Daptomycin Use in Fraser Health Hospitals: A Drug Use Evaluation

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Background

- Daptomycin is an intravenous antibiotic indicated for complicated skin and soft tissue infections (cSSTI), and *Staphylococcus aureus* bacteremia including right sided endocarditis.[1]
- Exhibiting concentration dependent killing against many gram positive organisms, daptomycin has activity against resistant organisms such as MRSA and VRE.[1]
- Daptomycin was introduced to hospital formulary in 2011 with restriction criteria limiting use to gram positive infections resistant to vancomycin and linezolid or to patients intolerant to vancomycin and linezolid to promote appropriate use, maintain utility of antibiotic, and minimize drug costs.
- Recent marked increase in hospital utilization of daptomycin in Fraser Health hospitals has prompted a review to determine if use of daptomycin is in accordance with current restriction criteria.

Objectives

Primary Objective:

To determine the proportion of patients ordered daptomycin consistent with restriction criteria at Fraser Health hospitals

Secondary Objectives:

1. To identify indications for daptomycin use in hospital
2. To determine prescribers by speciality for orders of daptomycin
3. To determine dose of daptomycin prescribed

Methods

Design: Retrospective chart review

Selection of Patients: Proportional systematic random sampling

Data Collection: Electronic and paper charts

Sample Size: Based on assumption that 50% (95%CI:44.75-55.25) of patients prescribed daptomycin meet restriction criteria

- Total # of patients = 357
- Required sample size = 177 patients

Patient Population:

- **Inclusion Criteria**: Patients prescribed daptomycin at ARH, BH, ERH, JPOCSC, RCH, and SMH between April 1, 2013 - March 31, 2014
- **Exclusion Criteria**: Patients prescribed daptomycin, but did not receive any medication

Statistical Analysis: Descriptive statistics (mean, median, standard deviation)

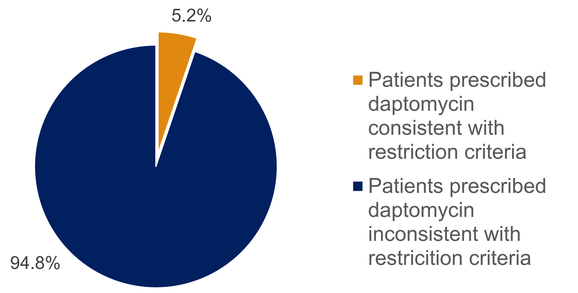

Figure 1: Percentage of patients ordered daptomycin consistent with restriction criteria

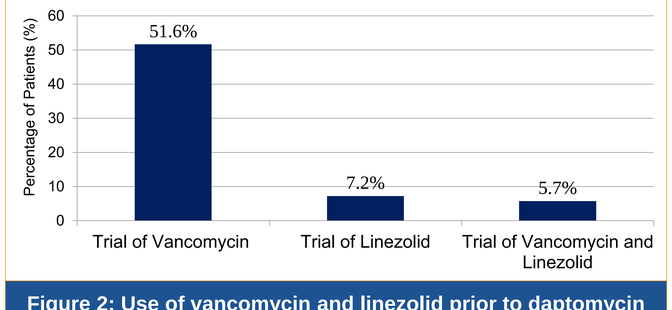

Figure 2: Use of vancomycin and linezolid prior to daptomycin

Patient Demographics	N=194
Age (years, mean ± SD)	59 ± 17.4
Male, n (%)	110 (56.7)
Weight (kg, mean ± SD)	84.6 ± 24.3
Serum Creatinine (μmol/L, median, Q_1- Q_3)	83 , 62-135
Type of order, n (%): •Inpatient •Outpatient	 86 (44.3) 108 (55.7)
Prescriber of daptomycin, n (%): •Infectious disease •Other	 190 (97.9) 4 (2.1)
Length of therapy (days, median, Q_1- Q_3)	11, 5-22
Dose of daptomycin on Day 1 (mg/kg, median, Q_1- Q_3)	6, 4-6
Cultures, n (%) •MRSA •VRE	 62/177 (35) 17/177 (9.6)

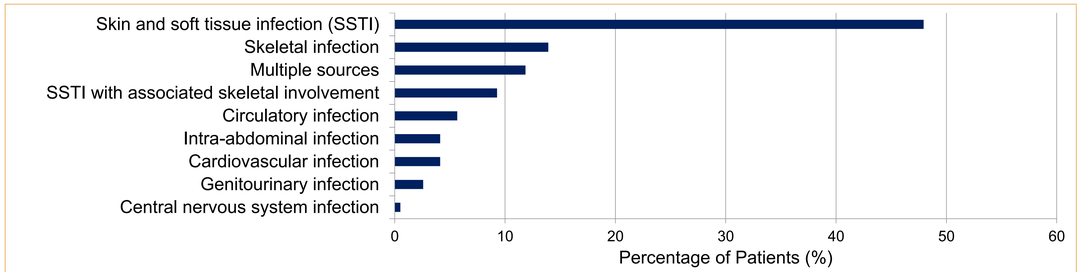

Figure 3: Type of infection documented in hospital

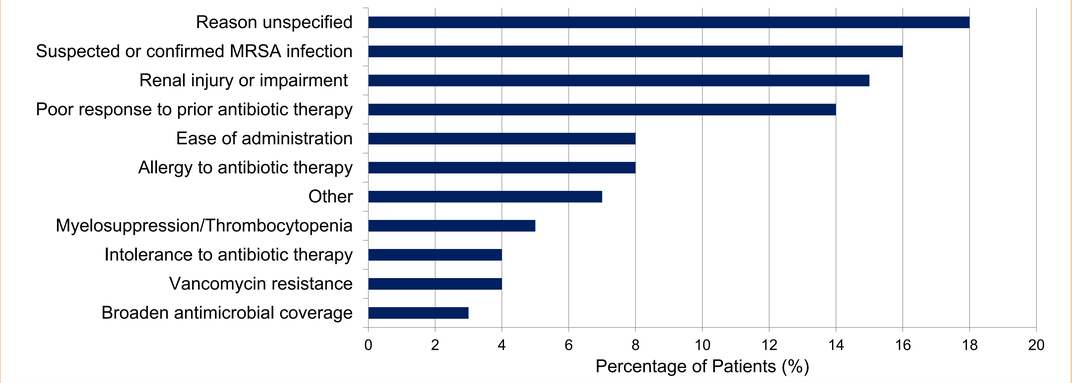

Figure 4 : Documented reasons for prescribing daptomycin

Discussion

- Overall a low percentage of patients (5.2%, 95%CI: 2.1-8.3%) prescribed daptomycin met restriction criteria in presence of low documented resistance and low rates of allergy/intolerance to linezolid and vancomycin.
- The primary prescriber speciality associated with daptomycin orders was infectious diseases with a median dose of 6mg/kg (IQR 4-6mg/kg), which is consistent with the dosing guidelines for daptomycin for the treatment of cSSTI (4mg/kg) and bacteremia (6mg/kg).
- 34% (37/108) of outpatients prescribed vancomycin prior to daptomycin had no reported cases of vancomycin resistance. One reason for the high utilization of daptomycin may be due to the convenience of once daily dosing and less frequent drug monitoring.
- The minimum inhibitory concentration (MIC) for vancomycin was not consistently reported on microbiology results. Studies have demonstrated that vancomycin used in the treatment of MRSA with a MIC ≥1.5 mg/L was predictive of treatment failure.[2]
- There was no access to microbiology results outside of the hospital setting, which may have impacted antibiotic therapy. Also, poor documentation in charts made it difficult to ascertain specific reasons for prescribing daptomycin.
- Antibiotic selection is a complicated process requiring assessment of multiple factors which we were unable to fully capture in our data collection and is a limitation to the current restriction criteria.

Conclusion

Study observed a low proportion of patients (10/194) prescribed daptomycin consistent with restriction criteria.

References:
1. Hair PI, Keam SJ. Daptomycin: A Review of its Use in the Management of Complicated Skin and Soft-Tissue Infections and *Staphylococcus aureus* Bacteraemia. Drugs. 2007;67:1483-1483.
2. van Hal SJ, Lodise TP, Paterson DL. The clinical significance of vancomycin minimum inhibitory concentration in *Staphylococcus aureus* infections: a systematic review and meta-analysis. Clin Infect Dis. 2012;54(6):755-71.

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