**ABSTRACT**

Diagnosing infection in elderly is challenging because typical manifestations seen in younger adults are often subtle, or nonexistent, and the co-existence of multiple comorbidities and medications can obscure the diagnosis. Our study aimed to develop a screening tool to assist clinicians in the early identification of bacteremia in elderly patients >80 years of age to thereby:

1. Improve early identification of elderly patients who require antibiotic treatment for bacteremia; and
2. Minimize unnecessary exposure to antimicrobials.

**METHODS**

- **Study Setting and Design**: A retrospective chart review of patients 80 years and older admitted to Sunnybrook Health Sciences Centre (SHSC) between March 12, 2010 and December 2, 2013 was completed.
- **Patients**: Included for inclusion in the SPSS database of the Sunnybrook Antimicrobial Stewardship Program.
- **Bacteremic patients (cases) were matched to controls based on gender, age (within 5 years), location (ICU: 1, Ward: 104), length of stay on the matching unit (within 30 days) at SHSC.
- **Controls**: Elderly patients who never had a positive culture (any site) and did not receive any antibiotics during their admission.

**Definitions**

- Bacteremic patients were defined as those with a positive blood culture in whom antimicrobials were started.
- Patients with blood isolates of potential contaminants were excluded (e.g., Coagulase-negative Staphylococci, Corynebacterium spp., Propionibacterium spp., and Bacillus spp. (other than B. anthracis)).
- Patients with a positive blood culture >48 hours since admission were considered to have nonacquired bacteremia, whereas patients with a positive blood culture >24 hours since admission were considered to have nosocomial bacteremia.
- If patients had multiple positive blood cultures during a given hospital stay, data was only collected in regards to their first positive blood culture.

**Sample Size**

A targeted sample size of 150 patients in each group was selected to maximize the number of factors that could be identified in this study. Ratios of 2:1 to 3:1 are considered acceptable, thus allowing for assessment of 50-75 factors.

**Statistical Analysis**

- Uni variate analysis:
  - **Simple t-test** of 2-tailed unpaired test (parametric) or Mann–Whitney U Test (non-parametric).
  - **Nominal data**
  - **Interval data**: Two-tailed unpaired t-test (parametric) or Mann–Whitney U Test (non-parametric).

**RESULTS**

- **Table 2. Table of Characteristics**
- **Table 3. Univariate Analysis**
- **Table 4. Univariate Analysis**
- **Table 5. Multivariate Analysis**
- **Table 6. Variables in a Linear Binary Logistic Regression Equation**
- **Figure 1. Receiver Operating Characteristics Curve**
- **Figure 2. ROC Curve**

**DISCUSSION**

• This large case-controlled retrospective study enabled development of a sensitive (~95%) and specific (~95%) screening tool for predicting bacteremia in elderly >80 years of age, evaluated in a prospective study of elderly patients.

**CONCLUSIONS**

Our pilot project developed a screening tool for bacteremia in elderly 80+ years of age using readily available and reliable laboratory parameters. The predictive model has both high sensitivity and specificity with a low negative predictive value. This screening tool will be evaluated in a prospective study of elderly patients.