

BLAST INJURIES: SPECIFICITIES AND NEW TRENDS

Marco Baldan – ICRC Regional Surgeon for Middle East



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SPECIFICITIES AND NEW TRENDS

- Delayed bowel perforations
- Quinary type of lesions
- Asphyxiation from fuel-air bombs
- Organic contamination
- Biological contamination
- Chemical warfare



DELAYED BOWEL PERFORATIONS

- First (?) description: Huller and Bazini, Blast injuries of the chest and abdomen. Arch Surg, 1970, 100:24-30.
- 32 patient injured by underwater blast > 24 underwent laparotomy. 1 showed subserosal haematoma without perforation. One week later deterioration of clinical conditions and at re-laparotomy multiple intestinal perforations.



DELAYED BOWEL PERFORATIONS

- First clear evidence: Paran et al, Perforation of the terminal ileum induced by blast injury: delayed diagnosis or delayed perforation? J Trauma-Injury Infection & Crit Care, March 1996, Vol 40 (3), 472-475.
- Case 1: 19 Y male, ER 20 minutes after blast, fully alert and haemodynamically stable. Abdomen soft, normal peristalsis, no tenderness. 20 hours after admission abdominal pain and signs of peritoneal irritation. Laparotomy: 8 cm haematoma of distal ileum with several small perforations.
- Case 2: 20 Y male, ER 35 minutes after blast, fully alert and haemodynamically stable. Abdomen soft, no tenderness. 24 H after admission abdomen soft and normal peristalsis > fluids by mouth. 48 H after admission abdominal pain, tenderness, peritoneal irritation. X-rays=free air. Laparotomy: 10 cm haematoma of distal ileum with several perforations in the middle.



DELAYED BOWEL PERFORATIONS

- Review article: Owers et al, Abdominal trauma in primary blast injury. Br J Surg 2011, 98: 168-179.
- Experimental studies:
- Johansson et al, Intramural haemorrhage of the intestine as an indirect effect of **missile** trauma. Acta Chir Scand 1982, 148:15-19. > Two of 11 lesions perforate at 23 and 26 hours.
- Johansson et al, Intestinal intramural haemorrhage after abdominal **missile** trauma – clinical classification and prognosis. Acta Chir Scand 1984, 150:51-56. > 5.4% delayed perforations.
- Cripps and Cooper, Risk of late perforations in intestinal contusions caused by **explosive blasts**. Br J Surg 1997, 84: 1298-1303. > 16% of small bowel and 12% of large bowel at high risk for late perforations



DELAYED BOWEL PERFORATIONS

Management:

- Observation for 48h (Paran, 1996)
- Excision/repair (Cripps and Cooper, 1997) if $> 15\text{mm}$ or covering more than 50% circumference on small bowel and $> 20\text{ mm}$ or confluent on large bowel

QUINARY TYPE OF BLAST LESION

- Article from Kluger et al 2006.
- Related to PETN (pentaeritritoltetranitrate)?
- Characterized by a systemic hyperinflammatory response without associated lesions that can explain it.
- Signs are: tachycardia, fever, low central venous pressure, increased fluid requirements to maintain an adequate tissue perfusion.



ORGANIC CONTAMINATION

- Animals (donkeys, horses, etc) carrying bags with explosive and raw fecal material (ENL-Colombia, Pakistan).
- Home made antipersonnel landmines containing fecal material and soft wood (Cambodia).



BIOLOGICAL CONTAMINATION FROM OTHER HUMAN BEINGS

- From suicide bomber
- From other victims

- 1 out of 32 victims of blast in Israel found with embedded allogenic bone fragment tested positive for Hep B virus (Braveman et al, IMAJ 2002; 4:528-529.)

- 5 out of 194 victims from London blast had allogenic bone fragments (Wong et al, J Trauma 2006; 60: 402-404.)



MANAGEMENT

- Hepatitis B prophylaxis (PEP) (Braverman 2002, CDC Atlanta)
- Hepatitis C testing (CDC Atlanta)
- HIV prophylaxis (PEP) in selected cases (CDC Atlanta)

