Cost-effectiveness of Antibiotic Treatment Strategies of Complicated Skin, Skin Structure Infections in Home-infusion from a Third Party Payer Perspective

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Background

Multiple studies have demonstrated the large burden placed on the United States healthcare system and globally by complicated skin, skin structure infections (cSSSIs), increasing in both incidence and direct healthcare costs in recent years.[1,2,3] One study found that total hospital admissions for skin and soft tissue infections increased by as much as 29% between the year 2000 and 2004, while the admissions for pneumonia remained relatively unchanged.[3]

Another study found the average total outpatient costs for vancomycin and daptomycin therapies in treating complicated skin and soft tissue infections caused by methicillin-resistant Staphylococcus aureus, was $4,001 and $5,690 respectively.[4] Newer glycopeptides antibiotics, particularly the long-acting lipoglycopeptides oritavancin and dalbavancin, offer less frequent dosing in the treatment of cSSSIs, with fewer laboratory monitoring parameters when compared to vancomycin and daptomycin. Examples include vancomycin troughs, creatine phosphokinase (CPK) for daptomycin, and close monitoring of renal function for both. As such, oritavancin and dalbavancin therapy would require fewer nursing visit and supplies, and could represent a more cost-effective alternative to daptomycin and vancomycin.

Purpose

To determine the comparative cost-effectiveness of oritavancin, dalbavancin, vancomycin and daptomycin for the treatment of complicated skin and skin structure infections (cSSSIs) from a third party payer perspective. Treatment failure, duration of therapy and significant (grade 3 or 4) adverse effects will also be incorporated into the financial analysis and reported. Study findings may help guide therapy selection in certain patient populations where a more cost effective therapy is desired, in the absence of other factors that may dictate the selection of a particular therapeutic modality.

Methods

Study will be a retrospective cohort analysis, gathering cost, effect data and safety data from this organization's electronic records for all patients being treated with either oritavancin or dalbavancin for a cSSSI over a three month period in 2019. For each patient treated with oritavancin or dalbavancin, a vancomycin and daptomycin patient was matched based on gender and age, within 5 years, and diagnosis.

Therapy costs, including medications, supplies/per diems, nursing visits, and costs associated with the treatment of adverse events, will be calculated. Using the cost per antibiotic therapy and outcome data, treatment success, a cost-effectiveness ratio will be determined for each antibiotic.

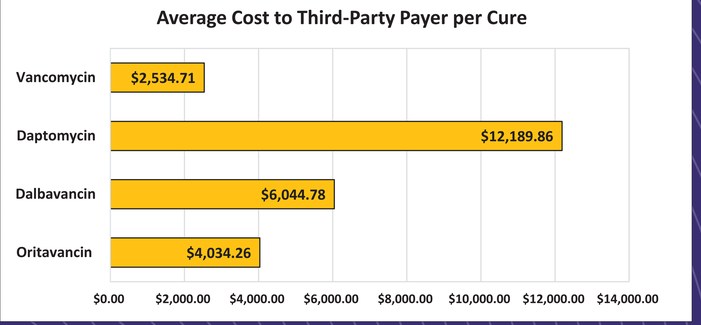
The duration of therapy will be defined as the first day of receiving antibiotic treatment provided by this organization, to the last day of therapy attributed to cSSSI. End of therapy could illustrate treatment success, treatment failure, hospital re-admission or death. Treatment success was determined by information documented in progress notes in conjunction with a stoppage of antibiotic therapy, or marked as "Therapy Completed" at the time of discharge from our service.

Table 1: Population Characteristics and Results

	Vancomycin (n=26)	Daptomycin (n=26)	Dalbavancin (n=17)	Oritavancin (n=9)
Age, median (IQR)	51 (31-78)	49 (28-80)	51 (28-80)	45 (29-81)
Gender				
Male, n (%)	9 (35%)	9 (35%)	6 (35%)	3 (33%)
Female, n (%)	17 (65%)	17 (65%)	11 (65%)	6 (67%)
Patients w/ Comorbid Conditions[a]	23 (88%)	22 (85%)	14 (82%)	8 (89%)
Adverse Reaction	0 (0%)	1 (4%)	0 (0%)	1 (11%)
Therapeutic Success	100%	100%	100%	100%
Mean Cost of Therapy	$ 2,534.71	$ 12,189.86	$ 6,044.78	$ 4,034.26

[a] asthma, diabetes, hypertension, heart disease

Figure 1: Mean Cost of Therapy



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Results

Data was collected from 78 patients serviced by a home infusion pharmacy with either oritavancin, dalbavancin, daptomycin or vancomycin monotherapy for a cSSSI between September 2019 and December 2019. Nine patients were treated with oritavancin and 17 with dalbavancin. Twenty-six daptomycin and vancomycin patients were matched to the oritavancin and dalbavancin patients based on gender, diagnosis and age. Approximately 65% of patients were female, 35% male. 86% of patients had a comorbid condition. Results showed no difference in efficacy or incidence of adverse events *(Table 1)*.

Cost data illustrated an apparent cost savings to third party payers for vancomycin therapy regardless of the requirement for more frequent dosing and nursing visits, with an average cost of $2,534.71 per successful treatment of a cSSSI. The newer long-acting lipoglycopeptides, dalbavancin and oritavancin, were shown to be considerably more cost effective than daptomycin, with a mean cost of $6,044.78 and $4,034.26 respectively compared to $12,189.86 for daptomycin *(Figure 1)*.

Discussion

An intention-to-treat methodology was adopted making the results more applicable to general practice and eliminating the need to determine patient compliance. Some direct nonmedical costs and indirect costs were excluded in the analysis as this would open up the study to too many variables with no definitive method of obtaining accurate data. However, an analysis of cost and effect data from these 78 home infusion patients showed a clear cost savings to third party payers when vancomycin is used as monotherapy to treat cSSSIs with no discernable difference in safety between therapies.

Some of the study limitations include the variance in duration of therapy, dosages used, and the small sample size limiting the generalizability of results. While some costs were excluded from this analysis, these costs could represent a significant financial burden on the third party payer and ultimately alter the final outcome of a more robust cost-effective analysis. Additionally, adverse events and safety data was reliant on accurate self-reporting.

Conclusion

Long-acting lipoglycopeptides could theoretically represent a more cost-effective alternative to daptomycin and vancomycin as they require fewer nursing visit and supplies. Nevertheless, study results showed vancomyin, despite requiring more nursing visits, close monitoring, and frequent dosing, was the most cost-effective treatment of a complicated skin, skin structure infection. Oritavancin and dalbavancin did however demonstrate a cost savings when compared to daptomycin and could be utilized more frequently in certain patient populations as cost-effective alternatives.

Disclosures

Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation: Alexandros Pitsakis, Maria Giannakos, Jay Winters: Nothing to disclose.

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