Automated Peritoneal Dialysis vs Hemodialysis in China: Cost–Utility Analysis

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Background

ESKD imposes a substantial and increasing clinical and economic burden in China.[1,2]
HD is widely used but requires frequent facility-based treatment, leading to high medical resource utilization, transportation burden, and productivity loss.[2,4]
APD provides home-based, automated overnight dialysis and may reduce patients' daily treatment burden.[6,10]
Compared with HD, APD may offer advantages in convenience, quality of life, and indirect cost reduction.[7]
China-specific cost-utility evidence comparing APD with HD is needed to inform clinical and reimbursement decisions.[7]

Objective

To assess the cost-effectiveness of APD versus HD for adult ESKD patients in China from societal, health system, and payer perspectives, and to examine a scenario analysis of APD with remote patient monitoring (RPM-APD) versus HD.

Methods

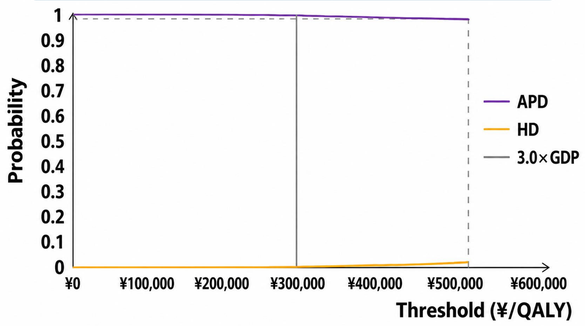
- A five-state Markov model was used to compare APD versus HD in adult ESKD patients in China.[1]
- Health states included APD, CAPD, HD, kidney transplant, and death.[7]
- The model used 1-year cycles, a 30-year time horizon, and a starting age of 50 years.
- Analyses were conducted from societal, health system, and payer perspectives.
- Outcomes included costs, life-years (LYs), quality-adjusted life-years (QALYs), and ICERs.[8,9]
- Costs and outcomes were discounted at 5% annually.
- The willingness-to-pay threshold was 287,247 CNY/QALY.[13]
- One-way and probabilistic sensitivity analyses were performed to assess robustness.

Results: APD vs HD

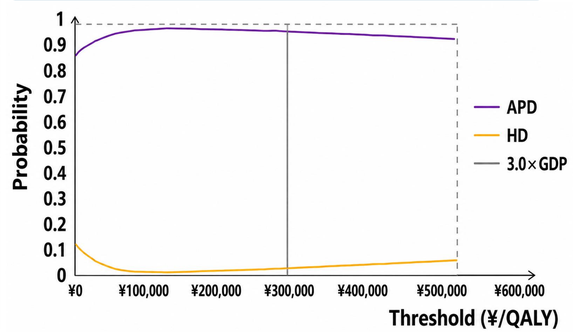
Perspective	Incremental Cost (CNY)	Incremental QALYs	ICER (CNY/QALY)	Cost-Effectiveness Probability
Societal	-251,477.22	+0.84	-297,626.92	100%
Health system	-67,377.50	+0.85	-79,506.57	96%
Payer	-106,635.25	+0.84	-126,204.35	97%

☑ Across all three perspectives, APD dominated HD by lowering costs and increasing QALYs.

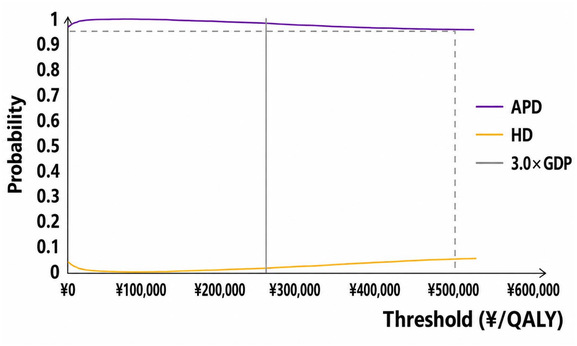
(A) Societal Cost-Effectiveness Acceptability Curve



(B) Health System Cost-Effectiveness Acceptability Curve



(C) Payer Cost-Effectiveness Acceptability Curve



- Probabilistic sensitivity analyses showed that APD maintained a consistently high probability of being cost-effective compared with HD across societal, health system, and payer perspectives.
- The CEACs suggest that the economic advantage of APD was not driven by a single perspective, but remained stable under parameter uncertainty.
- Together with the base-case results, these findings support the robustness of APD as an economically favorable dialysis option for adult ESKD patients in China.

Results: RPM-APD vs HD

Perspective	Incremental Cost (CNY)	Incremental QALYs	ICER (CNY/QALY)	Cost-Effectiveness Probability
Societal	−51,208.28	+1.93	-26,547.77	100%
Health system	+90,486.09	+1.93	+46,910.46	99%
Payer	-9,152.98	+1.93	-4,745.15	100%

RPM-APD substantially increased QALYs compared with HD and remained economically favorable across all three perspectives; even when direct medical costs increased in the health system perspective, the ICER remained well below the threshold.[11,12]

Conclusion

- APD was a dominant strategy versus HD for adult ESKD patients in China, reducing costs while improving QALYs across all three perspectives.
- RPM-APD further increased health benefits and remained economically favorable compared with HD.
- These findings support APD as a valuable dialysis option for clinical decision-making and healthcare resource allocation in China.

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