HEARING IMPAIRMENT CAUSED BY WAR

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INTRODUCTION

The live weapons, artillery, heavy bombings and explosions are the cause of many lives lost and handicapped from war all over the world. Hearing impairment is one of the ailments resulting from war and has been extensively developed in clinical work and reports on study the subject.3-4, 16

Unlike the very gradual and continuous type of damage to the ear caused by industrial conditions, hearing damage due to military activities is secondary to the loud impact noise and blast wave exposure appearing in a matter of seconds. A closer examination of the available literature indicates that the explosion of artillery, heavy bombings and explosions are the causes of hearing impairment in war.1-3, 16

There was sufficient information on 111 cases of soldiers at the Ghaem Medical Center in Mashad, Iran while implying that war seems to be a major factor in causing hearing impairment. This study while implying that war seems to be major factor in causing hearing impairment, intends to clarify some of the cause and effect relations also. The hearing impairment caused by war can be of different types and severity and will be a real handicap.

Table 1- Types of hearing impairment in war

<table>
<thead>
<tr>
<th>Type of hearing loss</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensorineural</td>
<td>54 46.7%</td>
</tr>
<tr>
<td>High frequency</td>
<td>31 29%</td>
</tr>
<tr>
<td>Conductive</td>
<td>24 22.4%</td>
</tr>
<tr>
<td>Functional</td>
<td>2 1.9%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

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experiment on sheep and chinchillas with 160 dB, and
an acute mechanical fracture of the organ of Corti was
demonstrated. The damage to the basilar membrane
and Hensen cells are part of the histopathology caused
by the loud impact noise in the experiments of
Voldrich.2 Finally if the victim survives the other
injuries, acoustically, a precox aged ear with severe
handicap will result from these types of traumatic
exposures.

While our experience in every day clinical work
speaks in favor of membrane perforations, rupture of
the eardrum, etc., documents pointing to what hap­
pens in the auditory system of a soldier whose ears are
being damaged are scarce.2,4 The clinical history mostly
reports of accidental explosions near the firemen4
and may be quite different from the real military
experiences presented in this paper. The therapeutic
aspect is only confined to the ruptured eardrum, a
clinical finding which is not the main problem. The
sensorineural deafness is the major part of the ailment
caused by war as is shown in this presentation.

MATERIAL AND METHOD

A clinico-audiological study was designed to include
those soldiers who were complaining from hearing
impairment caused by war. This study was performed
at the ENT out-patient department of the Ghaem
Medical Center in Mashad, Iran. One hundred and
twenty soldiers were originally brought into this
prospective study. They were followed for a period of
three years. Nine of them were dropped because they
did not have adequate information to confirm their
hearing impairment was caused by war trauma. The
data collected from 111 cases are summarized as fol­

Categorization of the hearing impairment: The
hearing loss of the troopers were classified in the
following four groups:

<table>
<thead>
<tr>
<th>Types of hearing impairment</th>
<th>Perforated eardrum</th>
<th>Unrelated</th>
<th>Hemotympanum</th>
<th>Intact Drum</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bilateral</td>
<td>Unilateral</td>
<td>Bilateral</td>
<td>Unilateral</td>
<td></td>
</tr>
<tr>
<td>Conductive</td>
<td>5</td>
<td>8</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Sensorineural</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>High-frequency</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Functional</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Type of hearing impairment:
The severity of hearing loss:

<table>
<thead>
<tr>
<th>Type of hearing impairment</th>
<th>The severity of hearing loss</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dead ear</td>
</tr>
<tr>
<td>Unilateral conductive</td>
<td>-</td>
</tr>
<tr>
<td>Bilateral conductive</td>
<td>-</td>
</tr>
<tr>
<td>Unilateral Sensorineural</td>
<td>1</td>
</tr>
<tr>
<td>Bilateral Sensorineural</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
</tr>
</tbody>
</table>

Sensorineural hearing loss,
High frequency loss. This type of sensorineural
hearing loss is seperately categorized because of its
specific relation to the abrupt loud impact noise of a
handgun.

Conductive hearing loss, corresponding to rupture
of the eardrum or ossicular chain derangement.

Functional

Table I summarizes this categorization.
The otoscopic findings are summarized in Table II.
The perforated eardrum was considered to be unre­
lated to the trauma of war when the soldier had a strong
positive history of a previous ear infection.

The severity of the hearing loss: The degree of the
hearing loss was studied in those whose hearing prob­
lem was sensorineural or conductive. Table III summa­
rizes this part of the study.

Hearing impairment and its relation to the type of
explosion: The history of the type of explosion was
asked for and the number of cases was recorded in
Table IV.
RESULTS

In this study, sensorineural hearing loss was the most common type of hearing impairment and the severity of this complication places war trauma as the foremost factor causing hearing handicaps.

The abrupt loud impact noise of heavy explosions and continued handgun shooting as well as the blast wave exposure are considered to be the major factors responsible for producing sensorineural hearing loss.

The complications within the auditory system are studied in more detail pointing to the possibility of a cause and effect relation between the type of explosions and the type of hearing impairment.

DISCUSSION

111 cases of hearing impairment caused by war, were the subject of this clinico-audiologic assessment over a period of three years. Adequate history was obtained and physical exam performed to verify that the patient’s hearing impairment has resulted from the soldier’s engagement in different types of explosions.

This limited study while not sufficient to draw a statistical conclusion, may be able to comment on the following facts with some degree of certainty:

War is a major source of loud impact noise and will increase the incidence of hearing impairment. Considering of the type of hearing impairment and its severity, the conclusions drawn from Tables I and II may suggest that 76 of the hearing impairments are classified as sensorineural and 50 of them will either have a dead ear or severe hearing loss. This study points to the significance of war trauma as a major factor causing hearing handicaps.

REFERENCES