

A Novel Mode of Infection with Hepatitis B: Penetrating Bone Fragments due to the Explosion of a Suicide Bomber

Itzhak Braverman MD, David Wexler MD and Meir Oren MD

Otolaryngology Unit, and Directorate, Hillel Yaffe Medical Center, Hadera, Israel

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We describe a blast injury caused by a human suicide bomber that led to a penetrating bone fragment containing tissue positive for hepatitis B surface antigen. The tissue acted as an infectious source that was disseminated by the explosion.

Patient Description

Following the explosion of a human suicide bomber, 32 people who suffered blast injuries presented to the emergency room of our hospital. Of these, 22 patients were admitted: 4 had severe injuries, 5 had moderate injuries, and the remainder was mildly wounded. We present one of these patients.

On examination, this 31 year old woman was fully conscious, with multiple skin abrasions and lacerations due to impacted blast fragments. She had first-degree facial burns and some deep injuries in her legs. Bilateral traumatic tympanic membrane perforations were noted. There were no apparent chest or abdominal injuries. Computerized tomography scans of the neck and chest revealed no internal damage, but several high density fragments were noted in the right cervical subcutaneous tissues [Figure], as well as in the left breast, pubis, right hand and both legs.

The patient was taken to the operating room where embedded bone fragments were removed from the neck [Figure], breast and pubis. The postoperative recovery was uneventful and she was discharged home on postoperative day 60, following prolonged

orthopedic treatment because of the leg injuries. Her hearing test showed bilateral high tone sensorineural hearing loss with normal speech reception thresholds.

The bone fragments were sent to the Israel Institute of Forensic Medicine, and examination revealed findings positive for HbsAg (by the AXSYM system, Abbott, USA) Human immunodeficiency virus test was negative. Accordingly, the patient was treated with active and passive hepatitis B vaccinations.

Comment

Powerful explosions commonly cause conventional blunt and penetrating trauma. Knowledge of the potential mechanisms of injury will greatly aid the management of blast injury patients [1].

Human bone fragments, which act as foreign bodies and are of biologic infected origin, are a new concept in blast injuries. Primary blast injuries occur as a direct effect of change in atmospheric pressure caused by the blast wave. Secondary blast injuries occur when objects accelerated by the energy of the explosion strike the victim [1], causing blunt or penetrating ballistic trauma (as described here) by the bone fragments.

Traditional blast injuries include burns, impacted shrapnel from the bomb itself, and tympanic membrane damage and hearing threshold shifts from pressure waves. In the case of a suicide bombing, the blast shrapnel may include soft tissue and bone fragments from the bomber himself, creating a novel and gruesome way of disseminating infectious disease. We believe that the routine submission of such retrieved bone fragments for formal virologic analysis is warranted. Real-time ultrasound can be used to guide the surgeon both in seeking dynamic bone fragments and removing the foreign body [2].

Because of the above described case, the Israel Ministry

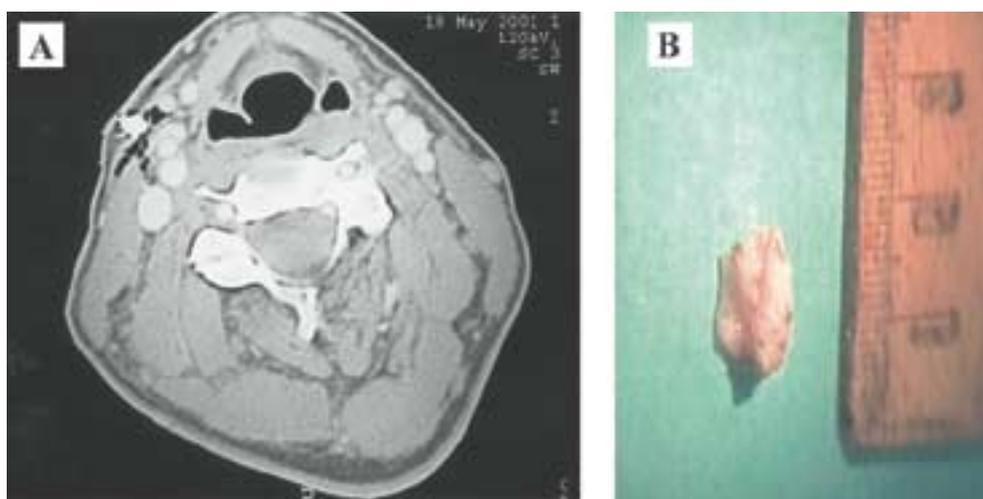


Figure 1. [A] Axial CT of the neck showing right cervical bone fragment foreign body with air in the subcutaneous tissue. **[B]** Bone fragment that was removed from the neck and sent for laboratory examination for HbsAg.

HbsAg = hepatitis B surface antigen

of Health has ordered active immunization against hepatitis B for all injured patients in such terror attacks.

To the best of our knowledge this is the first report on human bone fragments acting as foreign bodies in a blast injury [3,4].

References

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Correspondence: Dr. I. Braverman, Director, Otolaryngology Unit, Hillel Yaffe Medical Center, Hadera 38100, Israel.

Phone: (972-4) 630-4549/4275

Fax: (972-4) 821-5575

email: braverman@hillel-yaffe.health.gov.il

Oxymorons – the combination of contradictory or incongruous words

Act naturally	Passive aggression
Found missing	Clearly misunderstood
Genuine imitation	Temporary tax increase
Same difference	Tight slacks
Almost exactly	Plastic glasses
Government organization	Definite maybe
Alone together	Pretty ugly
Silent scream	Exact estimate
Small crowd	Microsoft Works
Sweet sorrow	