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Acinetobacter baumannii in casualties returning from Afghanistan

ABSTRACT

Military personnel returning from Afghanistan and entering Canadian hospitals may be infected with multi-drug resistant *Acinetobacter baumannii*. The Public Health Agency of Canada, in conjunction with the Canadian Forces, have developed an alert to inform hospitals of the potential for importation of *Acinetobacter baumannii*, and the appropriate precautionary measures that should be taken to prevent secondary spread within hospitals.

BACKGROUND

Acinetobacter baumannii is a gram-negative bacterium that is typically multi-drug resistant and capable of surviving within the environment for significant periods of time. It can cause a wide range of infections including pneumonia, sepsis, meningitis, cellulitis and urinary tract infections¹. This organism presents a threat to immunocompromised patients and has become an emerging healthcare-associated infection that is of particular concern within intensive care units². *A. baumannii* is also a common cause of war wound infections³. In war settings, infection with this organism may occur due to contamination of trauma wounds in the field environment, as it is known to be found in water and soil. However, infection may also occur within the hospital setting where colonized and/or infected patients are the source and *Acinetobacter* is transmitted from patient-to-patient via healthcare providers or through contaminated environmental surfaces⁴.

Military experience with drug-resistant *Acinetobacter*

A. baumannii has been known to cause hospital-associated outbreaks^{4,7}. Recently, this organism has received attention due to increased reports of infection and/or the colonization of

injured soldiers who have returned to the United Kingdom (UK) and the United States (US) from Iraq and Afghanistan⁸. Between January 1, 2002 and August 31, 2004, medical facilities that treat wounded soldiers returning to the US from Iraq and Afghanistan, reported 102 patients with *A. baumannii* bloodstream infections. The majority of these cases came from the Landstuhl Regional Medical Center (LRMC) in Germany and the Walter Reed Army Medical Center (WRAMC) in the District of Columbia, US. At both facilities a significant increase in the number of such infections was seen in 2003 and 2004 compared to previous years⁹. A paper published in October, 2005 indicated that since May 2003 the WRAMC had 53 cases of nosocomial transmission, resulting in four deaths, in their facility³. Since March 2003, wounded soldiers returning to the UK from Iraq have been entering UK National Health Service (NHS) hospitals⁸. An article published in July 2006 reported that within the UK, 10 different strains have been linked to individuals returning from Iraq¹⁰.

The source of *A. baumannii* infections in wounded soldiers has been a contentious issue. It remains unclear as to whether infections have occurred due to contamination at the time of injury or following hospital admission. One study was conducted to determine if common source(s) of infection existed between infected individuals from the UK and the US with links to Iraq. Isolate DNA fingerprints using pulsed-field gel electrophoresis (PFGE) were compared revealing three outbreak strains that were common to both, indicating a potential common source. These strains included the T-strain, a strain called OXA-23 clone 2 and a minor outbreak strain referred to as H1AC-2, H3AC-1 or USAC-3. The T strain in particular has been highly

associated with soldiers returning to the UK from Iraq. It is also responsible for the greatest number of *A. baumannii* infections within the UK¹⁰.

Canadian situation

The experiences of the US and UK warn of the threat of both importation of specific strains of *A. baumannii* and the potential for secondary transmission within hospital settings³. The Canadian military transfers seriously injured soldiers from field hospitals in Afghanistan to the US Landstuhl Regional Medical Center hospital in Germany prior to transferring the patients into Canadian hospitals. In general, Canadian personnel requiring hospitalization after returning from Afghanistan are admitted to a local hospital based on where the individual is stationed. Therefore, there is the potential for nosocomial spread of imported *A. baumannii* strains across Canada. As of April 2007, a reported 108 military personnel have returned from Afghanistan and entered Canadian hospitals. The Public Health Agency of Canada's (PHAC) National Microbiology Lab (NML) in Winnipeg, Manitoba has already identified similar MDR-strains reported by the UK, US, Afghanistan and Iraq among returning Canadian troops. To our knowledge, no nosocomial transmission of these strains has been seen in Canadian hospitals. This can be attributed both to infection control practices already in place in Canadian hospitals and to the proactive steps taken by PHAC and the Canadian Forces as described below.

Actions and recommendations

In order to prevent the importation and possible secondary spread of MDR-*A. baumannii* in Canadian hospitals PHAC, in conjunction with the Canadian Forces, has implemented precautionary measures. An alert was created to monitor the spread of imported *Acinetobacter* spp. in Canadian hospitals. It describes the infection prevention and control precautions and provides information on what actions to take should an individual

test positive for *A. baumannii*. This form is included in the medical files of all personnel injured in Afghanistan and transferred to Canadian hospitals. A recently updated version of the alert can be found in Appendix 1. Hospitals are asked to contact the Nosocomial and Occupational Infections Section, PHAC if any patient returning from Afghanistan is tested for *A. baumannii*. If positive, completion of an epidemiological questionnaire will be requested. The PHAC also requests that hospitals

forward any *Acinetobacter* isolates to the NML for further molecular typing.

A. baumannii can be transmitted through direct or indirect contact. Therefore, there is a risk of nosocomial transmission if direct contact occurs between an infected or colonized individual and a susceptible patient. Transmission can also occur via the hands of health care providers or through contact with contaminated instruments and fomites¹¹. Recommendations to prevent secondary transmission include

Appendix 1: Copy of the Multi-drug resistant *Acinetobacter baumannii* alert instructions

Alert: Multi drug resistant *Acinetobacter baumannii*

Canadian Forces soldiers returning to Canada who have been treated in Afghanistan or at Landstuhl Regional Medical center (LRMC) in Germany may be infected or colonized with multi-drug-resistant *Acinetobacter* (MDRA) and may be sources of introduction of this organism to Canadian health-care institutions. In order to prevent secondary transmission of this organism, the following is recommended for patients admitted to Canadian hospitals following treatment in Afghanistan or LRMC:

1. Place on contact precautions according to PHAC Infection Control Guidelines: *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*, pending results of screening cultures (pages 45-51). <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/index.html>. If pneumonia is suspected with productive sputum individuals should be placed on both contact and droplet precautions.
2. Screening cultures for *Acinetobacter* should be taken from: groin, wounds or medical device exit sites, urine, and sputum or endotracheal secretions.
3. The microbiology laboratory should test the screening specimens submitted from these soldiers for multi-drug resistant *A. baumannii* (MDRA). Tests for other antibiotic resistant organisms (AROs) including methicillin resistant *Staphylococcus aureus* (MRSA), vancomycin resistant enterococcus (VRE) and extended-spectrum beta-lactamases (ESBLs) should also be done.
4. If screening cultures are positive and/or the patient is known to be colonized or infected with MDRA upon arrival a consult with an infectious disease physician is recommended. If screening cultures are negative, contact (and droplet if applicable) precautions may be discontinued.
5. Patients with positive screening cultures should remain on contact (and droplet if applicable) precautions until they have three sets of negative specimens taken at least one week apart for all previously positive sites. If a patient tests positive in Landstuhl they still would require three negative tests in Canada before being taken off contact precautions. If they test negative in Landstuhl they still need to be tested in Canada.
6. In order to monitor the situation at a national level, the National Microbiology Laboratory would like to examine the molecular epidemiology of strains identified in these individuals. Please submit any organisms you identify (*A. baumannii* or other AROs) from these individuals (infections or colonization) to:
Dr. Michael Mulvey Email: Michael_Mulvey@phac-aspc.gc.ca
National Microbiology Laboratory
1015 Arlington St., Winnipeg, Manitoba R3E 3R2
Tel: 204-789-2133 Fax: 204-789-5020
7. Please contact the Nosocomial and Occupational Infections Section if you receive a patient from Afghanistan and test for *A. baumannii*. **It is important that you contact us regardless of the test results so that we can keep track of the number of individuals tested.** We will also provide you with a one page questionnaire to complete at that time.
Contact: Ms. Shirley Paton Shirley_Paton@phac-aspc.gc.ca
Phone: 613 957-0326
8. If a soldier tests positive for MDR *Acinetobacter* within your facility you should monitor for *A. baumannii* within the facility for at least six months post identification of the organism to determine if there has been any secondary transmission.



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the screening of all returning soldiers entering Canadian hospitals for MDR-*A. baumannii*. The groin, wounds, and medical device exit sites should be swabbed and urine, sputum/endotracheal secretion samples taken for *A. baumannii* screening cultures. These patients should be placed on contact precautions (and droplet if necessary) on admission as outlined in the Health Care Infection Control Guideline series entitled "Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care"¹¹. Precautions should be maintained until screening cultures are found to be negative as described in appendix 1. If a patient is known to be infected or colonized prior to arrival, or the screening cultures for *Acinetobacter* spp. are found to be positive, an infectious disease physician should be consulted and the patient should remain on contact precautions. In addition, hospitals receiving these patients should be screening for other multi-drug-resistant organisms such as Vancomycin-resistant Enterococci or Methicillin-resistant *Staphylococcus aureus*.

As military personnel continue to be injured in Afghanistan and to enter Canadian hospitals, it is critical that infection control professionals and microbiologists are aware of this issue and the appropriate precautionary measures that should be taken. ●

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