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BACKGROUND

- Invasive fungal disease (IFD) causes over 300 million severe cases and 1.5 million deaths annually worldwide, being a leading cause of mortality in patients with hematological malignancies.
- Global antifungal resistance is on the rise. Furthermore, conventional amphotericin B deoxycholate (AmBd) is associated with significant nephrotoxicity. Lipid formulations improve safety but lack comprehensive HTA evidence for rational selection—especially in middle-income countries like China.

OBJECTIVE

- To develop a clinical comprehensive evaluation index system for the treatment of invasive fungal disease and to conduct empirical research to provide methodological references for rational clinical use in hospitals.

METHOD

- Based on literature review and relevant guidelines^[1-3], the Delphi method was employed to construct a clinical comprehensive evaluation index system and evaluation criteria for the treatment of invasive fungal infections.
- AmBd, liposomal amphotericin B (L-AmB), and amphotericin B colloidal dispersion (ABCD) were included as examples in the empirical research.

RESULTS

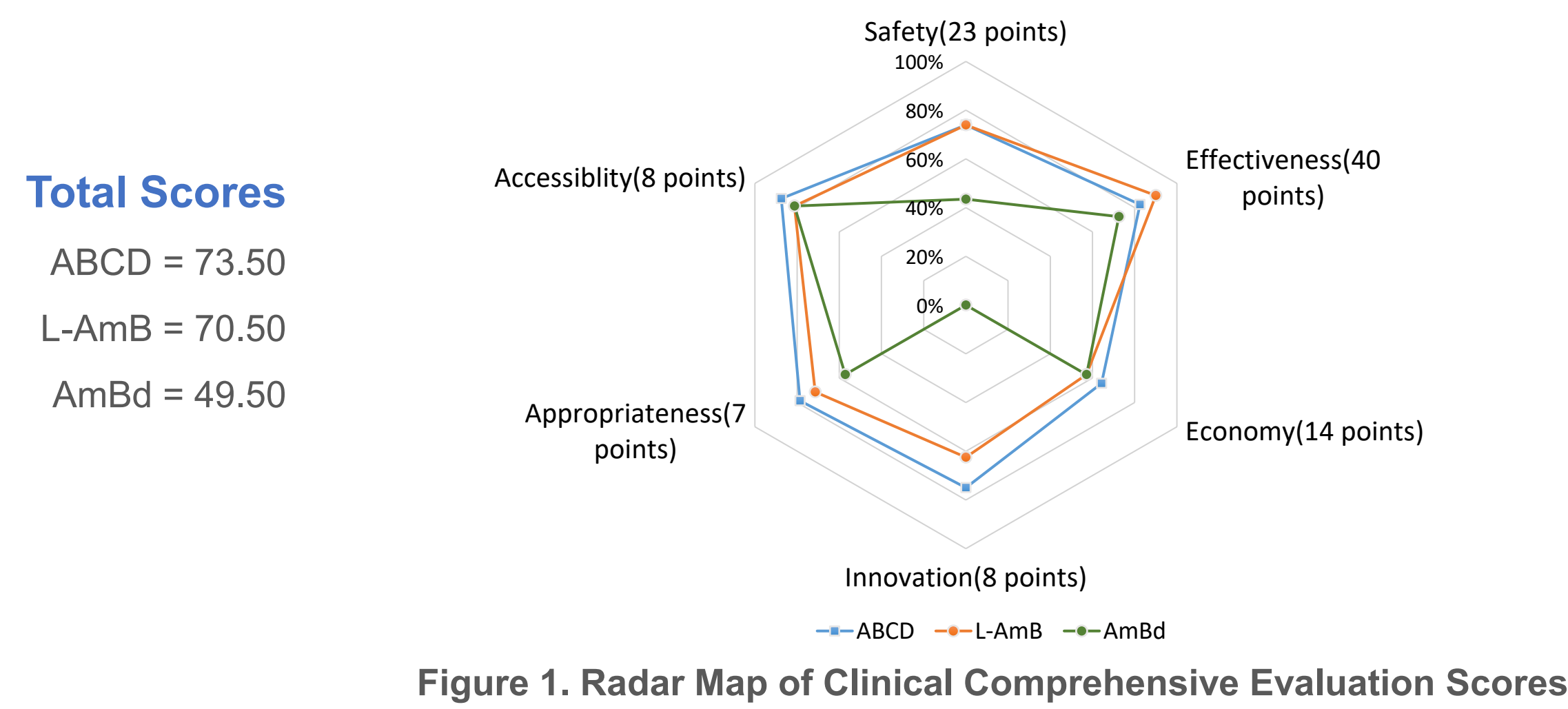
Clinical Comprehensive Evaluation Index System

6 primary indicators and 13 secondary indicators were finalized along with their corresponding weights and quantitative scoring.

Table 1. Comprehensive Clinical Evaluation Index System for IFD Medications

First-Level Index	Second-Level Index	Weight
Safety	A1- Incidence and severity of adverse events	12%
	A2- Drug contraindications	11%
Effectiveness	B1- Authoritative guideline recommendations	22%
	B2- Therapeutic effect observation indicators	18%
Economy	C1- Drug price	7%
	C2- Cost–utility analysis	7%
Innovation	D1- Mechanism innovation	3%
	D2-Application innovation	3%
	D3- domestic original research and innovation	2%
Appropriateness	E1- Technical appropriateness of the drug	3%
	E2- Appropriateness of drug use	4%
Accessibility	F1- Drug accessibility	4%
	F2- Affordability	4%
Total		100%

Comprehensive Scores of Three AmB Formulations



Dimension-Specific Results

Safety

- The three amphotericin B formulations show no significant differences in fever, chills, discontinuation rate, mortality, overall adverse events, liver injury, or infusion reactions. However, ABCD and L-AmB have lower nephrotoxicity than AmBd; ABCD is safer for patients with impaired hepatic or renal function, while AmBd carries stricter usage restrictions in cases of severe organ dysfunction²³.

Effectiveness

- L-AmB demonstrated superior efficacy and received higher recommendation grades in both domestic and international guidelines.

Economy

- Compared with AmBd, the ICERs for both ABCD and L-AmB were below the willingness-to-pay (WTP) threshold of one times the GDP per capita in China.

Table 2 Comparison of Economic Indicators for Three AmB Formulations

Indicator	ABCD	L-AmB	AmBd
DDD Cost (CNY)	1,663	2,533	277
ICER vs AmBd (CNY/QALY)	54,672	76,933	-

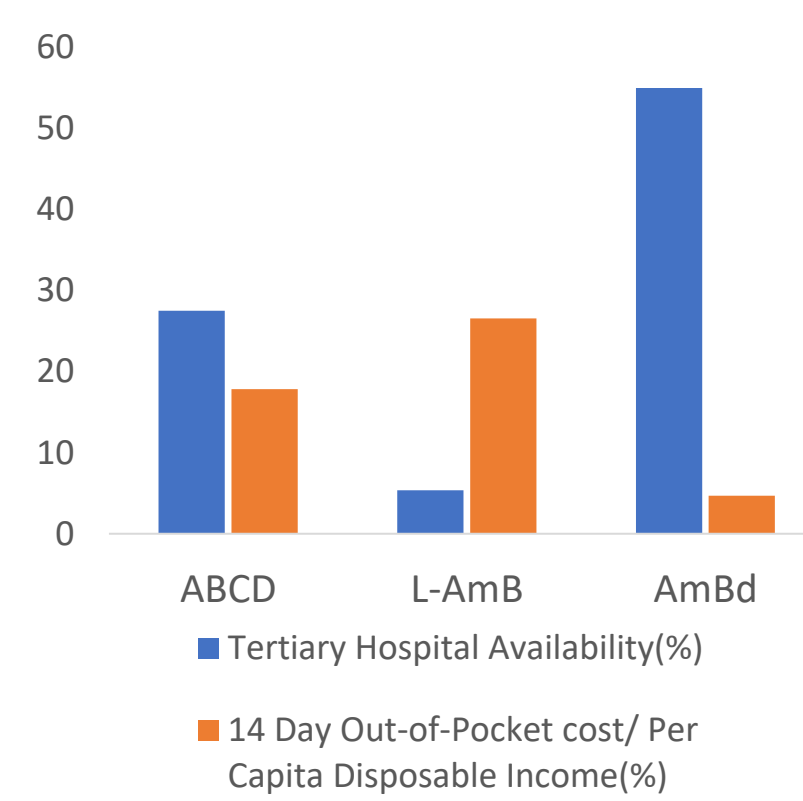
Innovation

- As a Category 4 Priority New Drug in China, ABCD addresses a clinical gap by allowing dose escalation from 1 mg/kg to 6 mg/kg due to its lower nephrotoxicity, thereby shortening treatment, improving efficacy, and enhancing compliance, particularly for patients intolerant or unresponsive to AmBd.

Appropriateness

- ABCD, stable at room temperature with a 2-hour infusion, offered practical advantages over L-AmB and the more cumbersome AmBd, which requires refrigeration and a prolonged (>6 hours), light-protected infusion

Accessibility



CONCLUSIONS

The proposed clinical evaluation index system offers a structured and evidence-based approach for guiding antifungal drug selection. The comprehensive evaluation, which integrates safety, efficacy, economy, and other dimensions, revealed a trade-off: ABCD provided the best overall value due to its favorable economic profile and safety advantages, while L-AmB offered the highest clinical efficacy. These findings can inform value-based decision-making in clinical practice.

REFERENCES

1 ZHAO Z G, DONG Z J, LIU J P. A quick guideline for drug evaluation and selection in Chinese medical institutions(the second edition)[J]. Her Med, 2023, 42(4): 447-456.
2 TONIN F S, STEIMBACH L M, BORBA H H, et al. Efficacy and safety of amphotericin B formulations: A network metaanalysis and a multicriteria decision analysis[J]. J Pharm Pharmacol, 2017, 69(12): 1672-1683
3 WANG Y Y, LU J M, ZHANG Y, et al. Efficacy and safety of four kinds of intravenous preparations of amphotericin B in the treatment of fungal infections: A network meta-analysis[J]. Eval Anal Drug Use Hosp China, 2024, 24(3): 327-332.

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