Acoustic Trauma in Soldiers Associated with Demolition Accident: A Case Report

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1. INTRODUCTION

Acoustic trauma is a hearing impairment due to exposure of impulsive loud noise that can caused permanent hearing loss[1,2,3]. The impairment that occurs the ears not only mechanical impairment (eg. Tympanic membrane rupture, endolymphatic hydrops, etc), but also metabolic impairment in the cochlea (oxidative stress), so that tend to impairment and necrosis stereocilia of the cochlea.

Demolition using explosion weapons is one of skill for the soldiers who are demolition training (commando, raider, etc).

2. CASE REPORT

About one year ago, an accident of demolition training occurs in 18 soldiers of Raider course in Pusdiklatpassus Batujajar, West Java, Indonesia. Two soldiers immidiately reffered to Jakarta Centre Army Hospital, because had an eyeball rupture, while 16 soldiers suffered a hearing loss reffered to ENT Department of Dustira Army Hospital. Five soldiers (PAD 1), six soldiers (PAD 4), and five soldiers (PAD 10).

3. CASE DATA

Table 1. Examination Result of The Demolition Victims

No	Name	Age (years)	Symptoms	Physical Examination	Otoscopy	Audiometry
1.	RR (PAD 2) Prada 31160045770695	19	− Hearing loss − Tinnitus	Face excoriation	Bilateral tympanic membrane perforation	Mixed type hearing loss moderate-severe
2.	IS (PAD 2) Praka 31090643230889	28	− Hearing loss − Tinnitus	Face excoriation	Sinistra tympanic membrane perforation	Acoustic trauma
3.	FR (PAD 2) Prada 31170020750798	19	− Hearing loss − Tinnitus	Face excoriation	Tympanic membrane intact, hyperaemia +/+	Acoustic trauma
4.	RH (PAD 2) Pratu 31120043160890	27	− Hearing loss − Tinnitus	Face excoriation	Sinistra tympanic membrane perforation	Acoustic trauma
5.	RP (PAD 2) Praka 31090638040588	29	− Hearing loss − Tinnitus	Face excoriation	Sinistra tympanic membrane perforation	Acoustic trauma
6.	Lgt (PAD 4) Prada 31150031410995	22	− Hearing loss − Tinnitus	Face excoriation	Tympanic membrane intact, hyperaemia +/+	Acoustic trauma
7.	Rmj (PAD 4)	25	− Hearing loss − Tinnitus	Face excoriation	Dextra tympanic membrane perforation	Acoustic trauma

	Pratu 31110340171191					
8.	NH (PAD 4) Prada 31160373461194	22	− Hearing loss − Tinnitus	Face excoriation	Dextra tympanic membrane perforation	Acoustic trauma
9.	Isw (PAD 4) Praka 31060543190486	31	− Hearing loss − Tinnitus	Face excoriation	Tympanic membrane intact, hyperaemia +/+	Acoustic trauma
10.	Mds (PAD 4) Pratu 31120040840590	27	− Hearing loss − Tinnitus	Face excoriation	Tympanic membrane intact, hyperaemia +/+	Acoustic trauma
11.	YP (PAD 4) Serda 21140098771095	21	− Hearing loss − Tinnitus	Face excoriation	Bilateral tympanic membrane perforation	Mixed type hearing loss moderate-severe
12.	BP (PAD 10) Prada 31150355230496	21	− Hearing loss − Tinnitus	Face excoriation	Tympanic membrane intact, hyperaemia +/+	Acoustic trauma
13.	Ssr (PAD 10) Serda 21150201130295	22	− Hearing loss − Tinnitus	Face excoriation	Sinistra tympanic membrane perforation	Acoustic trauma
14.	Rzk (PAD 10) Prada 31150031330995	22	− Hearing loss − Tinnitus	Face excoriation	Tympanic membrane intact, hyperaemia +/+	Acoustic trauma
15.	AK (PAD 10) Sertu 21120007201291	25	− Hearing loss − Tinnitus	Face excoriation	Bilateral tympanic membrane perforation	Acoustic trauma
16.	RF (PAD 10) Sertu 21120221790692	25	− Hearing loss − Tinnitus	Face excoriation	Dextra tympanic membrane perforation	Acoustic trauma

Physical examination data shows that all of the soldiers (100%) suffered tinnitus, hearing loss, and face excoriation due to grenade explosion during the demolition training. Ten soldiers (62,5%) suffered tympanic membrane rupture, either unilateral or bilateral, and almost all of the soldiers (87,5%) suffered acoustic trauma.

Figure 1. Otoscopy and Audiometric

4. DISCUSSION

A huge accoustic energy (explosion) exposed to the ears caused an mechanic impairment such as tympanic membrane rupture or hydrolymphatic rupture of the cochlea and metabolic impairment in the cochlea (oxidative stress), so that tend to impairment and necrosis stereocilia of the cochlea.[1-5]

The accident during demolition training is a occupational accident, and the victims will suffered blindness or without hearing impairment.[1,6] Audiometric examination results and subjective symptoms after the 10th day of the explosion shows tend to permanent hearing loss. It shows the absence of body protection system in high risk occupational activities (example: demolition training).

Noise induced hearing loss is the most common case of occupational accident.[6] The military is an institution that working on close-related with an explosion weapons, so that hearing prevention program can reduce of hearing loss. Preventive of hearing impairment program is a method to decrease the prevalence of hearing impairment in the

workplace. Implementation of hearing conservation program will improve the quality of life of the soldiers and civil society in the military environment.

5. REFFERENCES

1. Dobie RA. Noise Induce Hearing Loss. Head and Neck SurgeryLaryngology. Second edition. Edited by Byron J Bailey. Lippincott-Raven Publishers. Philadelphia. 1998. Halaman: 2155− 56.
2. Sataloff TR and Sataloff J. Sensorineural hearing loss. Diagnostic criteria. hearing loss. Second edition. Copyright by Mercel Dekker, Inc. New York. 1993. 253–7.
3. Alberti PW. Noise and the ear. Scott Brown's Otolaryngology. Edited by Alan G Kerr. Butterworth-Heinemann. London. 1997;6 (2/11/7–2/11/18).
4. Colleen G, Le Prell, Daisuke Y, Shujiro BM, Tatsuya Y and Josef MM. Mechanism of noise-induced hearing loss indicate methods and prevention. Hear Res.2007 April;226(1-2):22–43.
5. Henderson D, Bielefeld EC, Harris KC, Hu BH. The Role of oxidative stres in noise induced hearing loss. Ear and Hearing : Lippincott Williams & Wilkins, USA ; 2006.27:1–19.
6. Nilland J. Zenz C. Occupational hearing loss, noise, and hearing conservation. Zenz C. (chief ed). Dickerson OB. Horvarth EP. Occupational Medicine. 3rd ed. Mosby. St. Louis: 1994.