Abstracts of Scientific and Invited Papers NATO Medical Conference 2009 and 8th NATO Blood Conference

30 September–02 October 2009 Estoril, Portugal

Epidemiological Surveillance

Wound Infection Surveillance of War Wounds in British Forces Personnel

Andrew Green;[1] *Tania Thomas;*[2] *Debbie Mortiboy;*[3] *Emma Hutley*[1]
1. Surgeon Generals Department, London, UK
2. Royal Centre for Defence Medicine, Birmingham, UK
3. University of Birmingham NHS Foundation Trust, Birmingham, UK

Introduction: Deployed British military personnel sustaining battlefield wounds enter a single aeromedical evacuation pathway with rapid repatriation to a sole UK civilian hospital in Birmingham. A prospective wound infection surveillance system was established to identify true clinical wound infection in these patients.
Methods: All military patients admitted to the UK civilian hospital with battlefield wounds were included and followed-up on until hospital discharge. Wounds were clinically and objectively assessed for infection using Surgical Site Infection Surveillance (UK definitions). Variables possibly affecting outcome such as type of injury and surgical interventions also were recorded.
Results: In the 12-month period (April 2008–April 2009) 162 patients were captured by WISS. Thirty-six distinct wound infection episodes occurred in 27 individuals—a wound infection rate of 16%. A total of 75% of these were classified as "deep" infections. All were contaminated at time of injury, most often blast injury (88%). No deaths resulted from wound infection. Microbiology varied, but *Acinetobacter species* caused no clinical infections despite significant rates (37%) of colonization.
Conclusions: The low clinical wound infection rate reflects the quality of primary surgical care. The results are a critical performance indicator of surgical and post-trauma care, forming an integral part of patient management. The wound infection surveillance system now will be extended to include long-term follow-up.
Keywords: British forces; infection; military personnel; wound; wound infection; war
Prehosp Disast Med 2010;25(5):s89

Impact of Medical Intelligence for Non-Medical Users

Salvatore Schmidt
Bundeswehr Medical Office, Germany

The NATO-accepted definition of *Medical Intelligence (Renseignement Médical)* is "intelligence derived from medical, bio-scientific, epidemiological, environmental and other information related to human or animal health. This intelligence, being of a specific technical nature, requires medical expertise throughout its direction and processing within the intelligence cycle." (AJMedP-3)

By combining inputs from several collecting methods and processing medical intelligence predict intentions, threats, risks, and future developments.

Medical intelligence contributes to an integral intelligence picture that highlightes threats and risks. For example:

1. Two countries are in a state of dispute that seems to be escalating. Suddenly, the border between the two countries is closed and all communication by road is ceased.
2. As medical intelligence signaled one of the countries has an outbreak of foot-and-mouth disease, and closed its border per OIE regulations.
3. The information confirmed that there was no escalation of foot-and-mouth disease, some of the bureaucratic systems functioned, and the country demonstrated commitment to international obligations.

Keywords: impact; medical; medical intelligence; non-medical
Prehosp Disast Med 2010;25(5):s89

Medical Evacuation

A Pilot Study of Performance of LTV1000 and TbirdVSO2 Ventilators Stimulated at Altitude: Study of Tidal Volume

Jean Pierre Tourtier; Thomas Leclerc; Borne
Military Hospital Val de Grâce, Paris, France

Introduction: Military air evacuations require a great amount of flexibility in terms of ventilator options, without alteration of tidal volume across a wide range of hypo-barometric conditions. The performance of two ventillators was studied using an advanced turbine delivery system: (1) a LTV1000; and (2) a TbirdVSO2. The ventilators' abilities to deliver a set tidal volume (V_t set) in the face of cabin altitude change and variable compliance and resistance were compared.
Methods: A decompression chamber was used to mimic the hypo-barometric environment at a range of cabin simulated

altitudes of 1,500 and 3,000 meters (4,000 and 8,000 ft). Ventilators were tested against models simulating a normal lung, a low compliance (ARDS) lung and a high-resistance (asthma) lung, with various FiO_2. The volumes delivered were measured with dedicated instrument of the French Air Force physiological laboratory.

Results:

	Normal Lung	Asthma	ARDS
LTV 1000: % maximum variation V delivered/V_t set	+16	+18	-16
T BIRD VSO2: % maximum variation V delivered/V_t set	-17	-18	-22

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Conclusions: Both ventilators performed well. In hypo-barometric conditions, the LTV1000 showed mostly a moderate increase in volume delivered for normal lung and asthma and moderate decrease and increase for ARDS, whereas the TBIRD VSO2 showed a moderate decrease in all cases (more marked with FiO_2 = 21%).

Keywords: air evacuation; altitude; ventilator
Prehosp Disast Med 2010;25(5):s89–s90

A Pilot Study of Performance of LTV1000 and TbirdVSO2 Ventilators at Simulated Altitude: Study of Fraction of Inspired Oxygen

Jean Pierre Tourtier; Thomas Leclerc; Borne
Military Hospital Val de Grâce, Paris, France

Introduction: The performance of two ventillators built with an advanced turbine delivery system (LTV1000 and $TbirdVSO_2$) was studied. The ventilators' abilities to deliver a set fraction of inspired oxygen (FiO_2) in the face of cabin altitude change and compliance and resistance variation were compared.

Methods: A decompression chamber was used to simulate the hypo-barometric environment from 1,500 to 3,000 meters (4,000 to 8,000 ft). A model of normal lung was used. Ventilators were tested with V_t = 700 ml and various FiO_2 set (21%, 50%, 90%). Each FiO_2 set was noted, the effective FiO_2 assessed by the ventilators (paramagnetic analysis) and the FiO_2 delivered (dedicated instrument of the French physiological laboratory of aviation) was measured.

Results: The maximum variation of FiO_2 really delivered compared to FiO_2 set and FiO_2 assessed is shown in the Table.

Ventilator	LTV 1000	LTV 1000	T BIRD VSO2	T BIRD VSO2
FiO2 set (%)	50	90	50	90
% variation FiO2 delivered/set	-3	+10	+20	+10
% variation FiO2 delivered/ assessed	+28	+30	+29	+14

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Conclusions: Both ventilators showed a moderate variation between FiO_2 set and delivered. On the other hand, variations between FiO_2 delivered and assessed are high, suggesting the inefficiency of ventilators hypo-barometric conditions.

Keywords: air-evacuation; altitude; ventilator
Prehosp Disast Med 2010;25(5):s90

Medical Air Transportation with Tbird Ventilator: Cabin Altitude Must be Input!

Jean Pierre Tourtier; Thomas Leclerc; Borne
Military Hospital Val de Grâce, Paris, France

Introduction: Mechanical ventilators suffer from variations in the environmental pressure. For a Tbird ventilator, the cabin altitude value should be input manually, which might be tedious. The ability of the Tbird VS02 to deliver a set tidal volume at high altitude was assessed in two cases: with and without the input of cabin altitude.

Methods: A decompression chamber was used to mimic the hypo-barometric environment at a range of cabin simulated altitudes of 1,500 and 3,000 meters (4,000 and 8,000 ft). A model of a normal lung was used. The ventilator was tested with V_t set = 400 ml and various FiO_2 (21%, 50%, 90%), with and without inputting cabin altitude. The volume delivered was measured using the dedicated instrument of the French Physiological Laboratory of Aviation and Space Medicine of the Air Force.

Results:

	1,500 m	3,000 m
V_t set (ml)	400	400
Volume delivered without input of cabin altitude	280 ±5	125 ±10
Volume delivered with input of cabin altitude	385 ±5	350 ±10

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Conclusions: Performance of the Tbird VSO_2 are reduced dramatically regarding V_t if the value of cabin altitude is not input manually. Concomitantly to the development of highly specialized machines, there is the need to train personnel to optimize the performance of the ventilators.

Keywords: air-evacuation; altitude; ventilator
Prehosp Disast Med 2010;25(5):s90

An Intensive Care Unit Taking Off!

Jean Pierre Tourtier; Thomas Leclerc; Borne
Military Hospital Val de Grâce, Paris, France

Introduction: Aeromedical evacuation (MEDEVAC) is a dimensioning component of French Armed Forces foreign deployment. Considering the technical limitations of the previous collective MEDEVAC system (conversion of an Airbus A 310), the Ministry of Defense asked for a new one, designed for MEDEVAC of multiple critically injured patients.

Methods: A non-dedicated vector among existing French Air Force aircraft with cargo capacity, high range, and permanent availability was selected. A platform meeting medical and aeronautical standards was created, based on a combination of specifically designed, modifiable modules.