Letter from Croatia

WOUNDS CAUSED BY LOW-VELOCITY HAND GRENADE SPHERES

Several recent reports deal with wounds caused by modern high-velocity bullets. However, few reports analyse the potential of close-range shotgun discharges in causing wounds. Shotgun shells have a pelleted load similar to that of the assault M75 hand grenade (ex-Yugoslav Federal Army Arms Factory ‘S. Rodic’ Bugojno, Bosnia and Herzegovina), which contains approximately 4000 spheres, 3 mm in diameter in a plastic shell. These shells are dangerous at point-blank range because of the small kinetic energy loss.

During the 1991–92 war, Osijek University Hospital functioned as a war hospital for the north-eastern region of Croatia. During the 18 months (May 1991–November 1992), 4545 injured were managed at the Department of Surgery, Osijek University Hospital. Among them, 25 sustained injuries by M75 assault hand grenade. We studied the hospital records of these patients (3 women and 22 men) who had a mean age of 24 years and were followed up for 3–5 months after injury. Six patients were civilians and 19 were army personnel. The mean transportation time from the site of injury to the hospital was 50 minutes. X-ray exploration was done in all patients.

Patients underwent either a limited or a formal surgical procedure. Limited surgical procedure included limited excision, wound irrigation and antiseptic coverage, systemic antibiotics and observation. Formal surgical procedure meant general anaesthesia, wound excision, exploration of the projectile path and, if necessary, opening of the body cavities (laparotomy). No attempt was made to remove pellets that were not conveniently found during wound treatment.

The mean hospital stay was 13 days for those 13 patients who were admitted to the hospital. The remaining 12 were discharged after the surgical procedure.

Four patients had a single injury and 21 had multiple injuries. Injuries of the lower extremity occurred in 14 patients and of the upper extremity in 13 patients. There were 2 traumatic amputations, both of which required surgical re-amputation. Ten patients had head injuries, and 10 had thorax injuries. There were 7 patients with abdominal wall injuries.

Six patients had penetrating injuries (body cavity penetration, explosive bone fractures, opened joints, vascular injuries), which occurred in association with head injury (3/10 patients) thoracic injury (1/10), abdominal wall injuries (2/7), and 4 of 27 patients with injured limbs had injuries of the deeper structures (2 ampu-
tations, 2 bone injuries, 1 radial artery lesion). There were 2 brain injuries, 1 eye injury, 2 lung injuries, 1 liver, 1 spleen, 1 stomach, 1 colon and 1 diaphragm injury.

Five patients underwent a formal surgical procedure (2 re- amputations, 2 thoracic drainages, 1 diagnostic abdominal lavage, 1 abdominal exploration with suturing of the stomach and colon and splenectomy, and 1 eye operation), and the remaining 20 underwent a limited surgical procedure. Antibiotics such as penicillin, aminoglycoside and metronidazole were administered in 20 patients.

One patient was evacuated early and was lost to follow up; the remaining 24 (96%) had no postoperative complications.

Wide surgical debridement, routine antimicrobial prophylaxis and delayed closure are the principles for managing severely contaminated wounds in wartime. Since pellets leave the plastic bombshell unclustered and spread quickly, they behave as isolated, small, low-velocity missiles with small wounding potential. Even when penetrating deep into the body, they cause minimal disruption and no temporary cavitation while releasing most of the energy to the surface even at point-blank range.

Our experience indicates that the majority of low-velocity wounds by a hand grenade may be safely treated in a limited manner. It appears that penetrating injuries caused by the M75 hand grenade demand a careful, conservative surgical attitude.

REFERENCES
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