Otological Manifestations of a Scud Missile

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In the worst Scud missile attack of the Gulf war, a surface to surface missile demolished a barracks block in Dhahran, Saudi Arabia. Twenty-eight soldiers were killed; 98 were admitted to King Fahad Hospital of the University (KFHU) in Al-Khobar, of these 60 wounded, 20 were seen by the ENT surgeon; 15 (25%) had severe ear injuries. The protocol was to refer those with ear injuries to primary treatment all patients with ear injuries were later transferred to a military hospital. This paper analyses injuries to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm those attending to the ears, and suggests that during an alarm...
Figure 1. The pure tone audiogram of the patient with a right moderate sensorineural hearing loss and a left dead ear.

Figure 2. Plain X-rays showing a Scud missile shrapnel lodged posterior to the parotid gland.

Site of the blast, KFHU received 60 of the 98 wounded soldiers. Of these, 20 were seen by the ENT specialist; 19 were males and one female. (Circumstances did not allow the same ENT specialist to see all the 60 wounded soldiers at KFHU.) Their ages ranged from 19 to 47 years. Fifteen of them had otological injuries; six had traumatic perforation of the tympanic membrane (five unilateral and one bilateral = seven ear drums), resulting in
conductive hearing loss of mild to moderate degree. Three soldiers (including the only female) had mild unilateral sensorineural hearing loss. Figure 1 shows pure tone audiogram of the only patient with a dead left ear and a moderate sensorineural hearing loss in the right ear. Other otological manifestations of the loud sound are listed in the table. No patient complained of vertigo. One patient had a fractured temporal bone.

The remaining five patients had shrapnel injuries to the head and neck. Three of them had superficial injuries of no serious nature. Of the other two, one had shrapnel lodged in the maxillary antrum, and in the second, the shrapnel pierced the anterior wall of the cartilaginous external auditory meatus and was embedded in the sulcus posterior to the parotid gland (Fig. 2). This patient was found to have incomplete facial palsy the following morning before the shrapnel was removed. His tympanic membrane and cochlear functions were intact.

**Discussion**

Loud sound, from both military and industrial sources, can cause severe damage and disability. The otological sequelae of the loud noise of the Scud explosion in Dhahran were hearing loss, tinnitus, vertigo, and changes in equilibrium. Noise-induced hearing loss is an entirely preventable disability, but totally incurable. Methods of protection against chemical attacks are well established. The impact on the ear has not received appropriate attention in the design of protective devices. This is, undoubtedly, because the loss of life is the main concern. However, hearing protection ought to be an essential part of the precautionary measures that the general public is advised to follow in such circumstances. The otological sequelae of the loud noise of the Scud explosion in Dhahran were hearing loss, tinnitus, vertigo, and changes in equilibrium.