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Cost-Effectiveness Analysis of Isavuconazole Versus Voriconazole for the Treatment of Invasive Aspergillosis in Jordan

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Introduction

Invasive fungal diseases (IFDs) such as invasive aspergillosis (IA) or mucormycosis are a common complication among immunocompromised patients.1 Voriconazole is well established as standard treatment for invasive aspergillosis (IA).

Objectives

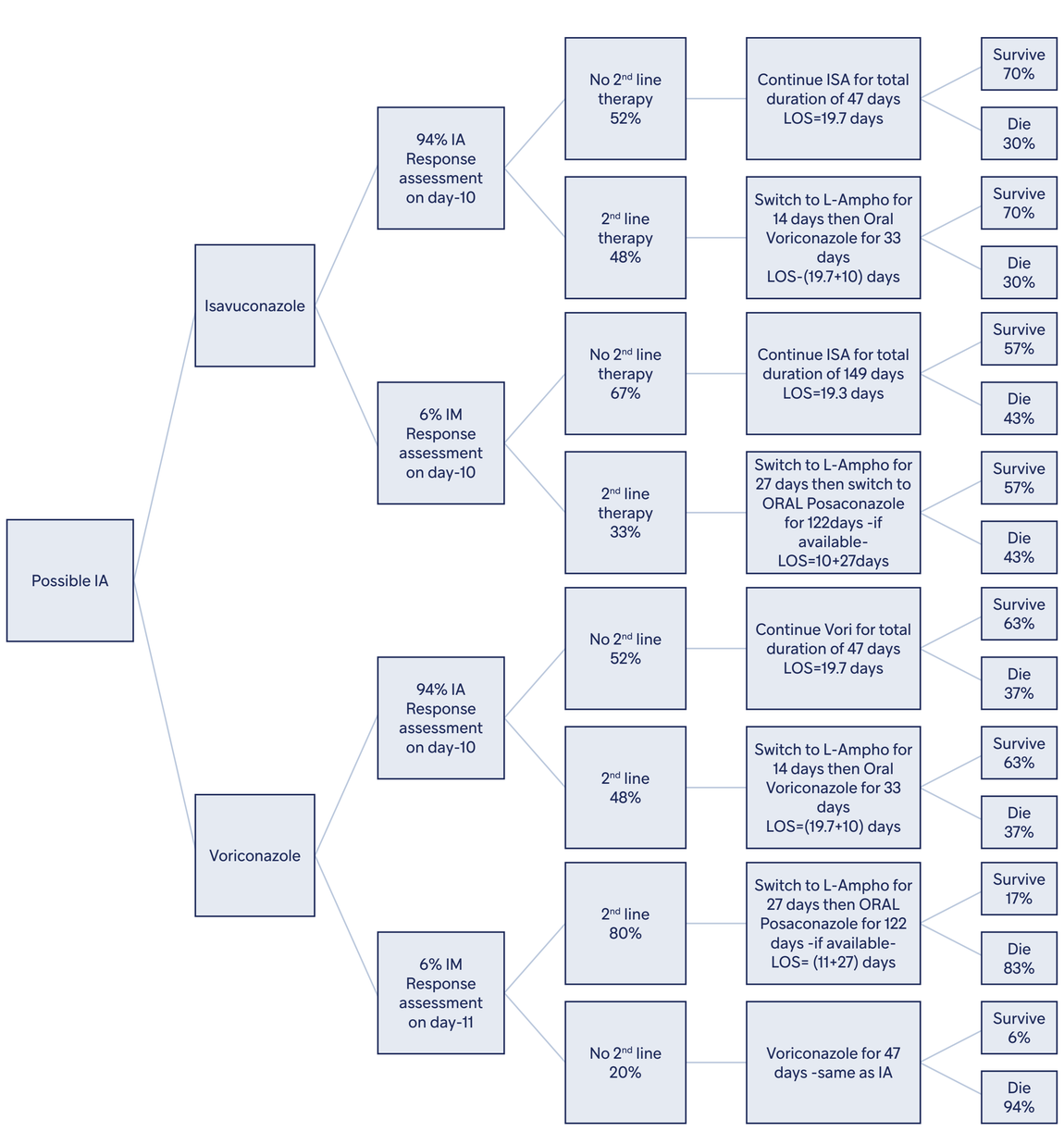
To examine the cost-effectiveness of Isavuconazole versus Voriconazole for the treatment of invasive aspergillosis (IA) in Jordan.

Cost Inputs

Medication	Strength	Presentation	Public Price (JOD)
Voriconazole	200 mg	1 vial	56.59
Voriconazole	200 mg	30 tablets	563.66
Liposomal Amphotericin (L-Ampho)	50 mg	1 vial	97.90
Posaconazole delayed release tablets	100 mg	24 tablets	N/A
Isavuconazole	100mg	14 tablets	503.64
Isavuconazole	200mg	1 vial	280.80
Input	**Cost (JOD)**	**Reference**	
Hospitalization cost (per day)	70.00	Average Cost in 4 Private Hospitals in Jordan	
Infusion cost (per 1 administration)	30.00	Average Cost in 4 Private Hospitals in Jordan	
Liver Function tests (per test)	25.00	Average Cost in 4 Private Hospitals in Jordan	

Method

We conducted a cost-utility analysis comparing Isavuconazole and Voriconazole for the treatment of IA using a decision tree model.[2]



Patients with possible IA entered the model, with 6% assumed to actually have invasive mucormycosis (IM). The Jordanian Food and Drug Administration was contacted for information regarding the cost of medications.

Cost of medications administration, treatment switches, oral step-down therapy, nephrotoxicity and lab tests monitoring were included in the model. Our model incorporates data and clinical definitions from published randomized clinical trials, observational studies, medical guidelines, and clinical practice. A one-way sensitivity analysis was performed to assess the reliability of the results. Our model was constructed from the payer's perspective.

Results

The total cost of Isavuconazole for the treatment of IA was 12,252.5 Jordanian Dinar (JOD) (1 JOD: 1.41 USD), and 2,967.8 JOD for patients with IM. The total cost of Voriconazole for the treatment of IA and IM was 9,980.3 JOD and 5,463.0, respectively. The combined estimated quality-adjusted life year (QALY) associated with Isavuconazole treatment and Voriconazole treatment for IA and IM was 6.81 QALY and 5.91 QALY, respectively.

	Cost (JOD)					Effectiveness	
	Drug	Hospital	ADEs	Infusion	Monitoring	LYG	QALY
Isavuconazole							
IA	9963.62	1612.1	32.69	527.91	116.22	7.89	6.47
IM	2719.01	105.87	1.43	119.73	21.73	0.41	0.336
Combined	15220.31					8.3	6.806

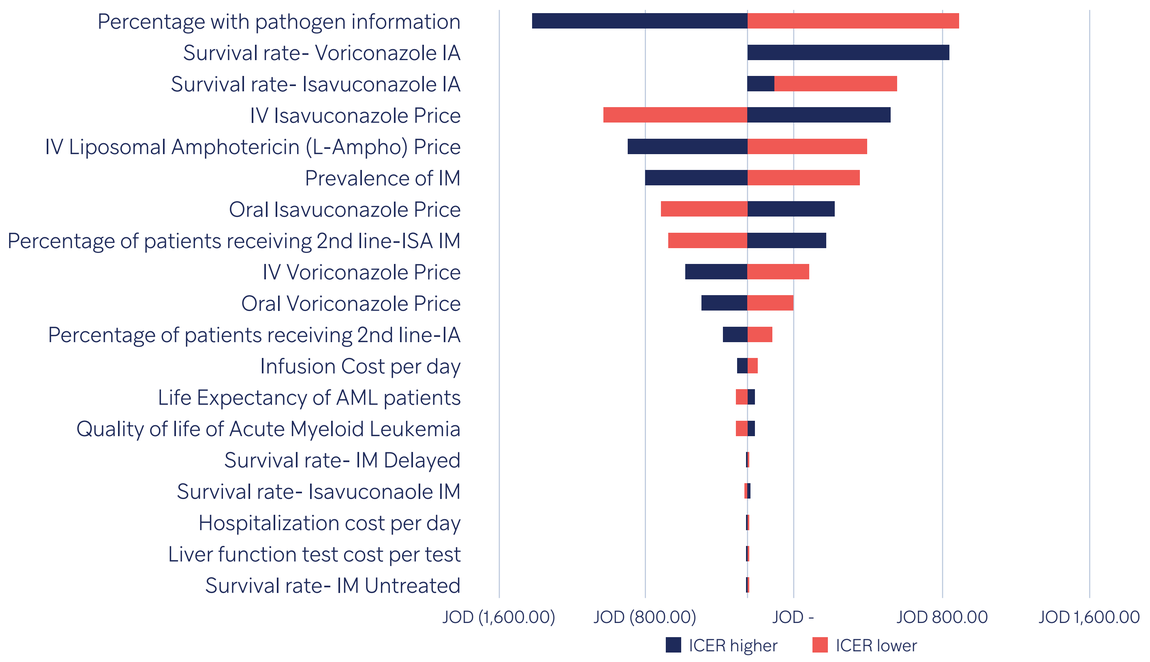
	Cost (JOD)					Effectiveness	
	Drug	Hospital	ADEs	Infusion	Monitoring	LYG	QALY
Voriconazole							
IA	7555.81	1612.1	32.69	640.7	139.02	7.10	5.83
IM	5034.29	144.9	3.48	252	28.31	0.097	0.087
Combined	15443.3					7.2	5.91

The incremental cost-effectiveness ratio (ICER) for the use of Isavuconazole versus Voriconazole for the treatment of IA was -248.68 JOD per QALY gained.

	Isavuconazole Versus Voriconazole for the treatment of Invasive Aspergillosis (IA) in Jordan
Difference in Cost	-222.97 JOD
Difference in QALYs	+0.89
ICER	-248.68 JOD per QALY gained (Dominant)

Our model was most sensitive to the probability of switching Voriconazole to liposomal amphotericin in the case of IM and the survival rates of Isavuconazole and Voriconazole in IA.

Tornado Diagram



Conclusions

From the payer's perspective in Jordan, Isavuconazole is a cost-effective treatment option for IA. Our findings can help clinicians prescribe cost-effective medications for patients with IA.

References:

1. Lass-Florl C. The changing face of epidemiology of invasive fungal disease in Europe. Mycoses. 2009;52(3):197–205.
2. Floros L, Kuessner D, Posthumus J, Bagshaw E, Sjölin J. Cost-effectiveness analysis of isavuconazole versus voriconazole for the treatment of patients with possible invasive aspergillosis in Sweden. BMC Infect Dis. 2019 Feb 11;19(1):134. doi: 10.1186/s12879-019-3683-2. PMID: 30744563; PMCID: PMC6371439.