

# Pharmacokinetic-pharmacodynamic approach permits vancomycin dose adjustment for effectiveness against infections caused by gram-positive pathogens MIC >1mg/L in ICU paediatric burn patients

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## Introduction

Paediatric septic ICU burn patients present metabolic conditions that change pharmacokinetics with impact on pharmacodynamics during the earlier period of severe hospital infections. Effective vancomycin dose regimen in ICU pediatric patients is a challenge to the clinic staff, once the initial dose recommended cannot reach the target against MIC 1 mg/L strains; then therapy fails with consequence on desired outcome.

## Objectives

To apply vancomycin serum monitoring through pharmacokinetic-pharmacodynamic approach to perform in burn pediatric patients the dose adjustment in a real time.

## Methods

Therapy started for patients at the first septic shock with empirical dose regimen recommended 10-15mg/kg q6h, one hour pump infusion. Cultures of fluid and secretions were collected before the antimicrobial therapy starts. Patients were investigated in two sets after the recommended empiric daily dose (set 1) and after individualized drug therapy (set 2). Blood was sampling at the 3rd and at the 5th hrs (1.5mL/each) after the beginning of infusion. Vancomycin serum measurements were done by immunoassay and liquid chromatography. PK/PD approach was performed with basis on the predictive index  $AUC_{0-24}^{SS}/MIC > 400$ , MIC is the minimum inhibitory concentration value for each isolated pathogen. Isolates of Gram-positive and Gram-negative strains were considered in those patients

### 20 septic pediatric burn patients (6F/14M)

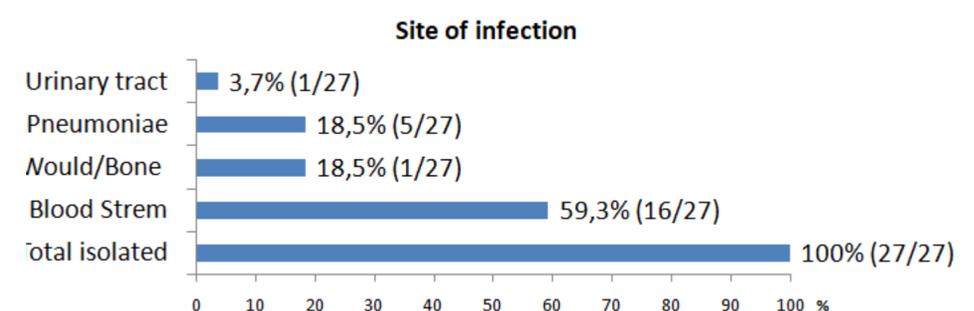
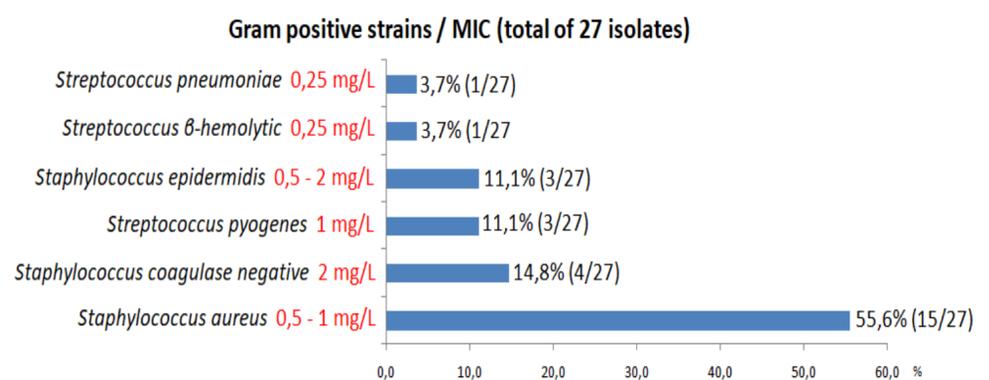
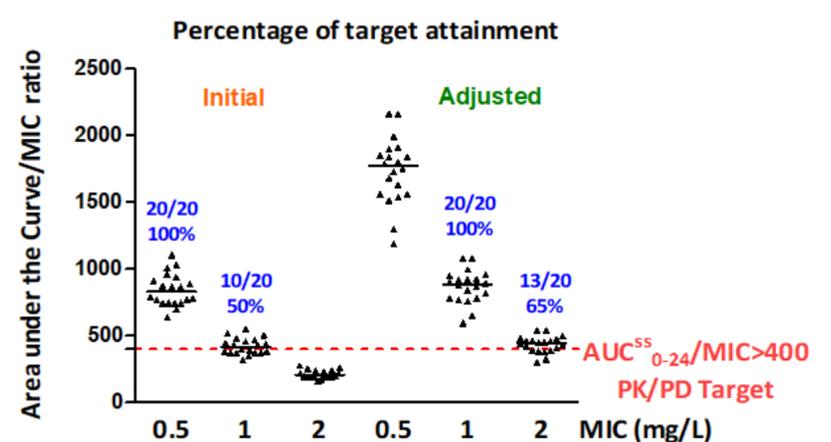


- Age: 5.0 (3.0 - 9.0) years
- Ideal body weight: 22 (16 - 38) kg
- Total burn surface area: 30 (20 - 39) %
- Creatine Clearance 240 (201 - 295) mL/min

- Fire was the agent of burning
- Inhalation injury occurred in 12/20 patients
- Vasopressors and mechanical ventilation were required in 13/20.

## Results

Vancomycin target against MIC 1mg/L gram-positive strains was reached only in 50% patients after the empirical initial dose. Then, dose was adjusted to reach the target mainly against *Staphylococcus aureus*, and *Streptococcus spp* (MIC 1mg/L) for all patients



## Conclusions

Increases on total body clearance with a reduction of biological half life can impact vancomycin effectiveness in ICU pediatric burns. Consequently, drug serum measurements and PK/PD approach must be considered for dose adjustment to guarantee vancomycin effectiveness against nosocomial gram-positive pathogens