Cost-savings Analysis with Use of Omadacycline Among Hospitalized Community-Acquired Pneumonia Patients At Risk of *Clostridium difficile* Infection Being Treated with Moxifloxacin: Budget Impact Model Findings

Poster #4-049

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BACKGROUND

- *Clostridium difficile* (CDI) infection is a substantial cause of morbidity and mortality across the United States (US)
  - CDI has been reported with the use of nearly all antibacterial agents and ranges in severity from mild diarrhea to fatal colitis
  - CDI places a huge burden on healthcare systems, particularly for hospitalized patients, because it is associated with extended hospital stays, repeat admissions, and significant mortality
  - In 2011, *C. difficile* was responsible for nearly 500,000 infections and associated with ~29,000 deaths, in the USA[1]
- A meta-analysis of CDI rates associated with antibiotic use suggests that tetracyclines may be linked to a decreased risk of CDI compared with other classes of antibiotics[2]
  - This suggests that it may be appropriate to use tetracyclines to decrease the burden of CDI associated with antibiotic use[2]
- Omadacycline (OMC; Paratek Pharmaceuticals, Inc., King of Prussia, PA) is an aminomethylcycline antibiotic that was recently approved in the US for the treatment of adult patients with community-acquired bacterial pneumonia (CABP)[3]
  - In the Phase 3 **O**madacycline for **P**neumonia **T**reatment **I**n the **C**ommunity (OPTIC) study, OMC was shown to be non-inferior to moxifloxacin (MOX) in the treatment of patients with CABP (NCT02531438)[3]
  - Adverse event rates were comparable between treatment groups. However, *C. difficile* infections occurred in 8 patients (2%) who received MOX and 0 patients who received OMC[3]
- A budgetary impact model was created to highlight cost-saving opportunities for treating patients hospitalized for CABP with OMC compared to MOX, taking the risk and cost of treatment-associated CDI into account

METHODS

Model Structure and Populations

- The economic model was developed using a hospital perspective to estimate the budget impact of replacing the current strategy of treating 100 patients hospitalized for CABP with 5 days of MOX, to treating with 5 days of OMC
  - This time period reflects the initial 5 days of a minimum treatment of 7 days for either OMC or MOX in CABP

Costs Included

- Hospital room and board fees were assumed to be the same for OMC and MOX
- Drug acquisition costs (MOX: US$46/day, wholesale acquisition cost)
- OMC acquisition cost varied between $150 and $600/day
- CDI adverse event treatment (average cost-per-case attributed to hospital-onset CDI was $34,157[4])
- No additional adverse events were considered

Sensitivity Analysis

- Sensitivity analysis with incremental CDI incidence of MOX (0-12%) and cost of CDI treatment (Low: $1,522; Mean: $34,149; High: $122,318) were undertaken to capture incidence uncertainty
  - The assumptions were that treatment with OMC has a lower propensity to induce CDI relative to MOX and has the potential to avoid CDI events, leading to a reduction in overall hospital costs

RESULTS

- From the hospital/health system perspective and a CDI treatment cost of $34,149, for every 100 patients treated with OMC instead of MOX, the incremental cost of reductions in CDI rate with OMC ranged between $52,000 and $132,884 (cost saving) depending on the acquisition cost of OMC and CDI incidence for MOX (0-12%) (**Fig.1; Table 1**)
- Analysis showed that for OMC to become cost saving, the incidence of CDI in MOX-treated patients would need to range between 1.5% and 8.1%, depending on the acquisition cost of OMC ($150-$600/day)
- At the lower end of the cost per hospitalized CDI case, OMC would not be cost saving at any price point
- As the cost per case of CDI increases, OMC use becomes cost saving for a hospital compared with MOX at lower CDI incidence rates

RESULTS

Figure 1. Incremental Cost per 100 Patients Treated with Omadacycline Relative to Moxifloxacin at Varying Incidences of Moxifloxacin-associated CDI Event Rates

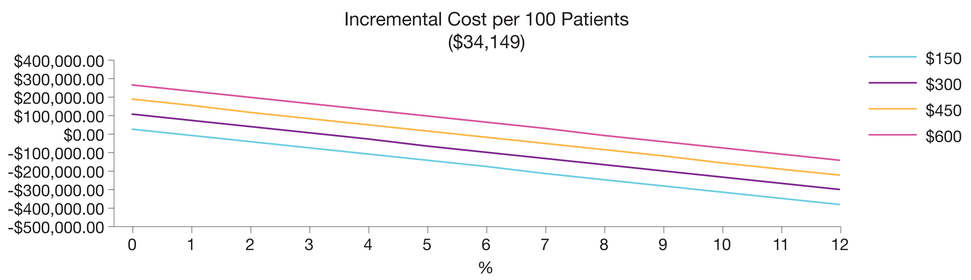

Table 1. Incremental Cost Savings for Reduction in CDI Associated with Omadacycline vs Moxifloxacin in CABP

CDI-attributable Cost per Case, $[4]		1,522 (Lower Range)				34,149 (Mean)				122,318 (Upper Range)			
Omadacycline Daily Acquisition Cost, $		150	300	450	600	150	300	450	600	150	300	450	600
CDI Incidence, %	0	29,372	109,322	189,272	269,222	29,372	109,322	189,272	269,222	29,372	109,322	189,272	269,222
	1	27,850	107,800	187,750	267,700	-4,776	75,173	155,123	235,073	-92,945	-12,995	66,954	146,904
	2	26,328	106,278	186,228	266,178	-38,925	41,024	120,974	200,924	-215,263	-135,313	-55,363	24,586
	3	24,806	104,756	184,706	264,656	-73,074	6,875	86,825	166,775	-337,581	-257,631	-177,681	-97,731
	4	23,284	103,234	183,184	263,134	-107,223	-27,273	52,676	132,626	-459,899	-379,949	-299,999	-220,049
	5	21,762	101,712	181,662	261,612	-141,372	-61,422	18,527	98,477	-582,217	-502,267	-422,317	-342,367
	6	20,240	100,190	180,140	260,090	-175,521	-95,571	-15,621	64,328	-704,535	-624,585	-544,635	-464,685
	7	18,718	98,668	178,618	258,568	-209,670	129,720	-49,770	30,179	-826,853	-746,903	-666,953	-587,003
	8	17,196	97,146	177,096	257,046	-243,819	-163,869	-83,919	-3,969	-949,171	-869,221	-789,271	-709,321
	9	15,674	95,624	175,574	255,524	-277,968	-198,018	-118,068	-38,118	-1,071,489	-991,539	-911,589	-831,639
	10	14,152	94,102	174,052	254,002	-312,117	-232,167	-152,217	-72,267	-1,193,807	-1,113,857	-1,033,907	-953,957
	11	12,630	92,580	172,530	252,480	-346,266	-266,316	-186,366	-106,416	-1,316,125	-1,236,175	-1,156,225	-1,076,275
	12	11,108	91,058	171,008	250,958	-380,415	-300,465	-220,515	-140,565	-1,438,443	-1,358,493	-1,278,543	-1,198,593

CDI = *Clostridium difficile* infection
Cost of hospital-onset CDI tested over the range of values reported by Zhang et al.[4]
Purple highlighted cells show cost savings (negative $ values) associated with omadacycline in the model, at the given omadacycline costs and CDI incidence rates.

CONCLUSIONS

- The model illustrated the economic impact associated with reductions in CDI rates with omadacycline compared to moxifloxacin, when treating patients hospitalized for CABP
- As part of the analysis, the model demonstrated the incremental increase in CDI rates with moxifloxacin compared to omadacycline that conferred cost savings
- Use of omadacycline has the potential to reduce the economic burden associated with patients hospitalized for CABP who are treated with moxifloxacin if it can avoid approximately 2-8 cases of moxifloxacin-associated CDI per 100 patients
- Future studies are required to identify CABP patients at greatest risk of moxifloxacin-associated CDI
- Like all studies of this nature, the findings in this analysis and modeling require validation in real-world settings

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