Cost saving opportunities among hospitalized patients with acute bacterial skin and skin structure infections (ABSSSI) with omadacycline, a once-daily antibiotic with IV-to-oral transition capability, relative to current standard of inpatient care

Poster P1266
Abstract 955

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ABSTRACT

Background: Care of patients with acute bacterial skin and skin structure infection (ABSSSI) places a major financial burden on the healthcare system, largely due to inpatient costs. Omadacycline (OMC) is an oral (PO) and IV once-daily antibiotic with broad spectrum activity, including MRSA that is under development for the treatment of patients with ABSSSI. The present study examined the cost impact of shifting ABSSSI patients from current inpatient standard of care (SOC) treatment to inpatient IV OMC treatment with early hospital discharge on oral OMC. The goal was to identify the hospital length of stay (LOS) reduction required for OMC treatment to confer cost savings.

Material/methods: A decision-analytic, cost-minimization model from the hospital and 3rd party payer's perspectives was constructed to compare costs associated with inpatient SOC versus OMC treatment (IV in hospital and discharge home on PO) among patients with ≥2 comorbidities and no life-threatening conditions. All OMC patients received OMC PO to complete 10-day course of therapy (COT). In the SOC arm, patients either completed COT with IV vancomycin in a hospital-based clinic (50%) or received a generic PO antibiotic (50%) to complete a 10-day COT. Inputs for LOS and costs were obtained from the Premier Hospital Database™. The daily costs for OMC were varied from 0 to $1,000/day.

Results: In the Premier Hospital Database, the median LOS for ABSSSI patients with ≥2 comorbidities and no life-threatening conditions was 5 days, and each hospital day was estimated to be $1,346 in 2016 US dollars. From the hospital perspective, which excluded outpatient cost, OMC was cost saving with a 1-day hospital LOS reduction if the daily cost of OMC was ≤$383. From the 3rd party payer's perspective, which included outpatient treatment costs, OMC was cost saving with a 2 days' LOS reduction at all OMC daily cost levels below $317/day.

Conclusions: Cost saving may be realized with OMC relative to SOC inpatient treatment if hospital LOS is reduced by 1 to 2 days with OMC IV-to-oral transition treatment. These findings need to be validated in the clinical trial arena.

INTRODUCTION

- Care of patients with acute bacterial skin and skin structure infections (ABSSSI) places a major financial burden on the healthcare system, largely due to inpatient costs.
  - Average inpatient costs per ABSSSI patient ranges between $6,000 to $13,000 2016 US dollars, with multi-day room and board expenses comprising 50% of total costs.
- Survey data suggest that many ABSSSI patients are often admitted to the hospital solely for the administration of intravenous antibiotics.
- Given the inpatient costs associated with management of ABSSSI patients, it is essential that clinicians develop treatment strategies that can expeditiously shift the site of care from the inpatient to the outpatient setting.
- Omadacycline (OMC) is an oral and IV once-daily antibiotic with broad spectrum activity, including MRSA that is under development for the treatment of patients with ABSSSI.
- The present study examined the cost impact of shifting ABSSSI patients from current inpatient standard of care (SOC) treatment to inpatient IV omadacycline treatment with early hospital discharge on oral OMC.
  - OMC has an oral dosing formulation and oral antibiotics have been shown to shorten hospital stay across several disease states, including ABSSSI.

OBJECTIVES

- Conceptual healthcare decision models were developed from the hospital and 3rd party payers' perspectives to evaluate the potential economic impact of omadacycline (OMC) among hospitalized patients with ABSSSI with two or more comorbidities and no life-threatening conditions.
  - Determine the reduction in hospital stay required with OMC treatment to confer cost savings relative to current inpatient SOC treatment.
  - Characterize the upper end of daily OMC acquisition cost that still conferred cost savings with 1-2-day hospital stay reductions relative to inpatient SOC treatment.

METHODS

Structure and Population

- Two decision-analytic, cost-minimization models were constructed to accomplish the study objectives.
- The first model compared the costs associated with current inpatient SOC (reference condition) versus inpatient OMC for the treatment of ABSSSI patients with two or more comorbidities (Charlson Comorbidity Index (CCI) score ≥ 2) and no life-threatening conditions from the hospital's perspective.
  - Four categories of disease severity among hospitalized ABSSSI patients were considered: CCI of 2 with and without systemic symptoms, and CCI of ≥ 3 with and without systemic symptoms.

METHODS (CONT.)

- The second model was identical to the first and included subsequent outpatient costs from the 3rd party payer's perspective.
  - All patients in this model were assumed to receive outpatient treatment after initial hospitalization to complete a 10-day course of therapy.
  - In the SOC arm, patients were assumed to complete their therapy post-hospital discharge with intravenous vancomycin in a hospital-based infusion suite (50%) or a generic oral antibiotic (25% Bactrim and 25% Linezolid) in the outpatient setting.
  - In the OMC arm, all patients were considered to receive oral OMC post discharge in the outpatient setting.
- Treatment failure and re-hospitalization rates were excluded from the models since studies have demonstrated no significant difference in treatment failure or re-hospitalization rates between antibiotics for treatment of ABSSSI.
- Patients with life-threatening conditions were also excluded from the models, as OMC has not been studied in this population.

Models Inputs

- Standard of care arm
  - Data from a retrospective, observational study that used hospital discharge data from the Premier Research Database™ was used to determine the median length of hospital stay associated with hospital inpatient treatment of ABSSSI patients in the standard of care arm.
    - Data from patients with the following characteristics were extracted for the decision analytic models: (1) admitted, (2) had CCI score of ≥ 2, and (3) had no life-threatening conditions.
  - To calculate the cost of inpatient treatment from the median length of stay, each hospital day was estimated to cost $1,346 in 2016 US dollars (amount in Premier Research Database™ analysis[3] inflated to July 2016 using the US Medical Care CPI).
  - For the model from the 3rd party payer's perspective, patients completed 10-day course of therapy with either IV vancomycin in a hospital-based clinic (50%) or a generic PO antibiotic (25% Bactrim and 25% Linezolid) in outpatient setting.
    - The wholesale acquisition cost (WAC) of linezolid 600 mg orally twice daily, Bactrim 1 DS tablet orally twice daily, and vancomycin 1000 mg IV twice daily for drug cost was used.
    - For vancomycin IV administration, the reimbursement rate under CPT 96365 as the cost associated with 1-hour infusions of vancomycin was employed.
- Omadacycline arm
  - Costs associated with inpatient SOC treatment were also assumed to be the same for patients receiving OMC.
  - For the model from the 3rd party payer's perspective, all patients were assumed to receive a 10-day course of OMC, split between the inpatient (IV administration) and outpatient (oral administration) setting.
    - The daily costs for OMC were varied from 0 to $1000 US dollars per day.

Model outputs

- The impact of 1 and 2-day hospital length of stay reductions with OMC relative to the current inpatient SOC on overall cost of care from both the hospital and 3rd party payer's perspective was determined.
  - One way sensitivity analyses: the daily cost of OMC was varied between 0-1000 US dollars per day to characterize the upper end of daily OMC acquisition cost that still conferred cost savings with 1-2-day hospital stay reductions relative to inpatient SOC treatment.
  - All costs in the model and in this poster, are daily costs unless stated otherwise.

MODEL INPUTS

Table 1: Hospital Length of Stay among Hospitalized Patients with ABSSSI[3]

	Hospital Length of stay	Patients with systemic symptoms but no life-threatening conditions (N=17,617)	Patients without life-threatening conditions or systemic symptoms (N=100,267)
CCI=0[2]	n	6,240	54,421
	Mean (SD)	4.64 (4.45)	3.56 (2.95)
	Median (IQR)	3 (2 – 6)	3 (2 – 4)
CCI=1[2]	n	3,067	20,834
	Mean (SD)	5.88 (5.25)	4.34 (3.49)
	Median (IQR)	4 (3 – 7)	4 (2 – 5)
CCI=2	n	2,564	11,152
	Mean (SD)	6.07 (4.71)	4.75 (3.78)
	Median (IQR)	5 (3 – 7)	4 (3 – 6)
CCI≥3	n	5,746	13,860
	Mean (SD)	7.20 (6.79)	5.22 (4.54)
	Median (IQR)	6 (4 – 9)	4 (3 – 5)

1. CCI=Charlson Comorbidity Index.
2. Length of stay Inputs for patients with CCI=0 and CCI=1 were not used in this model.
3. Lodise TP et al, Hospital admission patterns in adult patients with skin and soft tissue infections: Identification of potentially avoidable hospital admissions through a retrospective database analysis. Hospital Practice 2015;43(3):137-143.

METHODS (CONT.)

Figure 1: Cost-minimization model from the hospital inpatient perspective (no outpatient nodes) with one or two days shorter LOS

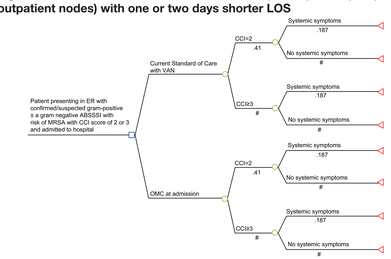
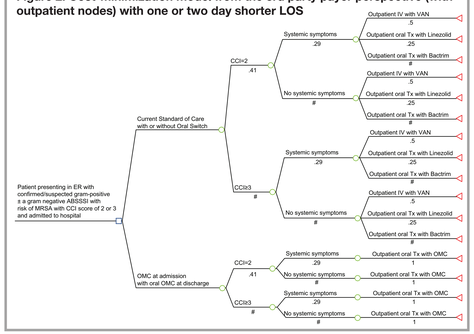
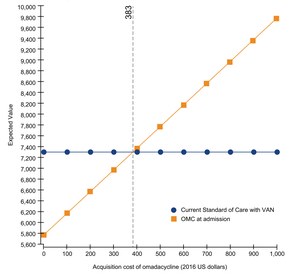


Figure 2: Cost-minimization model from the 3rd party payer perspective (with outpatient nodes) with one or two day shorter LOS



RESULTS

Figure 3: Sensitivity analysis on the OMC drug cost per day from the hospital perspective with one day shorter LOS



RESULTS (CONT.)

Figure 4: Sensitivity analysis on the OMC drug cost per day from the hospital perspective with two days shorter LOS

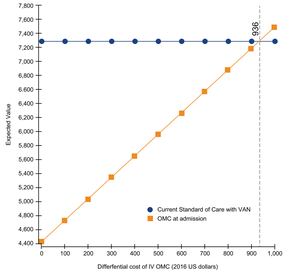


Figure 5: Sensitivity analysis on the OMC drug cost per day from the 3rd party payer perspective (with outpatient nodes) with one day shorter LOS

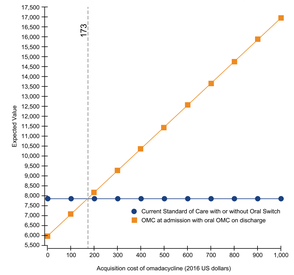
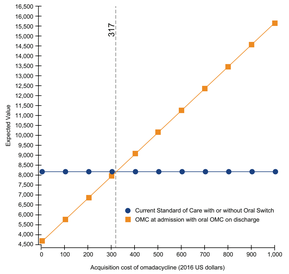


Figure 6: Sensitivity analysis on the OMC drug cost per day from the 3rd party payer perspective (with outpatient nodes) with two days shorter LOS



RESULTS (CONT.)

Table 2: Upper bounds of cost-minimizing OMC drug acquisition costs by length of stay with IV-oral switch and OMC drug acquisition cost

Reduction of hospital LOS with patient receiving OMC IV-PO switch on discharge	Perspective	Upper bound of cost-minimizing OMC drug daily acquisition cost (in 2016 US dollars)
1 day	hospital	$383
2 days	hospital	$936
1 day	3rd party payer	$173
2 days	3rd party payer	$317

In the Premier Hospital Database™, the median LOS for ABSSSI patients with ≥ 2 comorbidities and no life-threatening conditions was 5 days and each hospital day was estimated to be $1,346 in 2016 US dollars. From the hospital perspective, which excluded OP cost, OMC was cost-saving with a 1-day hospital LOS reduction if the daily cost of OMC was ≤ $383/day, and ≤ $936/day with a 2-day hospital LOS reduction. From the 3rd party payer's perspective, which included OP treatment costs, OMC was cost-saving with a 1 day LOS reduction at $173/day. With a 2 days LOS reduction, OMC was cost-minimizing at all OMC daily cost levels below $317/day.

CONCLUSIONS

- Cost-saving may be realized with omadacycline relative to standard of care inpatient treatment if hospitalization length of stay is reduced by 1-2 days with omadacycline IV-to-oral transition treatment.
- Given that IV-PO drugs (eg, quinolones and oxazolidinones) have been shown to reduce hospitalization length of stay in various studies, these findings are in keeping with previous research. The modeling findings need to be validated post launch of omadacycline in a real-world setting.

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