EE102

Cost-Utility Of First-Line Systemic Therapies For Unresectable Hepatocellular Carcinoma In Vietnam: A Preliminary Analysis

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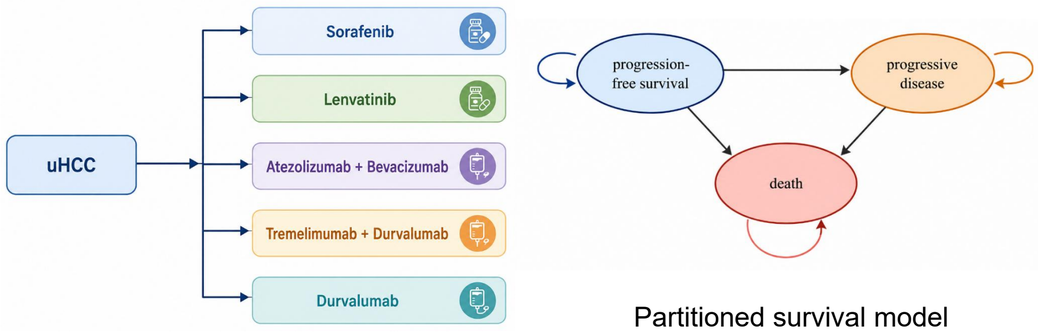
Introduction

- Unresectable hepatocellular carcinoma (uHCC) represents a substantial health burden in Vietnam, with a large proportion of patients diagnosed at advanced stages[1-5]. While sorafenib remains the only first-line systemic therapy reimbursed by health insurance, newer therapies have been approved and introduced into clinical practice with demonstrated survival benefits. However, their high costs may limit patient access, highlighting the need for cost-effectiveness evidence to inform reimbursement and resource-allocation decisions[6,7].
- This study aims to evaluate the cost-utility of first-line systemic therapies available in Vietnam for uHCC, compared with standard treatment (Sorafenib), to support decision-making.

Method

- A three-state partitioned survival model was developed to assess the cost-utility of lenvatinib, atezolizumab + bevacizumab, tremelimumab + durvalumab, and durvalumab versus sorafenib from a healthcare payer perspective over a lifetime horizon[8].
- Clinical efficacy was derived from the IMbrave150 trial[9] and a network meta-analysis[10], while cost inputs were obtained from published literature and Vietnamese-specific data and standardized to 2024 US Dollar (USD). Outcomes were measured in quality-adjusted life years (QALYs)[11-16].
- Incremental cost-effectiveness ratios (ICERs) were used to compare treatment strategies against a cost-effectiveness threshold (CET) of 1–3 times Vietnam's 2024 gross domestic product (GDP) per capita, equivalent to 4,717–14,151 USD (114-342 million Vietnamese Dong).
- Univariate and probabilistic sensitivity analyses were conducted to assess parameter uncertainty.



Partitioned survival model

Results

1. Parametric survival modelling

The best-fitting distributions were weibull for sorafenib, lenvatinib, tremelimumab plus durvalumab, durvalumab and log-normal for atezolizumab plus bevacizumab, presented in Figure 1.

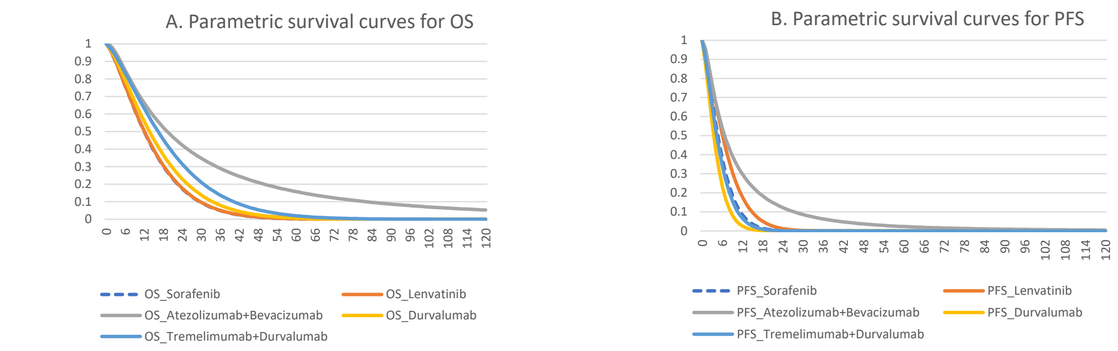


Figure 1. Parametric survival curves (A-B)

PFS, progression-free survival; OS, overall survival

2. Base-case analysis

In healthcare payer perspective, compared with sorafenib, lenvatinib, durvalumab, tremelimumab plus durvalumab, and atezolizumab plus bevacizumab gained 0.015, 0.101, 0.282, and 1.122 QALYs, with ICERs of 10,173; 140,786; 95,815; and 46,499 USD/QALY, respectively. At the Vietnamese's CET of 3 GDP per capita in 2024 (14,151 USD), only lenvatinib was cost-effective, presented in Table 1.

Table 1. Results of base-case analysis

Healthcare payer perspective									
Treatment	**Costs (USD)**	**LYs**	**QALYs**	**Incremental Costs**	**LYs gained**	**QALYs gained**	**ICER/LY**	**ICER/QALY**	**Interpretation***
Sorafenib	13,211	1.234	0.874	-	-	-	-	-	Reference
Lenvatinib	13,368	1.243	0.890	157	0.009	0.015	18,008	10,173	Cost-effective
Atezolizumab + Bevacizumab	65,362	2.824	1.996	52151	1.589	1.122	32,816	46,499	Not cost-effective
Tremelimumab + Durvalumab	40,186	1.652	1.156	26975	0.417	0.282	64,648	95,815	Not cost-effective
Durvalumab	27,448	1.395	0.975	14236	0.161	0.101	88,697	140,786	Not cost-effective
Societal perspective									
Treatment	**Costs (USD)**	**LYs**	**QALYs**	**Incremental Costs**	**LYs gained**	**QALYs gained**	**ICER/LY**	**ICER/QALY**	**Interpretation***
Sorafenib	90,554	1.234	0.874	-	-	-	-	-	Reference
Lenvatinib	90,752	1.243	0.890	198	0.009	0.015	22,667	12,804	Cost-effective
Atezolizumab + Bevacizumab	138,769	2.824	1.996	48,216	1.589	1.122	30,340	42,990	Not cost-effective
Tremelimumab + Durvalumab	116,696	1.652	1.156	26,142	0.417	0.282	62,651	92,856	Not cost-effective
Durvalumab	104,455	1.395	0.975	13,902	0.161	0.101	86,611	137,891	Not cost-effective

*, Comparing with cost-effectiveness threshold of 3 GDP per capita (14,151 USD). CET, Cost-effectiveness threshold; GDP, Gross Domestic Product; ICER, Incremental cost-effectiveness ratio; LY, Life year; QALY, Quality-Adjusted Life Year; USD, US Dollar. 1 USD = 24,164 Vietnamese Dong.

3. Sensitivity analysis

Sensitivity analyses supported the base-case findings for all other treatments, while lenvatinib was sensitive to PFS/OS hazard ratios, lenvatinib and sorafenib costs, with changing its cost-effectiveness status, shown in Figure 2.

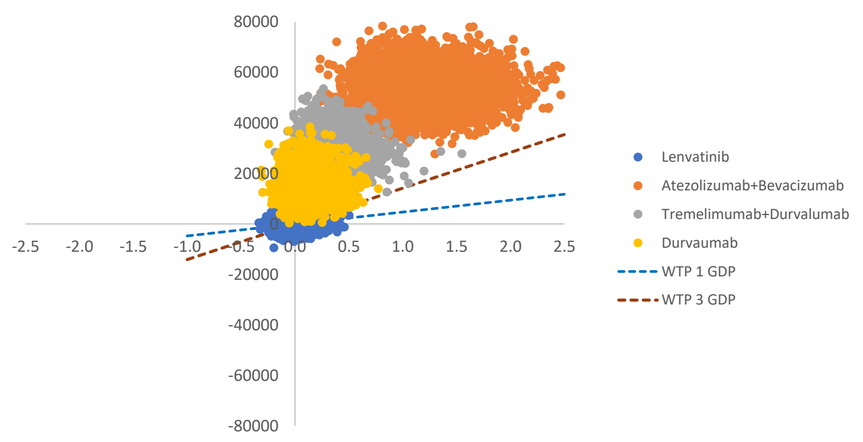


Figure 2. Cost-effectiveness plane

GDP, Gross Domestic Product; WTP, Willingness-to-pay

4. Scenario analysis

Scenario analyses generally did not alter the base-case cost-effectiveness conclusions at the 3-GDP threshold, except that lenvatinib became dominant at 30% reimbursement and dominated under the Gompertz overall survival distribution for sorafenib, presented in Table 2 and Table 3.

Table 2. Results of scenario analyses on reimbursement rate

	Reimbursement rate by healthcare payer*, USD			
Reimbursement rate	**Lenvatinib**	**Atezolizumab + Bevacizumab**	**Tremelimumab + Durvalumab**	**Durvalumab**
30%	Dominant	15,913	20,905	19,118
50%	3,083	23,710	48,609	71,424
70%	166,651	31,506	76,313	123,730

*Sorafenib and bevacizumab were assumed to be reimbursed at 50%, reflecting the current Vietnam-specific context. Dominant, less costly and more effective strategy;

Table 3. Results of scenario analyses on alternative distributions of Sorafenib

Treatment	**Base-case, USD**	**Alternative distributions of PFS curve of Sorafenib, USD**					**Alternative distributions of OS curve of Sorafenib, USD**				
		Log logistic	**Gamma**	**Log normal**	**Exp**	**Gompertz**	**Log logistic**	**Gamma**	**Log normal**	**Exp**	**Gompertz**
Lenvatinib	10,173	148,639	106,318	98,956	65,876	Dominated	6,242	4,626	6,629	8,260	10,895
Atezolizumab + Bevacizumab	46,499	44,125	45,000	45,183	45,505	46,601	76,059	4,575,895	74,864	58,711	44,544
Tremelimumab + Durvalumab	95,815	106,815	103,230	102,297	100,888	95,151	27,155	17,782	31,315	54,486	126,881
Durvalumab	140,786	133,057	136,736	136,923	135,201	138,714	41,927	25,571	47,779	79,467	182,454

Exp, Exponential; OS, Overall survival; PFS, Progression-free survival; QALY, Quality-adjusted life-year; USD, United States dollar. Dominated, more costly but less effective strategy.

Discussion

- Our findings were generally consistent with previous economic evaluations, lenvatinib showing favorable cost-effectiveness, while atezolizumab + bevacizumab provided the largest QALY gain but remained above the threshold because of its higher cost[14-16].
- Reimbursement substantially influenced cost-effectiveness, suggesting that reimbursement policy may improve access to newer therapies[7,16].
- Overall conclusions were generally supported by sensitivity analyses, although results remained sensitive to drug costs and survival assumptions[14-16].

Conclusion

Preliminary findings suggest that although currently available first-line systemic therapies may provide additional health benefits for patients with uHCC in Vietnam, only lenvatinib was cost-effective at the current willingness-to-pay threshold. These early results provide evidence to inform reimbursement considerations and future patient-access strategies for systemic therapies.

References

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