DOI:10.24041/ejmr2020.45

OTOTOXICITY IN MDR-TB PATIENTS ON CATEGORY-4 REGIMEN: A CASE REPORT

Tanish Baqar*, Sharique Ahmad, Silky Rai

Undergraduate Student, Department of Pathology*

Era's Lucknow Medical College & Hospital, Sarfarazganj Lucknow, U.P., India-226003

Received on : 20-11-2020
Accepted on : 12-12-2020

Address for correspondence
Dr. Silky Rai
Department of Pathology
Era's Lucknow Medical College & Hospital, Lucknow-226003
Email: drsilkyrai@gmail.com
Contact no: +91-7004182385

ABSTRACT

Multiple drug-resistant tuberculosis (MDR-TB) is a critical situation affecting adults as properly as children across the globe (1). To determine the incidence and risk factors associated with Multiple Drug Resistant Tuberculosis (MDR-TB) (2), we studied Ototoxicity on 18 culture confirmed MDR-TB patients in Eras' Lucknow Medical College and Hospital, Lucknow from September, 2019 to January, 2020. This case follows a well documented report of a patient describing an unusual and novel occurrence of ototoxicity when undergoing treatment concerning multiple drug resistance tuberculosis along with symptoms, signs, diagnosis, treatment and follow-up (3). For descriptive convenience, the patient will be classified as patient 1. The following case is the cornerstones of medical progress and provides many new ideas in medicine. Containing an extensive review of the relevant literature on the topic, the case report is a rapid short communication between busy clinicians who may not have time or resources to conduct large scale research.(4)

KEYWORDS: Multiple-drug resistant tuberculosis, Ototoxicity, Second line injectables, Kanamycin.

INTRODUCTION

In India, estimates confirmed that the superiority of MDR-TB among new and previously dealt with patients changed into 2.5% and 16%, respectively over the following years (5). Multiple drug-resistant tuberculosis is a particular type of drug resistant TB. It signifies that Mycobacterium tuberculosis, the causative agent for tuberculosis that an individual is infected with is immune to two of the foremost drugs, isoniazid (INH) and rifampicin (RMP) which are usually provided as an anti-tuberculosis drug (2). This designates that the person is resistant and won't be cured by the above medicine, the patient will require a different regimen especially prescribed for MDR-TB patients subdivided as an Intensive and a Continuous phase. This study used a small number of (n = 18) patients, despite their high risk for toxicity children were excluded. The study population comprised of all patients who were treated for MDR-TB at Eras' Lucknow Medical College and Hospital. The inclusion criteria included all those culture positive patients suspected with MDR-TB from September, 2019 to January, 2020 receiving second-line injectables.

During the intensive phase therapy of MDR-TB treatment regime, any of the injectables (Capreomysin, Amikacin and kanamycin) are prescribed as second line injectables' (SLI) (1). The bacterial protein synthesis is restrained by Kanamycin and Amikacin. Capreomysin is much more expensive in comparison to Kanamycin and Amikacin. A higher cross-resistance is seen between Amikacin and kanamycin but not as such with Capreomysin (1). These drugs are conventionally given intramuscularly; they can also be given intravenously for variable periods depending on the available intravenous access (1). Irreversible ototoxicity with these drugs is an earnest issue and needs meticulous monitoring. The incidence of ototoxicity increases sharply after 6 months of avail (7). The auditory perception loss commences from frequencies higher than the conventional verbalizing range; hence audiometry (including frequencies higher than 8000 Hz) is better suited than clinical monitoring for early detection of ototoxicity (1).

Criteria: In words Hearing loss can be explained as follows:

- Normal Hearing <25 db HL (adults)
- Mild hearing loss = 25-40 db HL
- Moderate hearing loss = 41-65 dB Hl
- Severe hearing loss = 66-90 db HL
- Profound hearing loss = 90+db HL

OBSERVATION

PRE-OPERATIVE/UNAIDEDAUDIOMETERY

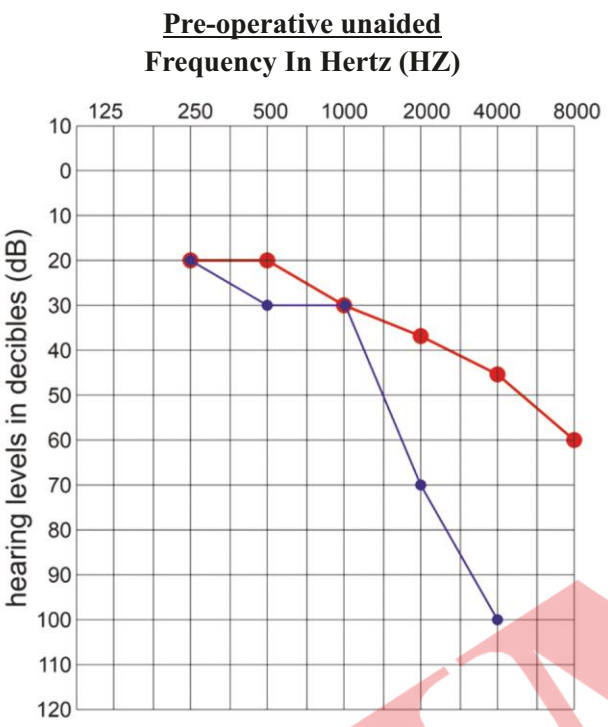

Fig. 1: The Original Image Shows A Post-operative/ Unaided Audiometry Graph Derived From Patient 1 With Ototoxicity. The Y-axis Represents Hearing Levels In Decibels (db) And X-axis Represents Frequency (hertz). The Graph Shows Mild-frequency Sensorineural Hearing Loss In The Right Ear And Moderately Severe Conduction Hearing Loss In The Left Ear.

RESULT

Between September, 2019 to January, 2020, 18 patients admitted through inclusion criteria were resistant in-vitro to rifampicin and isoniazid with or without other anti-tubercular drugs based totally on Drug Susceptibility Test (DST) results from an RNTCP- certified Culture and DST Laboratory and were called as a Multiple drug resistant-TB suspect (MDR-TB). The incidence was significantly equal among men (50%) and women (50%), higher in persons > 17years of age (77%) than in younger patients <17years of age (22%). Out of the 18 patients examined, ototoxicity was found in 2 subjects (11.1% patients) during their intensive therapy phase. In patient 1 the Incidence of high frequency hearing loss was lower at week 1, and gradually increased after 6 weeks of follow up. The hearing curve of Patient 1 shows that he is struggling with mild-frequency sensorineural hearing loss in the right ear and moderately severe conduction hearing loss in the left ear. The incidence of Ototoxicity was found to be more common in males as compared to females. (8). The audiogram for patient 1 is shown above in figure 1. The air conduction threshold is plotted onto the graph using red circles (representing the right ear) and blue crosses (representing the left ear). A continuous line is drawn to connect the circles and crosses

DISCUSSION

The auditory perception level is quantified relative to "normal" hearing perceiving in decibels (dB), with higher numbers of dB designating worse hearing on the vertical axis and frequency in hertz on the horizontal axis (3). The dB score is not authentically percent loss, but nevertheless 100 dB hearing loss is approximately equipollent to consummate auditory impairment for that particular frequency. It is said normal when the score is 0. In any possible case when the scores is less than 0, it denotes better than average hearing ability (3). The hearing curve of Patient 1 shows that he is struggling with mild-frequency sensorineural hearing loss in the right ear (8). Sensorineural hearing loss is positioned in the inner ear and frequently influences higher frequencies since these frequencies are detected at the base of the cochlea and are thus more susceptible to issues and functional deterioration (9). Some individuals have a sensorineural hearing loss only at high frequencies, also referred to as partial deafness, sometimes only the hair cells at the base of the cochlea are damaged. In the internal part of the cochlea, the apex, the hair cells, which are accountable for processing the low tones, are nonetheless intact (10). Combined electric and acoustic stimulation, or EAS, was developed particularly for these cases (11). His left ear shows moderately-severe conductive hearing loss. Any trouble in the outer or middle ear that inhibits sound from being conducted well enough is referred to as conductive hearing loss (12). Conductive hearing losses are usually mild or moderate in degree, ranging 25 to 65 decibels (13). In some cases, a conductive hearing loss can be temporary (11). Depending on the specific cause of the hassle, medicinal drugs or surgical operation can help. Hearing aids or a middle ear implant can be used during a conductive hearing loss (11).

CONCLUSION

Permanent hearing disability is seen during long term administration of second-line anti-TB drugs which occurs because anti-tuberculosis SLIs (Capreomysin, Amikacin and kanamycin) especially Kanamycin, selectively eradicate cochlear hair cells targeting hair cells responsible for hearing at higher frequencies

first, and as the damage worsens it further progresses towards lower frequencies(15). As a result, WHO has suggested identification and early truculent administration of detrimental drug reactions as an imperative (14) component of the care of MDR-TB patients which increases adherence to treatment as a key to prosperous yet affluent consequences (15).

REFERENCES

1. Mukherjee A, Lodha R, Kabra SK. Current therapies for the treatment of multidrug-resistant tuberculosis in children in India. Expert opinion on pharmacotherapy. 2017; 18(15):1595-606.
2. Ress BD, Gross EM. Irreversible sensorineural hearing loss as a result of azithromycin ototoxicity: a case report. Annals of Otology, Rhinology & Laryngology. 2000; 109(4):435-437.
3. Johansen PB, Gran JT. Ototoxicity due to hydroxychloroquine: report of two cases. Clinical and experimental rheumatology. 1998; 16(4): 472-474.
4. Bates DE, Beaumont SJ, Baylis BW. Ototoxicity induced by gentamicin and furosemide. Annals of Pharmacotherapy. 2002; 36(3): 446-451.
5. Prasad R, Gupta N, Singh A, et al. Multidrug-resistant and extensively drug-resistant tuberculosis (M/XDR-TB): management in special situations. International Journal of Medical Science and Public Health. 2015; 4(12): 1626-1633.
6. Prasad R, Gupta N, Banka A. Multidrug-resistant tuberculosis/rifampicin-resistant tuberculosis: Principles of management. Lung India: official organ of Indian chest society. 2018; 35(1): 78.
7. Modongo C, Pasipanodya J, Zetola N, et al. Amikacin Concentrations Predictive of Ototoxicity in Multidrug-Resistant Tuberculosis Patients. Antimicrobial Agents and Chemotherapy. 2015; 59(10): 6337-6343.
8. Shewade H, Kokane A, Singh A, et al. Treatment Initiation among Patients with Multidrug Resistant Tuberculosis in Bhopal District, India. Journal of Tuberculosis Research. 2017; 5(4): 237-242.
9. Valete-Rosalino CM, Rozenfeld S. Auditory screening in the elderly: comparison between self-report and audiometry. Brazilian journal of otorhinolaryngology. 2005; 71(2):193-200.
10. Downs MP, Sterritt GM. Identification audiometry for neonates: a preliminary report. Journal of auditory research. 1964; 22: 21-23.
11. Bailie GR, Neal D. Vancomycin ototoxicity and nephrotoxicity. Medical toxicology and adverse drug experience. 1988; 3(5):376-386.
12. Vietor NO, George BJ. Oxaliplatin-induced hepatocellular injury and ototoxicity: a review of the literature and report of unusual side effects of a commonly used chemotherapeutic agent. Journal of Oncology Pharmacy Practice. 2012; 18(3): 355-359.
13. Huizing EH, De Groot JC. Human cochlear pathology in aminoglycoside ototoxicity—a review. Acta Oto-Laryngologica. 1987; 104(sup436): 117-125.
14. Jangra MS, Chhabra M. Cycloserine induced suicidal tendencies and kanamycin induced ototoxicity in Indian MDR-TB patient: a case report. Current drug safety. 2018; 13(3): 211-213.
15. Prasad R, Singh A, Gupta N. Adverse drug reactions in tuberculosis and management. Indian Journal of Tuberculosis. 2019; 66(4):520-532.

How to cite this article : Baqar T., Ahmad S., Rai S. Ototoxicity In Mdr-tb Patients On Category-4 Regimen: A Case Report. Era J. Med. Res. 2020; 7(2): 257-259.

licencing Information

Attribution-ShareAlike 2.0 Generic (CC BY-SA 2.0)

Derived from the licencing format of creative commons & creative commonsmay be contacted at https://creativecommons.org/ for further details.