

Cost-Effectiveness of Ceftazidime/Avibactam Versus Meropenem in the Treatment of Complicated Intra-Abdominal Infections in China

Hu Q¹, Tao X¹, Jiang M¹, Long E²

¹University of Electronic Science and Technology of China, Chengdu, China; ²Sichuan Academy of Medical Sciences & Sichuan Provincial People's Hospital, School of Medicine, University of Electronic Science and Technology of China, Chengdu, China

INTRODUCTION

Complicated intra-abdominal infections (cIAIs) refer to infections caused by infection beyond the source cavity and into the peritoneal space. Common diagnoses of cIAIs include abdominal abscess, etc^[1]. cIAIs are usually caused by Gram-negative bacteria, Gram-positive bacteria, and anaerobic bacteria^[2]. In recent years, the infection rate caused by multi-drug resistant bacteria represented by Gram-negative bacteria has been increasing, which limits the effectiveness of existing antibiotics to a certain extent^[3]. Ceftazidime/avibactam is a novel β -lactam/ β -lactamase inhibitor. As an enzyme inhibitor, avibactam is more potent and has a broader inhibitory spectrum than clavulanic acid and tazobactam, which makes ceftazidime/avibactam a carbapenem Potential alternatives to class therapy for cIAIs^[4]. At present, the economic benefit of using ceftazidime/avibactam in the treatment of cIAIs in China is still unclear. Therefore, this study used a decision tree model to evaluate the economics of meropenem in the treatment of cIAIs^[5], in order to provide a reference for clinical rational drug use.

OBJECTIVE

To evaluate the cost-effectiveness of ceftazidime/avibactam (CAZ/AVI) versus meropenem (MEM) in the treatment of complex intra-abdominal infections (cIAIs) in China.

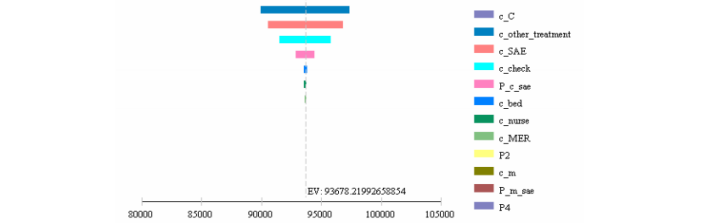
METHODS

Based on a systematic review comparing the effectiveness and safety of CAZ/AVI and carbapenems in the treatment of cIAIs (including 4 randomized controlled trials), a 21d study period was used to establish a decision tree model using Treeage 2011 software, Judge the economics of the plan with the incremental cost-effectiveness ratio, and conduct single-factor sensitivity analysis and probability sensitivity analysis.

Table 1. Cost-effectiveness analysis results

Treatment regimen	Costs(C, ¥)	cure rate(E, %)	C/E (¥)	ICER(¥)
CAZ/AVI 2000/500 mg + MER500mg q8h MEM 1000mg + Placebo q8h	93678.22	92.27	101526.19	7130578.049
	64442.85	91.86	70153.33	-

Figure 1. Tornado sensitivity analysis



c_C: daily cost of CAZ/AVI; C_other_treatment: daily cost of other treatments; C_SAE: daily cost of severe adverse reactions; C_check: check daily cost; P_c_sae: incidence of serious adverse reactions in CAZ/AVI group; C_bed: daily cost for hospital stay; C_nurse: daily cost of nursing; C_MER: daily cost of MEM; P2: Incidence of death in the CAZ/AVI group; C_m: Daily cost of MEM; P_m_sae: Incidence of serious adverse reactions in CAZ/AVI group; P4: Incidence of death in MEM group

Figure 2. Probabilistic sensitivity analysis of cost-effectiveness scatter plots

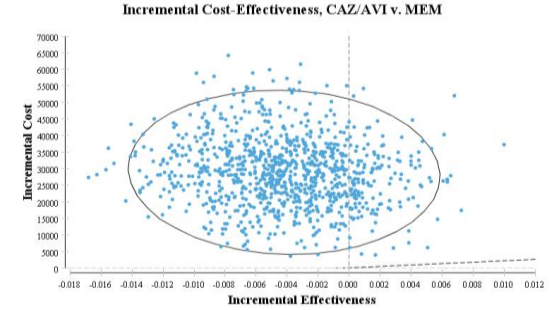
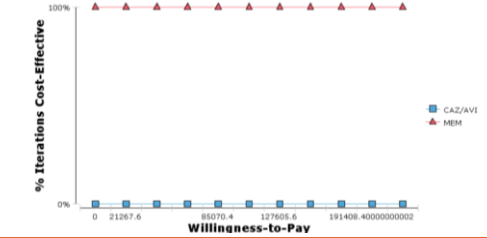


Figure 2. Cost-effectiveness acceptability curve of probability sensitivity analysis



RESULTS

The cost-effectiveness analysis showed that the CER of CAZ/AVI for cIAIs was 101526.19 yuan, and the cure rate was 92.27%; the CER of MEM for cIAIs was 70153.33 yuan, and the cure rate was 91.86%. Using 3 times China's per capita GDP in 2020 (212,676 yuan) as WTP, the ICER of CAZ/AVI versus MEM is 7130578.049 yuan, which is higher than China's WTP, and the additional cost is not worthwhile. The results of single factor sensitivity analysis showed that the average daily cost of CAZ/AVI had the greatest impact on the results; the results of the probability sensitivity analysis were stable. When the WTP fluctuates in the range of 0-212676 yuan/case, the treatment of cIAIs by MEM has The probability of cost-effectiveness is always greater than CAZ/AVI treatment and is 100%.

CONCLUSIONS

Ceftazidime/avibactam versus meropenem is not economical in the treatment of cIAIs.

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