A Review of Literature Concerning Multiply-Drug Resistant *Acinetobacter sp.* Outbreaks in Intensive Care Unit Settings

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Drug-Resistance

- Increasing threat
  “Some 14,000 individuals are infected and die each year from drug-resistant microbes picked up in hospitals.”

Factors contributing to resistance:
- Misuse of antimicrobial drugs
- Improper infection control practices

**Acinetobacter sp.**

Characteristics:

- Gram negative aerobic coccobacillus
- Common in environment worldwide
  - Water
  - Soil
  - Human normal flora
- Rarely known as disease causing agent
Acinetobacter sp.

- Increasingly identified in nosocomial outbreaks
  - Intensive care units
  - Immunocompromised patients
  - Ventilator support

“CDC data indicate A. baumannii was responsible for 1% of all nosocomial infections and 4% of nosocomial pneumonia in the United States.”

\(^2\)Iskandar, Guha, Krishnaswamy, Roy, 2003
Public Health Significance

- Increased Morbidity
- Increased Mortality
- Longer duration of patient hospital stay
- Increased cost of health care
- Spread of multi-drug resistant bacteria
Increasing numbers *Acinetobacter* outbreaks being reported by hospitals and long-term care facilities within the last twelve months.

Facilities seeking guidance for control and prevention.
Literature Review

- Obtain current world knowledge
- Demographics
- Risk Factors
- Control measures

- Formulate and disseminate guidelines on prevention and control
Methods

- Internet Search Engines
  - PubMed
  - Medline
- English printed articles Jan 1990 - Oct 2003
- Search criteria
  - Outbreaks or epidemiological studies resulting from Outbreaks of drug-resistant *Acinetobacter* sp.
  - Intensive Care Units
Results

• 22 articles
• 12 countries
  - Australia, Belgium, Canada, China, France, Germany, Greece, Saudi Arabia, Spain, Turkey, United States, United Kingdom
Results

- Facility demographics
  - 261 to 1841 bed hospitals
  - 4 to 11 bed ICUs

- Principle outbreak species
  - *Acinetobacter baumannii*
Results

• Outbreak duration
  – Shortest 1 week
  – Longest 10 years

• Infections
  – Pneumonia
  – Bacteremia
  – Urinary tract infection
  – Wound infection
Results

- Imipenem most consistently sensitive antibiotic
- Resistant antibiotics
  - Ampicillin, cefuroxine, ceftazidime, azlocillin, aztreonam, gentamicin, amikacin, ciprofloxacin
- PCR fingerprinting and DNA macrorestriction analysis
Transmission Reservoirs

- Mechanical Ventilation tubing and water traps
- Oxygen and temperature probes
- Peak flow meters
- Peripheral and pulmonary arterial catheters
- Health care staff hands
- Protective gear – gloves & gowns
Risk Factors

• Mechanical ventilation
• One or more varieties of catheterization
• Previous antibiotic therapy
• Tracheostomy
Attempted Control Measures

- Hand Hygiene
- Protective equipment precautions
- Sterilization and decontamination
  - Equipment
  - ICU
- Use of disposable equipment alternative to reusable equipment
- Restriction of health care workers to ICU
- Cohort and isolation of infected and colonized patients
Successful Control Measures

- Sterilization and decontamination
  - Equipment
  - ICU
- Cohort and isolation of infected and colonized patients
- Hand Hygiene
- Protective equipment precautions
Conclusions

Prevention
• Adherence to infection control measures
• Compliance with antibiotic use protocols
• Continual surveillance in ICUs of environmental sources and identification of colonized patients

Public Health Significance
• Mortality, morbidity, health care costs
• Lifelong health complications
• Death
Future Research

• Plausibility for aerosolization and airborne transmission

• Stability of Acinetobacter in environment
Some may continue to ignore it...

... but hand-disinfection is the most important infection control measurement!