Microbiological profile of organisms causing bloodstream infections between 2004 and 2016 in a tertiary hospital, Limpopo Province, South Africa

Sizeka Maweya

BDT (Medunsa), MBChB(Pret),MMed(Fam.Med)(UL), MSc.Clin.Epi(Pret), AHMP(FPD,Yale)

Family Physician, Clinical Epidemiologist and Senior Lecture University of Limpopo

OUTLINE OF PRESENTATION

- Introduction
- Research Question
- Methodology
- Data Analysis
- Literature search
- Results
- Conclusions
- Acknowledgements

Introduction

- The aetiology and antimicrobial profile of bloodstream infections (BSIs) continue to change with the evolution of medical care, particularly among the hospitalized patients who require intensive care support and antimicrobial treatment

- The AIM of the study: To determine the aetiology and susceptibility profile of BSIs at Pietersburg hospital.

- Describe the prevalent bacterial pathogens isolated from the blood culture specimen received from Pietersburg Hospital and to review the antimicrobial profile.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Research Question

• Are BSIs common in Pietersburg Hospital?

• Hypothesis:

H_1-There was a change in the patterns of infectious agents isolated at Intensive Care Unit of the Pietersburg Provincial Hospital between 2004-2006 and 2014-2016.

H_0- No change

Methodology

- A cross-sectional, laboratory-based study comparing two study periods (2004-2006 and 2014- 2016)
- The local data used was drawn from the NHLS
- **2004-2006:**The BD BACTEC™ Blood Culture Media – BD was used for incubation of the bottles; however, the identification was done with Analytical Profile Index (API) which is a manual identification of organisms with a limited spectrum.
- **2014- 2016:**The same BD BACTEC™ Blood Culture Media – BD was used for incubation of the culture bottles. However, identification and susceptibility testing were done using Microscan® which is a semi-automated instrument

Data Analysis

- Data were entered into Epidata and saved as a Stata file for analysis in Stata version 13 from StataCorp LP

- Summary measures included proportions for binary variables and ratios for categorical variables with more than 2 outcome states

- Chi square tests or Fisher's exact tests, was used to determine whether any changes in antibiotic resistance were statistically significant (alpha = 0.05).

Results

Organism	2004-2006 (n=73)		2014-2016 (n=298)		p-values*
	No	%	No	%	
Acinetobacter spp	8	11	6	2	0.002
Coagulase negative staph	23	32	167	56	<0.001
E coli	4	5	10	3	0.489
Enterobacter spp	4	5	15	5	0.774
Enterococcus spp	4	5	19	6	>0.999
K.pneumoniae	8	11	36	12	>0.999
Proteus spp	2	3	2	1	0.175
Pseudomonas spp	2	3	9	3	>0.999
Staphylococcus aureus	6	8	21	7	0.801
Streptococcus pneumonia	2	3	3	1	0.256
Streptococcus group (A-F)	3	4	6	2	0.388
Viridans streptococci	2	3	4	1	0.337
MRSA	1	1	0	0	0.197
MRSE	2	3	0	0	0.038
Other *Klebsiella*	2	3	0	0	0.038

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Conclusions

- There was an increase in the number of tests and isolates

- Drug resistance level 3%, against antibiotics tested for (colistin,imipenem,linezolid,meropenem and vancomycin)

- No clinically significant change in the resistance levels between the first and second study periods.

Limitations

- Data for 2004- 2006 was very scant, possibly due to the change in the laboratory information system and the lack of input from the microbiologist at that time.

- Capturing of data was predominantly manual and could not be retrieved with the current system.

- The microbiology testing was not centralized in the first-time period; – inconsistent reporting standards and testing protocols may have been an issue during this time.

- No input from on-site pathologist, especially with the drug to organism matches, when reporting.

- Lack of specialist or senior doctors in the ICU – the hospital was primarily a regional hospital.

- Testing was done manually using the disc diffusion method.

- The reports were manually entered.

- No electronic capturing and storage for the reports.

Acknowledgements

Dr Elize Webb

My supervisor Prof Brendan Girdler-Brown UP SHSPH

My co-supervisor Prof Lekalakala NHLS UL

My PA Ms P. Khoza

Dr Sam Ntuli UL Biostatician