

Hearing Impairment in Rheumatoid Arthritis

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ABSTRACT

Objective: This study aims to find the relationship between rheumatoid arthritis (RA) and hearing loss or impairment

Method: Fifty patients 10 male 40 female were collected from the attendant and employee in al mosul general Hospital, department of rheumatology in Mosul and evaluated for hearing impairment in AL-zahrawi teaching hospital department of hearing and speech center.

Results: Nineteen of 50 patients with RA were found to have abnormal audiogram, constituting a prevalence rate of (38%), on the other hand, only 3 control subjects (6%) had hearing impairment.

Middle ear compliance was reduced by 1/2 to 1/3 of normal compliance value in 34 patients (68%).

Keywords: Low back pain (LBP), Pelvic girdle pain (PGP).

INTRODUCTION

Rheumatoid arthritis (RA) is a chronic symmetrical inflammatory polyarthritis of unknown cause involving the synovial joints and exhibiting in a proportion of patients a variety of extra-articular features such as vasculitis and nodules^[1]

The disease prevalence in the world ranges between 0.3-1.5 % of population^[2].

The incudomalleal and incudostapedial articulations are synovial joints with cartilaginous articular discs^[3]. Consequently, they could be subject to involvement by rheumatoid disease akin to that observed in similar joints elsewhere in the body. involvement of the ossicles of the ear is presented by tinnitus and decreased hearing^[4]. To date, however, the pathophysiology of middle ear in RA is unclear, both transient conductive deafness^[5] and permanent conductive deafness^[6] have been described in patients with RA.

Other studies have suggested that sensorineural deafness unrelated to drug therapy, may be more common in RA than in health^{[7][8]}.

while some authors stress the sensorineural nature of hearing loss, Kastanionndakis-I has reported the sensorineural hearing loss to be the result of extra-articular manifestation of the disease (rheumatoid nodule, vasculitis or drug toxicity)^[9] others consider the middle ear as a prime target of the disease, this was found by Siamopoulo- Mavridou-A; in 1990,^[10] in 10 out of 18 patients,

this finding indicates that chronic arthritic changes the middle ear function probably as result of inflammation of synovial ossicular joints, which is followed by stiffness of tympanic membrane and ossicular chain. Hearing impairment in patients with rheumatoid arthritis, its nature and extent has not been well delineated.

The rarity of studies and the few articles about this subject prompted us to further evaluate whether such a relationship existed and, if so, what factors might be involved.

PATIENTS AND METHOD

Fifty patients (10 males and 40 females) with RA, diagnosed according to the 1987 revised criteria of the American Rheumatism Association for classification of RA^[11], served as the study sample. Their age ranged from 25 to 58 years with mean age of 41.5±16.5 years, they were attending the rheumatology Department in al mosul general hospital in Mosul.

Fifty healthy subjects matched for age and sex, served as the control group, they were attending the rheumatology department in al mosul general hospital in Mosul. Selection of all participants was based on the criteria of negative

family history of ear disease, negative history of otorrhea, skull trauma, no wax, noise exposure or upper respiratory tract infection within one month of participation, and intact tympanic membranes. other investigation are complete blood Count, erythrocyte sedimentation rate ,rheumatoid factor.

Audiometric evaluation:

Pure tone audiometry and tympanometry were done at the hearing and speech center of the outpatient department of AL-zahrawi teaching hospital by means of a clinical digital audiometer type (Danplex DA65)and tympanometry type(DanplexTymp 87) which was calibrated to internationally acceptable standard. The tympanometry is constructed by recording the range of compliance on altering the air pressure within the external meatus from +200 mm H₂O to -600 mmH₂O.the measured compliance reaches a maximal when the pressure in the external acoustic meatus equals that within the middle ear cavity, and so the peak of tympanogram provides a good indication of the middle ear pressure. as the pressure in the external meatus changes away from the middle ear pressure, the tympanic membrane stretched out wards or inwards and stiffens, causing the compliance value to fall. At the extremes of thetympanogram, the compliance value indicates the volume of the air sealed within the external acoustic meatus. characteristic tympanogram are seen in different middle ear conditions. Normal ear tympanogram ,95% of the normal ears have a rang of compliance varying from (0.35 to 1.4 ml or cc).otosclerosis, early stages of otosclerosis provide a tympanogram that is within the lower range of normal value. As the otosclerosis advance, the range , of compliance diminishes. Ossicular disconnection an increased range of compliance is usual. the peak of the tympanogram may exceed 3 ml ^[12].

The pure tone threshold averages of frequencies 250 ,500 ,1000 ,2000 ,4000,8000 Hz were calculated for the right and the left ears. Hearing acuity was classified according to the international organization classification of hearing impairment(12) slight: (27-40 Decibels), mild(41-55 dB), moderate (56-70 dB), severe (70-90 dB) and extreme more than (91 dB).

Statistical evaluation:

The Chi-square tests was used. A/p value<0.05 was considered significant.

RESULTS AND DICUSSION

Nineteen of 50 patients with RA were found to have abnormal audiograms of both ears, constituting a prevalence rate of (38 %). On theother hand, only 3 control subjects (6 %) hadhearing impairment (Table 1)

Table 1: The incidence of hearing loss in RA and control group

Hearing Loss	Number	Percentage
RA group		
Sensorineural	17	34
Conductive	2	4
Control group		
Sensorineural	2	4
Conductive	1	2

The mean hearing threshold levels were 35dB for the right ear and 40 dB for the left ear of the RA group. For the control group, the mean hearing threshold levels were 30 dB for the right ear and 25dB for the left ear. Conductive hearing loss was found in only 2 patients (4 %). Middle ear compliance was reduced by 1/2to 1/3 of the normal compliance values in 34 patient group varied 0.27 cc to 0.75 cc with a mean of 0.45 c for the right ear, and 0.33 cc to 0.68 cc with mean of 0,46 cc for the left ear. The Compliance levels for the controls ranged from 0.55cc to 1.16 with a mean of 0.95cc for the right ear, and 0.53 cc to 1.2cc with a mean of 0.86 cc for the left ear, the deference between the compliance values of RA and control groups was statistically significant.

No correlation could be drawn between sensorineural hearing loss and any of the clinical or laboratory variables under consideration.

Table 2: The relationship between sensorineural hearing loss and some clinical and lab

Variables		Sensorineural hearing loss				
		Present N=17	%	Absent N=33	%	P value
Age(years)mean		46		48		NS
Sex						
Male	N=10	4	40	6		NS
Female	N=40	13	32	27		NS
Duration						
<5 years	N=30	10	33	20		NS
5 years>	N=20	7	35	13		
ESR mm/h						
<50 mm/h	N=30	11	36	19		NS
>50 mm	N=20	6	30	14		
Rheumatoid Factor						
Positive	N=31	11	35	20		NS
Negative	N=19	6	31	13		

Variables

N=number

NS=not significant

Table 3: The relationship between middle ear compliance and Some clinical and lab

Variables		Reduced middle ear compliance				
		Present N=34	%	Absent N=16	%	P value
Age(years)mean		42		48		NS
Sex						
Male	N=10	4	40	6		
Female	N=40	30	75	10		P=0.034
Duration						
<5 years	N=30	25	83	5		P=0.004
5 years>	N=20	9	45	11		
ESR mm/h						
<50 mm	N=30	24	80	6		
>50 mm	N=20	10	50	10		
RheumatoidFactor						
Positive	N=31	26	83	5		P=0.002
Negative	N=19	8	42	11		

Variables

p value=p<0.05 considered significant

N=number.

There were no relationships between sensorineural in RA and drugs used in treatment (table 4).

Table 4: The relationship between sensorineural hearing loss in RA and drugs used in treatment

Drugs		Sensorineural hearing loss				P value
		Present NO	%	Absent NO	%	
NSAIDS *	50	17	34	33		NS
DMARD **	40	10	25	30		NS
Steroid	35	7	20	28		NS

*Non-steroidal anti-inflammatory drugs

**Disease modifying anti Rheumatic Drugs.

DISCUSSION

1. The high incidence of sensorineural hearing loss observed in our patients with RA could not be easily explained (table Sensorineural hearing loss may be secondary to neuritis or vasculitis or may represent a manifestation of ototoxic effect of drugs employed in the treatment of the disease. In this study we found no correlation between sensorineural hearing loss and the disease activity, RF positivity, age, sex and disease duration (Table 5)
2. This is in agreement with the study by Kakani Rs; Mehra and Deodhar SD; they notice no correlations between hearing loss or otoadmittance abnormality and duration or activity of the RA and positivity of RF^[13]. Goodwill DJ, Lord IJ and Knill RP, in 1972 found higher than usual incidence of sensorineural hearing loss and abnormal tympanometric finding in patients with RA (7). Also Magaro in 1990 reported high incidence (55%) sensorineural hearing loss in RA (Table 5). (14).

Table 5: Hearing loss in RA compared with Magaro study.

	Hearing loss	
	Present study	Magaro Study
Patient No	50	20
Sensorineural Hearing loss %	34	55
Conductive Hearing loss %	4	0

Source : ^[13].

Rosen Berg, et al found reduced middle ear compliances that were recorded in 16 (42%) of RA; The pattern of abnormality was similar in each case and indicated an decreased laxity of conductive system^[15]. (Table 6).

Table 6: Middle ear compliance in RA compared with Rosen Berg study.

	Middle ear compliance	
	Present study	Rosen Berg study
Patient No	50	38
Reduced middle Ear compliance %	68	42

Source: ^[15]

However firm histopathological evidence of RA involvement of interossicular joint is lacking^[16] and ankylosis of the joint may be unassociated with any clinical or audiometric disturbance^[17].

Increase collagenolytic which may occur in RA (Etherington, 1977) could contribute towards the abnormal laxity of conducting system^[18].

CONCLUSION

RA may affect the conductive or sensorineural functions of the ear. Increased stiffness of the tympanossicular chain was the most frequent finding. The more serious sensorineural hearing loss was fortunately less frequent and might be at least in part of cochlear origin. Further research appears warranted to investigate the cause and nature of sensorineural hearing loss in RA.

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