Pathway With Single-Dose Long-Acting Intravenous Antibiotic Dalbavancin is a Cost-Saving Alternative to Usual Inpatient Care of Acute Bacterial Skin and Skin Structure Infections (ABSSSI)

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OBJECTIVE

To evaluate the cost-effectiveness of a single dose of dalbavancin administered in the ED compared with IV antibiotics for appropriate patients who would otherwise be admitted to hospital and receive usual care such as vancomycin or daptomycin

CONCLUSIONS



The dalbavancin pathway led to a reduction in hospitalization days and savings per hospital day avoided. The results were robust to uncertainty in input parameters.



Treatment for ABSSSI in the ED with dalbavancin represents a cost saving alternative for the healthcare system.



These results could help guide the management of ABSSSI by shifting care from the inpatient to the outpatient setting where patients can be managed successfully, therefore freeing up hospital resources and reducing the total costs of ABSSSI treatment.

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Disclosures

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INTRODUCTION

- Acute bacterial skin and skin structure infection (ABSSSI) is a common type of bacterial infection accounting for up to10% of infection-related hospital admissions in the US¹, with the cost of occupying a hospital room being the largest contributing factor to overall ABSSSI treatment costs².
- Dalbavancin (Dalvance[®]) is a long-acting antibiotic that can be provided as a single-dose of 1500 mg in the emergency department (ED)³.
- Two pragmatic real-world studies have demonstrated that a new treatment pathway^{4,5} (Figure 1) with dalbavancin reduced hospital admissions⁴ and length of stay⁵ in hospitalized patients.

Figure 1. Pathway for Initial Empirical Treatment of Skin and Soft Tissue Infection With a Single-Dose Dalbavancin Regimen

Adult candidate for IV treatment with dalbavancin in outpatient setting				
Clinically defined ABSSSI*	Major cutaneous abscess, cellulitis, or wound infection ≥75 cm ² lesion size [†]			
Indicated for dalbavancin*	 √ Suspected/known Gram-positive etiology √ No known allergy to glycopeptide antibiotic 			
Fit for discharge after initial empirical treatment*	 ✓ Limited/stable comorbidities ✓ Not requiring more intensive/complex infection management: ✓ No severe or life-threatening infection ✓ No infection requiring multiple antibiotics ✓ No bilateral lower extremity involvement ✓ No immunosuppression ✓ No injection drug use presenting with a fever ✓ No pregnancy or breastfeeding ✓ No severe neurological disorder leading to immobility 			

Initial treatment: Single IV dose of dalbavancin (30-min infusion)

1500 mg dose if \geq 30 mL/min creatine clearance or on regular hemodialysis 1125 mg dose if <30 mL/min clearance and not on regular hemodialysis

Shift to outpatient setting

*If all criteria are true.

[†]Lesion size area: measured by the length multiplied by perpendicular width of the lesion

RESULTS

• Using dalbavancin resulted in a cost-saving of \$5,133.20 per patient (Table 3).

- Under usual care, the average length of stay in the hospital was 4.80 days per patient. With dalbavancin, the average days dropped to 0.56, a reduction of 4.24 days per patient (Table 3).
- With 4.24 hospital days avoided, using dalbavancin translated to a cost-offset of \$1,211.57 per hospitalization day avoided (Table 3).

Table 3. Base-case Results for Cost Saving of Dalbavancin vs.Usual Care and Hospitalization Days Avoided

	Usual Care	Dalbavancin
Inpatient costs	\$11,143.95	\$1,307.56
Dalbavancin drug costs	\$0.00	\$5,031.00
ED costs	\$586.00	\$586.00
Post-discharge infusion cost (infusion centre or home infusion)	\$290.78	\$0.00
Outpatient follow-up visit	\$183.19	\$183.19
Post-discharge drug acquisition	\$37.03	\$0.00
Mean hospitalization days	4.80	0.56
Total cost	\$12,240.94	\$7,107.75
Incremental costs		-\$5,133.20
Hospitalization days avoided		4.24
Cost per hospitalization day avoided		-\$1,211.57

One-Way Sensitivity Analysis

- The per-diem cost of inpatient hospital stay and the length of stay with usual care were the key drivers (Figure 3).
- There was always a cost saving with dalbavancin vs usual care (Figure 3).
- Similar findings were observed for cost saving per hospitalization day avoided (Figure 3).

METHODS

Model Description

- A decision-analytic cost-effectiveness model was developed from the perspective of the US healthcare system. A 14-day time horizon was used, representing the typical duration of ABSSSI management (Figure 2).
- The population was ABSSSI patients presenting at the ED, who would be eligible to receive IV antibiotic infusion. Patients can receive IV treatment in the ED, and then discharged or followed by hospital admission for continued management.
- Costs included ED visits, drug cost, inpatient stay, and physician visits.
- Cost outcomes associated with introducing a clinical pathway with dalbavancin were examined.
- Input parameter uncertainty was examined via one-way and probabilistic sensitivity analyses.

Figure 2. Decision Analytic Model Structure



Model Inputs

Decision Tree

- Data from the ADVANCE trial⁴ was used to determine the proportion of patients who were hospitalized after receiving dalbavancin in the ED, which was 17.6% (Table 1).
- The ENHANCE study⁵ was used for the length of stay with dalbavancin or usual care; 3.2 days and 4.8 days, respectively (Table 1).
- Following inpatient treatment with usual care, the proportion of patients receiving oral antibiotics, IV antibiotics, or no further treatment, was acquired from a retrospective database analysis in the US⁶ (Table 1).

Figure 3. One Way Sensitivity Analysis



-\$8,000 -\$7,000 -\$6,000 -\$5,000 -\$4,000 -\$3,000 -\$2,000 -\$1,000 \$0



Lower Bound Upper Bound Incremental costs



Cost of Inpatient hospital stay Length of hospital stay usual care Percentage of Dalvance patients hospitalized Length of hospital stay Dalvance Percentage usual care patients switching to oral antibiotics Percentage usual care patients staying on IV antibiotics Home infusion cost

Percentage of patients utilizing home infusion Percentage usual care patients with no further treatment Infusion centre cost

> Lower Bound Upper Bound Cost per hospitalization day avoided

		Input	Source
Dalbavancin arm	Dalbavancin hospitalization rate	17.6%	ADVANCE study ⁴
Daibavaricin ann	Dalbavancin length of stay	3.2 days	ENHANCE study⁵
Usual Care arm	Usual care length of stay	4.8 days	ENHANCE study⁵
	Switch to oral antibiotics	54.2%	Sulham et al. 2015 ⁶
Usual Care arm	Receive outpatient IV antibiotics	21.0%	Sulham et al. 2015 ⁶
	No further treatment	24.8%	Sulham et al. 2015 ⁶

Table 1. Decision Tree Inputs

Model Inputs

Costs

- Drug wholesale acquisition cost (WAC) price was obtained from Redbook Online 2.0⁷. The cost of dalbavancin was \$5,031 based on a single dose of 1500 mg (Table 2).
- The drug cost for the usual care arm during an inpatient stay was assumed to be included in hospitalization costs, which were calculated at \$2,321.66 based on average per-diem rates of for-profit hospitals in the US.⁹ Drug costs for the usual care arm after discharge was based on WAC prices and market share data from a real-world claims analysis^{6,7} (Table 2).
- The costs of medical visits, outpatient infusion and tests were obtained from the CMS Physician Fee Schedule or literature sources^{6,8} (Table 2).

Table 2.	Cost	Inputs
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	Cost (USD)*	Source
Outpatient ED visits	\$586.00	Moore et al. 2017 ⁸
Dalbavancin (Dalvance®)	\$5,031 (1500 mg)	Red Book 2.0 WACs ⁷
Inpatient stay (per-diem)	\$2,321.66	Kaiser Family Foundation ⁹
IV antibiotics prescribed after discharge	\$15.62 per day	Weighted average based on market share data ⁶ and Red Book 2.0 WACs ⁷
Oral antibiotics prescribed after discharge	\$0.73 per day	Same as above
Lab work for vancomycin	\$22.22	CPT code 80069 and 80202 ¹¹
Home infusion (assumption 50% patients)	\$227.39	Revankar et al 2014 ¹⁰
Infusion centre (assumption 50% patients)	\$73.62	CPT code 96365 ¹¹
Outpatients physician visit	\$183.19	CPT code 99215 ¹¹

*All costs are in 2021 US dollars and adjusted, where appropriate, using the medical component of the Consumer Price Index CPT: Current Procedural Terminology; ED: Emergency Department; IV: Intravenous; WAC: Wholesale Acquisition Cost

Probabilistic Sensitivity Analysis

• In 100% of the 10,000 simulated scenarios, dalbavancin was less costly than usual care (Figure 4).

Figure 4. Probabilistic Sensitivity Analysis



LIMITATIONS

- Treatment discontinuation, dose modification, or drug switch were not modelled.
- The model did not consider post-discharge patient adherence or variation in the duration of treatment.
- Only directs costs were examined; indirect costs incurred by the patient, such as transportation or missed opportunity costs, were not included.
- Patients typically take multiple antibiotics during their treatment course, making it challenging to quantify of the share of different antibiotics received during hospitalization and after hospital discharge. This was mitigated by using a composite cost of hospitalization to cover all aspects of the patient treatment during their hospital stay.