated carcinoma of the nasopharyngeal type (3 cases), infiltrating squamous cell carcinoma of the larynx (1 case) and osteosarcoma of the mandible (1 case).

According to topography, otalgia was due to a middle ear involvement in 39.8% ($n=35$), external ear involvement in 32.9% ($n=29$) and upper aerodigestive tract

involvement in 13.6% ($n=12$). Table 3 shows the topography of otalgia according to the gender and sex.

By age, otodynia occurred in children in 92.6% ($p=0.008$). In children the causes were otitis externa in 40.7% ($n=11$) and acute otitis media in 25.9% ($n=7$) and ear canal eczema accounted for 63.6% of otitis externa ($n=7$). In adults, otitis externa accounted for 29.5% ($n=18$) followed by chronic otitis media in 16.4% ($n=10$) and otomycosis accounted for 50% of otitis externa ($n=9$).

Reflex otalgia occurred in 34.4% of adults ($p=0.008$). Table 4 shows the relationship between the mechanism of otalgia with age and sex and the relationship between auricular topography with age and sex.

Discussion

The prevalence of otalgia in our study was high (22.3%). This prevalence varied from 18% to 36% according to authors in Africa [1, 2]. The negative impact of the symptomatology on the quality of life (sleep disorders, headaches, poor emotional balance) often compels patients to seek help. In this study, the length of the medical consultation time is quite long because of widespread self-medication in our environment such as using ear drops and the inaccessibility of patients to specialised health structures.

Table 2 Distribution of aetiologies of otalgia by age group and sex

	Total n (%)	Children n (%)	Adults n (%)	Male n (%)	Female n (%)
Etiologies of otodynia					
External ear infections	29 (44.6)	11 (40.7)	18 (29.5)	14 (29.8)	15 (36.6)
COM ^a	14 (21.5)	4 (14.8)	10 (16.4)	8 (17.0)	6 (14.6)
Eustachian tube dysfunction	9 (13.9)	2 (7.4)	7 (11.5)	2 (4.3)	7 (17.1)
AOM ^b	8 (12.3)	7 (25.9)	1 (1.6)	6 (12.8)	2 (4.9)
Ear Blast	3 (4.6)	0	3 (4.9)	3 (6.4)	0
Barotraumatic otitis	1 (1.5)	0	1 (1.6)	1 (2.1)	0
Fracture of the rock/traumatic brain injury	1 (1.5)	1 (3.7)	0	1 (2.1)	0
Total	65 (100.0)	25 (92.6)	40 (65.6)	35 (74.5)	30 (73.2)
Etiologies of referred otalgia					
Pharyngeal angina/pain, rhinopharyngitis	7 (30.4)	2 (7.4)	5 (8.2)	3 (6.4)	4 (9.8)
Trigeminal neuralgia	5 (21.7)	0	5 (8.2)	2 (4.3)	3 (7.3)
Oral cavity, pharyngeal and laryngeal cancers	5 (21.7)	0	5 (8.2)	3 (6.4)	2 (4.8)
Ballistic neck and facial wound	3 (13.0)	0	3 (4.9)	3 (6.4)	0
Chronic rhinosinusitis	1 (4.3)	0	1 (1.6)	0	1 (2.4)
TMJD ^c	1 (4.3)	0	1 (1.6)	1 (2.1)	0
Eagle's syndrome	1 (4.3)	0	1 (1.6)	0	1 (2.4)
Total	23 (100.0)	2 (7.4)	21 (34.4)	12 (25.5)	11 (26.8)

^a Chronic otitis media^b Acute otitis media^c Temporomandibular joint disorder**Table 3** Topographical distribution of otalgia aetiologies according to age group and sex

Topography of the causes of otalgia	Total n (%)	Children n (%)	Adults n (%)	Male n (%)	Female n (%)
Middle ear	35 (39.8)	13 (48.1)	22 (36.1)	20 (42.6)	15 (36.6)
External ear	29 (32.9)	11 (40.7)	18 (29.5)	14 (29.8)	15 (36.6)
UADT ^a	12 (13.6)	2 (7.4)	10 (16.4)	6 (12.8)	6 (14.6)
PNS ^b	5 (5.7)	0	5 (8.2)	2 (4.3)	3 (7.3)
NFS ^c	4 (4.6)	0	4 (6.6)	3 (6.4)	1 (2.1)
TMJ ^d	2 (2.3)	0	2 (3.3)	1 (2.1)	1 (2.4)
Internal ear	1 (1.1)	1 (3.7)	0	1 (2.1)	0
Total	88	27	61	47	41

^a Upper aerodigestive tract^b Peripheral nervous system^c Neck and facial skin^d Temporomandibular joint

Clinically, the use of cotton swabs was reported in several cases in this series. The airborne dusty environment exposes a person to ear itching which could explain this practice in our context. Unilateral otalgia is predominated over bilateral otalgia, which is in line with the results observed in many studies [6–8].

Indeed, most of the conditions that cause otalgia are usually lateralized to one side only.

Otalgia can be classified into two types: otogenic and reflex otalgia [2, 9]. Otogenic otalgias were the majority in our work, as reported by several authors [1–3]. This could be due to a bias. The work was carried out in an ENT department. According to Olsen, the prevalence of reflex otalgia could reach up to 50% in general practice [10].

The main symptoms associated with otalgia in this study were auricular (deafness, ear fullness, otorrhoea, auricular pruritus and tinnitus), which may explain the high frequency of otodynia. These results were similar to those found in the literature [1, 3].

The main aetiologies of otogenic otalgia found in our study were otitis externa and chronic otitis media. Otitis externa was also the first cause of otodynia in the series of Adegbiyi with 25.4%. As for reflex otalgias, the first cause found in our work was pharyngeal infections (angina and rhinopharyngitis) which was identical to that found by African and Korean authors [1, 3].

Depending on the age group, our study showed that the causes of otalgia differed between children and adults. Ear diseases were the most common cause of otalgia in children, while reflex otalgia was more common in adults., however, no African study is available that allows

Table 4 Relationship between the causal mechanism of otalgia to age group and sex

Variable	Age				P	Sex				P
	Child		Adult			Male		Female		
Mechanism										
Otodynia	n	%	n	%	0.008*	n	%	n	%	0.890
	25	92.6	40	65.6		35	74.5	30	73.2	
Referred otalgia	2	7.4	21	34.4		12	25.5	11	26.8	
Ear topography										
Middle ear	13	52.0	22	55.0	0.443	20	57.1	15	50.0	0.504
External ear	11	44.0	18	45.0		14	40.0	15	50.0	
Internal ear	1	4.0	0	0.0		1	2.9	0	0.0	

*P < 0.05 chi-square test

this comparison. On the other hand, several authors have found the same fact elsewhere [3, 11, 12]. In our study, the main causes of otalgia in children were otitis externa. Kim et al. found that acute otitis media accounted for 50% of cases [3]. This condition affects more than 80% of children before their third birthday [13]. The particular frequency of acute otitis media in children can be explained by the coexistence of recurrent rhinopharyngitis (diseases of adaptation at this age) and an immature Eustachian tube [14]. The high frequency of otitis externa in our study is due to the high number of ear canal eczemas. On one hand, the high number of eczemas could be explained by the medical history of our patients, especially the use of ear drops and allergic rhinitis [15, 16], and on the other hand by the influence of environmental factors (indoor air pollution, outdoor exposure to allergens and environmental tobacco smoke) [17, 18]. In adults, otitis externa was dominated by otomycosis. The use of cotton swabs, ear washing and repeated ear infections in patients were reported to favour the occurrence of otomycosis [19]. The main aetiologies of reflex otalgia in adults, in our work, were pharyngeal infections, trigeminal neuralgia and oral cavity, pharyngeal and laryngeal cancers which had the same proportions. In the series by Kim et al., the number of cancers was not significant. Nevertheless, cancers of the upper aerodigestive tract should be systematically sought in the presence of otalgia without otoscopic signs.

The analysis of the aetiologies of otalgia according to gender in our study showed no significant difference between males and females. On the contrary, Kim et al. revealed in their study that otogenic otalgia was more frequent in men, while reflex otalgia was more frequent in women [3]. Their argument was that males may be more likely than females to bite off their ears, which exposes them to more ear diseases, which is not observed in our daily practice.

Conclusion

Earache is a frequent reason for medical consultation at any age and for any gender. However, ear infections are more frequent in children. Reflex otalgia predominates in adults by pharyngeal infections, trigeminal neuralgia and oral cavity, pharyngeal and laryngeal cancers. The causes of otalgia do not differ by gender. Certain practices, such as the use of cotton swabs, seem to favour ear infections.

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Authors' contributions

All authors contributed to the design and development of this work. AAT was responsible for analyzing the data and writing the manuscript. The preparation of the material and data collection were carried out by TH. AC was responsible for correcting the form and content. All authors have read and approved the final manuscript.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The study had been authorised by the ethics committee of the Renaissance University Hospital (Reference n° 207/MSP/DGHR/DM/DAF/20). The study complied with the 2013 Declaration of Helsinki. All patients had consented to participate in the study. In the case of children, parental consent was obtained.

Consent for publication

A verbal consent was obtained from patients or their parents for the publication of the data.

Competing interests

The authors declare that they have no competing interests.

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