Vancomycin Resistant Enterococci causing serious outcome – A case study

Dr. J.K. Saravana Priya, Dr. R. Vanaja, Dr. C.P Ramani, Dr. Radhika. K, Dr. B. Gomathy Manju, Dr. P. Shanmugapriya

Institute of Microbiology, Madras Medical College.

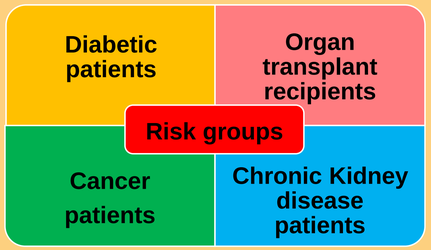
Abstract

Antimicrobial Resistance (AMR) is becoming an emerging threat and topic of discussion in the current scenario. In this particular case study, a young female with type 1 diabetes admitted for Diabetic Ketoacidosis developed Sepsis. During the medication period, patient is given the magic drug Vancomycin with few other antibiotics to treat Sepsis. Few days later, patient progressed to severe Sepsis which ultimately lead to septic shock followed by death. The isolate from blood culture identified to be Vancomycin resistant Enterococcus faecium. Ironically stating, despite the magic drug Vancomycin given to treat severe Sepsis turned to have no effect due to resistant pathogenic strains.

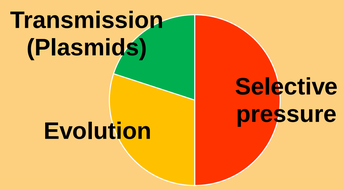
Background and Purpose

The need and importance to study the Antimicrobial resistance is due to following reasons:

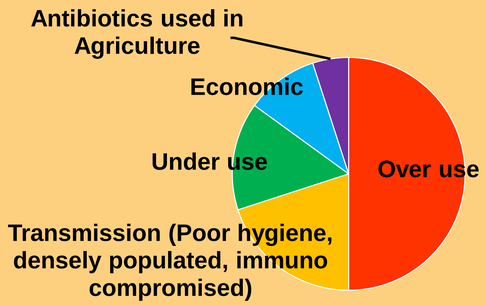
- **To improve the treatment modalities and survival rate in the field of clinical medicine.**
- **Antimicrobial resistance acts as a barrier in the treatment of vulnerable patients.**
- **Antimicrobial resistance is identified as one of the three greatest threats to human health reported by World Health Organization (WHO).**



Biological Factors of Antimicrobial Resistance



Social Factors of Antimicrobial Resistance

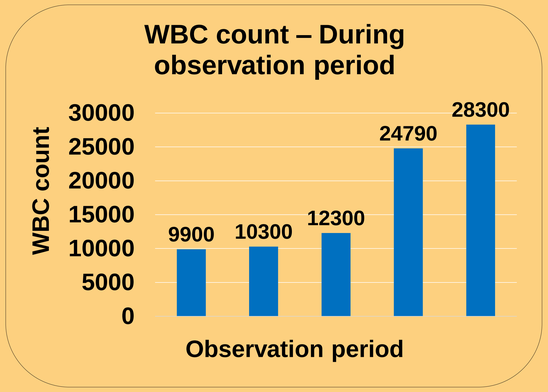


Case description

- ✓ **A 17-year-old female patient with type 1 diabetes presented with complaints of:**
  - **Nausea and vomiting**
  - **Abdominal pain**
  - **Weakness/Fatigue**
  - **Shortness of breath**

  (suggestive of Diabetic Ketoacidosis)
- ✓ **Insulin and empirical antibiotics (Ceftriaxone) were started.**
- ✓ **After few days, patient deteriorated and on examination:**
  - **Increase in Heart Rate observed.**
  - **Increase in Respiratory Rate with high fever observed. (suggestive of Sepsis)**
- ✓ **Patient condition worsened and developed cough with expectoration and altered sensorium. On examination, patient found to have Hypotension. (suggestive of severe Sepsis)**
- ✓ **In view of Sepsis, Vancomycin, Amikacin and Metronidazole were started.**
- ✓ **Few days later, patient developed breathlessness and sudden cardiac arrest. (suggestive of septic shock)**

Investigation



- ❑ **Two blood samples collected at two different sites and sent to Microbiology laboratory to identify the causative agent.**
- ❑ **Organism isolated from blood culture showed Vancomycin Resistant Enterococcus (E.faecium).**

- ❑ **Antimicrobial Susceptibility Testing (AST)**

Ampicillin	- resistant - 8 mm
Erythromycin	- resistant - 10 mm
High level Gentamicin	- resistant - 6 mm
Vancomycin	- resistant - 10 mm
Linezolid	- sensitive - 28 mm

- ❑ **Other investigations suggestive of Sepsis includes:**

Erythrocyte Sediment Rate (ESR)	- 160 mm/hr
C-Reactive Protein (CRP)	- 80 mg/dL
Serum lactate	- 4 mmol/L

Investigation and Outcome

- ❑ **Investigation suggestive of multi-organ failure:**

Renal Function Test	
▪ Urea	40 mg/dL (↑)
▪ Creatinine	2.6 mg/dL (↑)
Liver Function Test	
▪ Total Bilirubin	1.6 mg/dL (↑)
▪ Direct Bilirubin	0.6 mg/dL (↑)
▪ Albumin	3.0 g/dL (↓)
Electrolytes	
▪ Sodium	127 mEq/L (↓)
▪ Potassium	3.2 mEq/L (↓)
Enzymes	
▪ Creatine kinase-MB (CK MB)	35 Units/L (↑)
▪ LDH (Lactate Dehydrogenase)	264 Units/L (↑)
CT chest	
Left lower lobe consolidation with hemi thorax.	

<u>Outcome</u>: Despite being treated with these antibiotics, it could not help in the survival of the patient due to resistant pathogenic strains.

Discussion

The topic raised the need for discussion on below points:

1. **Resistant pathogenic strain emerging as another major public health problem.**
2. **Concerns over prevention of pathogenic resistant strains.**
3. **Management of Sepsis in the era of antimicrobial drug resistance.**
4. **Antimicrobial stewardship protocol in healthcare associated setting.**

References

1. **“Update on 2004 background paper” written by Per Nordberg, Dominique, L. Monnet, Otto Cars.**
2. **“Background paper 6.1 Antimicrobial resistance” by Emma M.Lodato, Boston University and Warren Kaplen, Ph.D, JD, MPH, Boston.**
3. **World Health Organization (WHO). Antimicrobial resistance; no action today, no cure tomorrow (webpage); WHO Press:7 April 2011 (cited 20 July 2012)**