A Survey of Relationship between Rheumatoid Arthritis and Hearing Disorders

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Abstract- RA (rheumatoid arthritis) is a chronic multisystem disease with a variety of systemic manifestations. One of these manifestations, is hearing disorder, so study of the relation between RA and hearing disorders is seem important. This was a case-control study which has done from December 2004 to August 2006. This study compared 50 patients with RA, with age, sex and job-matched as control. Audiometric tests in different frequencies show that hearing threshold in high frequencies specially in 8000 Hz had a significant difference between two groups, also acoustic reflexes were absent in case groups and had significant difference between two groups too. The evaluation of sensory neural hearing loss showed that this hearing loss is sensory not neural. Based on this study, frequent evaluation of audiometric tests is recommended for controlling hearing disorders by therapeutic and rehabilitation procedures in RA patients.

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Key words: Arthritis, Rheumatoid; hearing disorders reflex, acoustic

Introduction

It is obvious that hearing disorders may cause problems in our life. They are derived from pathology in outer, middle and inner ears or acoustic nerve. Sometimes patients complicate form the other symptoms such as pain, tinnitus, vertigo, dizziness or hearing loss, is the only one. Some of the studies have shown that RA (rheumatoid arthritis) may cause hearing disorders, so survey of correlation between rheumatoid arthritis and hearing disorders is important. It is noticeable that RA is a chronic multisystem disease of unknown etiology, and women are affected approximately three times more than men. RA is seen throughout the world and affects all races. The manifestations of this disease are neurologic disorders, Felty' s syndrome, disorders in TMJ and larynx (26% to 53%), eye disorders, and in the recent years studies show disorders in ear too (1-4).
Most of the patients with ear disorders show sensorineural hearing loss (SNHL), conductive hearing loss (CHL) and in some of them mixed hearing loss is observed (5,6).

Patients and Methods

This was a case-control study, has done from December 2004 to August 2006 in Shaheed Sadoughi hospital in Yazd. This study compared 50 patients with RA, with 50 age-sex and job-matched controls. For all patients pure tone audiometry, speech discrimination, tympanometry, acoustic reflex, acoustic reflex decay and tone decay tests have carried out. Before testing, a questionnaire was completed for every person. Hearing threshold more than 25 dBHL was considered as hearing loss. Statistical analysis of the two groups was carried out using Mann-Whitney, Fisher and Pearson tests.

Results

Patients were between 21-67 years old and the mean age of them was 47.58 (It was the same as the control group). From 50 cases (controls) 42 of them were female and 8 of them were male. Audiometric tests in different frequencies show that hearing threshold in high frequencies specially in 8000 Hz had a significant difference between two groups, *P*=0.017 in right ear and *P*=0.003 in left ear (Table 1).

Table 1. Results of audiometric test in different frequencies

Frequency (Hz)	250 RE	250 LE	500 RE	500 LE	1000 RE	1000 LE	2000 RE	2000 LE	4000 RE	4000 LE	8000 RE	8000 LE
P-value	29. 0	0.94	0.98	0.54	0.83	0.92	0.44	0.14	0.15	0.12	.0170	0.003

RE=Right Ear LE=Left Ear

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Table 2. Results of Acoustic Reflex test in Right Ear

Number & Percent / Acoustic Reflex	Group		Total
	Case	Control	
Number Right Ear (+)	38 (76%)	50 (100%)	88 (88%)
Number Right Ear (-)	12 (24%)	0 (0%)	12 (12%)
Number Total Ears	50 (100%)	50 (100%)	100n(100%)

P-value=0.003

Table 3. Results of Acoustic Reflex test in Left Ear

Number & Percent / Acoustic Reflex	Group		Total
	Case	Control	
Number Left Ear (+)	41	50	91
Percent	82%	100%	91%
Number Left Ear (-)	9	0	9
Percent	18%	0%	9%
Number Total Ears	50	50	100
Percent	100%	100%	100%

P-value=0.000

The results of tone decay, reflex decay and the speech discrimination score suggested cochlear pathology in patients with SNHL. Also acoustic reflex was absent in case groups and it had significant difference between two groups, *P*=0.003 in right ear and *P*=0.000 in left ear (Tables 2,3).

The patients were divided into two groups based on disease duration but there was no significant difference in hearing thresholds between these two groups and also made in another two groups based on the drugs which they used (NSAID, Steroid), but there was no significant difference in hearing thresholds between these two groups too.

Discussion

RA is the most common autoimmune disease and affects 2% to 3% of the adult population. The usual age of onset is from 35 to 45 (7). The characteristic feature of RA is persistent inflammatory synovitis, usually involving peripheral joints in a symmetric distribution. The potential of the synovial inflammation to cause cartilage damage and bone erosions and subsequent changes in joint integrity is the hallmark of the disease (1).

SNHL of the cochlear variation is a common finding in patients with RA whereas conductive loss and mixed HL also seen. SNHL may be the result of the extra-articular manifestation of the disease (rheumatoid nodular vasculitis) or due to drug ototoxicity (6, 9, 10).

Increased laxity of the middle ear transducer mechanism (because of the synovial joints between ossicles in middle ear) is the likely cause of conductive element. Also the presence of a mixed type of hearing loss suggested a multifocal involvement of the audiologic system in RA (8).

Some previous studies showed inner ear disorders in 35% of patients with RA (9) and other study showed inner ear disorders in 35%, middle ear disorders in 24% and mixed HL in 10% of the patients with RA (8). In inner ear disorders cochlea pathology was the reason of SNHL.

In this study the relation between hearing disorders and RA, show that hearing thresholds are affected significantly in RA patients specially in high frequencies (8000 Hz) and middle ear also affected (absent reflex) in RA.

So in spite of that some patients aren't aware of their hearing loss and they have no clinical complains, frequent evaluation of audiometric tests are recommended and it can be controlled by therapeutic and rehabilitation procedures in these patients.

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References

1. Kasper DL, Brounwald E, Fauci AS, Hauser SL, Longo DL, Jameson, et al, editors. Harrison's Principles of Internal Medicine. 16th ed. New York: McGraw-Hill; 2005. p. 1968-77.

2. Cummings CW, Flint PW, Harker LA, Haughey BH, Richardson MA, Robbins KT, et al, editors. Cummings Otolaryngology Head and Neck Surgery. 4th ed. Philadelphia: Elsevier Mosby; 2005. p. 2072-3.
3. Paparella MM, Shumrick DA, Gluckman JL, Meyerhoff WL, editors. Otolaryngology Head and Neck Surgery. vol III. 3rd ed. Philadelphia: WB Saunders; 1991. p. 857-8.
4. Lee KJ. Essential Otolaryngology: Head and Neck Surgery. 8th ed. New York: McGraw-Hill; 2003. p. 300.
5. Harris ED. Clinical features of rheumatoid arthritis. In: Ruddy S, Harris ED, Sledge CB, editors. Kelley's Textbook of Rheumatology. 6th ed. Philadelphia: WB Saunders; 2001. p. 967-1000.
6. Raut VV, Cullen J, Cathers G. Hearing loss in rheumatoid arthritis. J Otolaryngol 2001;30(5):289-94.
7. Brooker DS. Rheumatoid arthritis: otorhinolaryngological manifestations. Clin Otolaryngol Allied Sci 1988;13(3):239-46.
8. Ozcan M, Karakuş MF, Gündüz OH, Tuncel U, Sahin H. Hearing loss and middle ear involvement in rheumatoid arthritis. Rheumatol Int 2002;22(1):16-9.
9. Kastanioudakis I, Skevas A, Danielidis V, Tsiakou E, Drosos AA, Moustopoulos MH. Inner ear involvement in rheumatoid arthritis: a prospective clinical study. J Laryngol Otol 1995;109(8):713-8.
10. Walek H, Fritze W, Kolarz G. Possible involvement of the auditory system in rheumatoid arthritis. Z Rheumatol 1980;39(3-4):91-4.