Cost-Effectiveness of Direct Oral Anticoagulants Versus Low-Molecular-Weight Heparin in Patients with Cancer-Associated Venous Thromboembolism in Hong Kong

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BACKGROUND & OBJECTIVES

- Cancer-associated venous thromboembolism (CAT) is the second leading cause of death among patients with cancer and causes a heavy financial burden. Direct oral anticoagulants (DOACs) have been shown to have several advantages over low-molecular-weight heparin (LMWH) in clinical benefits and better patient adherence.
- Our study aimed to assess the cost-effectiveness of DOACs against LMWH in patients with CAT from the Hong Kong healthcare system perspective.

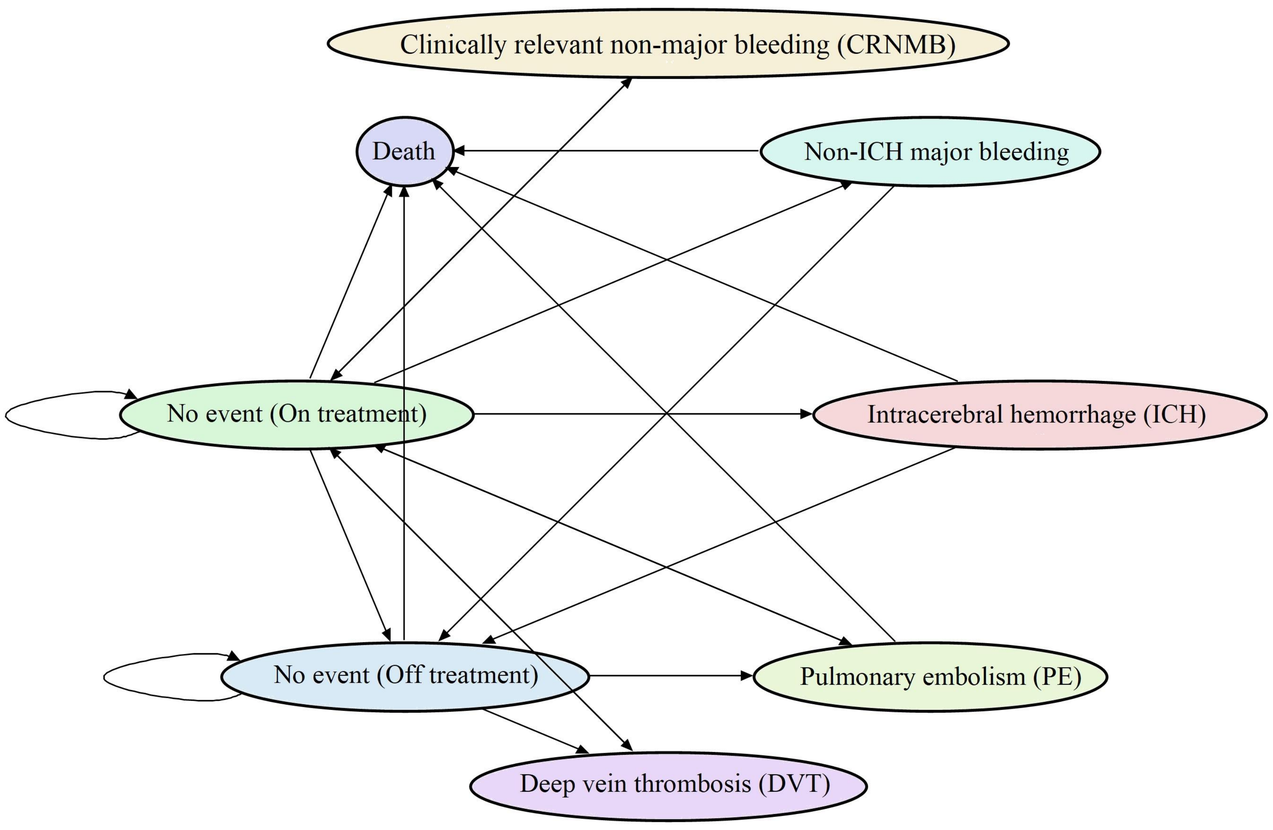


Figure 1. Markov transition-state diagram

METHODS

- A Markov state-transition model was developed to estimate the costs and quality-adjusted life years (QALYs) of DOACs and LMWH in a hypothetical cohort of 10,000 patients with CAT over a 5-year horizon (Figure 1).
- Transition probabilities and utilities were derived from published literature. Drug and adverse event management costs were derived from the Hong Kong Hospital Authority.
- One-way deterministic and probabilistic sensitivity analyses were performed to test the result robustness.

Number of events (per 10,000 patients)	DOACs	LMWH	Differences
Recurrent PE	868	1,058	-190
Recurrent DVT	877	1,272	-395
ICH	17	42	-25
MB (non-ICH)	682	378	304
CRNMB	1,209	1,033	176
Discontinue	4,402	5,960	-1,558
Death	7,485	7,499	-14
Due to PE	7	7	0
Due to ICH	0	0	0
Due to non-ICH MB	7	2	5
Due to other reasons	7,471	7,490	-19
Total cost (USD) per patient	2,232	8,224	-5,992
QALYs per patient	1.52	1.50	0.02

Table 1. Base case analysis for a 5-year time horizon

RESULTS

- The base-case results showed that in 5 years, as demonstrated in Table 1, DOACs were observed to be associated with 190 fewer recurrent pulmonary embolisms (PEs) and 395 fewer recurrent Deep vein thrombosis (DVT) incidents, 25 fewer intracranial hemorrhages (ICHs), 304 more non-ICH major bleedings (MBs), 176 more clinically relevant non-major bleedings (CRNMBs), and 14 fewer deaths per 10,000 patients compared to LMWH.
- Compared with LMWH, DOACs demonstrated greater QALY gain (1.52 versus 1.50) with reduced medical costs ($2,232 versus $8,224).
- In the one-way sensitivity analysis, the cost of LMWH, probability of LMWH treatment discontinuation, and relative risk of non-ICH major bleeding in the first six months contributed the most to the incremental cost-effectiveness ratio (ICER) (Figure 2).
- The probabilistic sensitivity analysis yielded the same results as the base-case analysis (Figure 3).

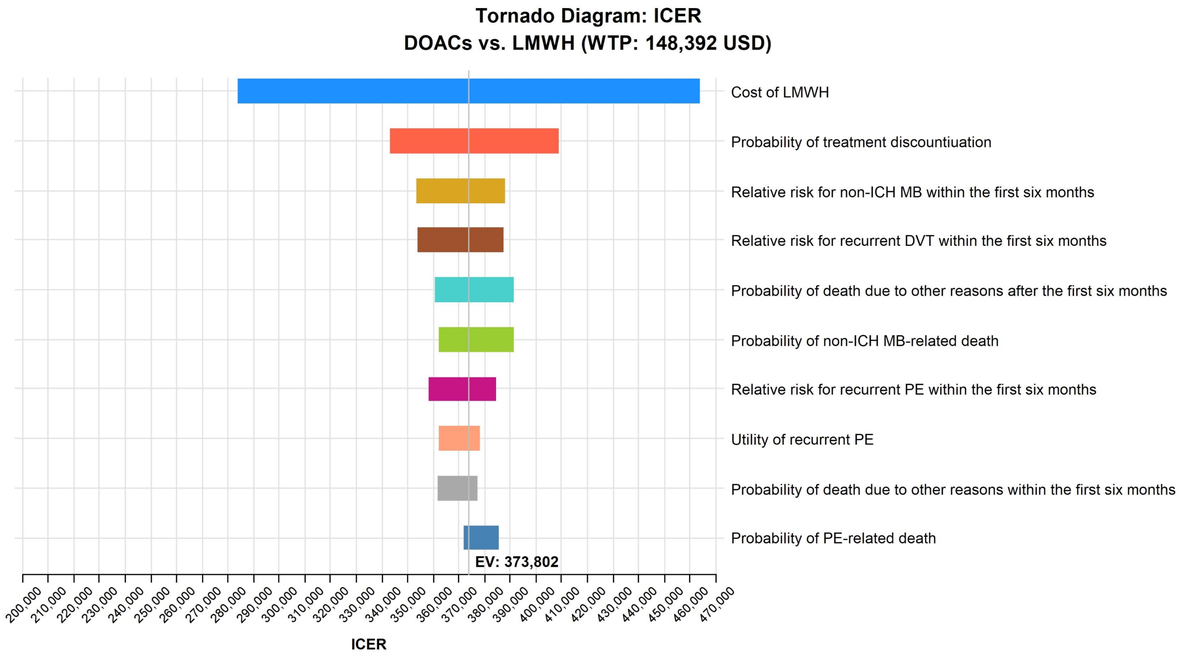


Figure 2. One-way deterministic sensitivity analysis for incremental cost and QALY

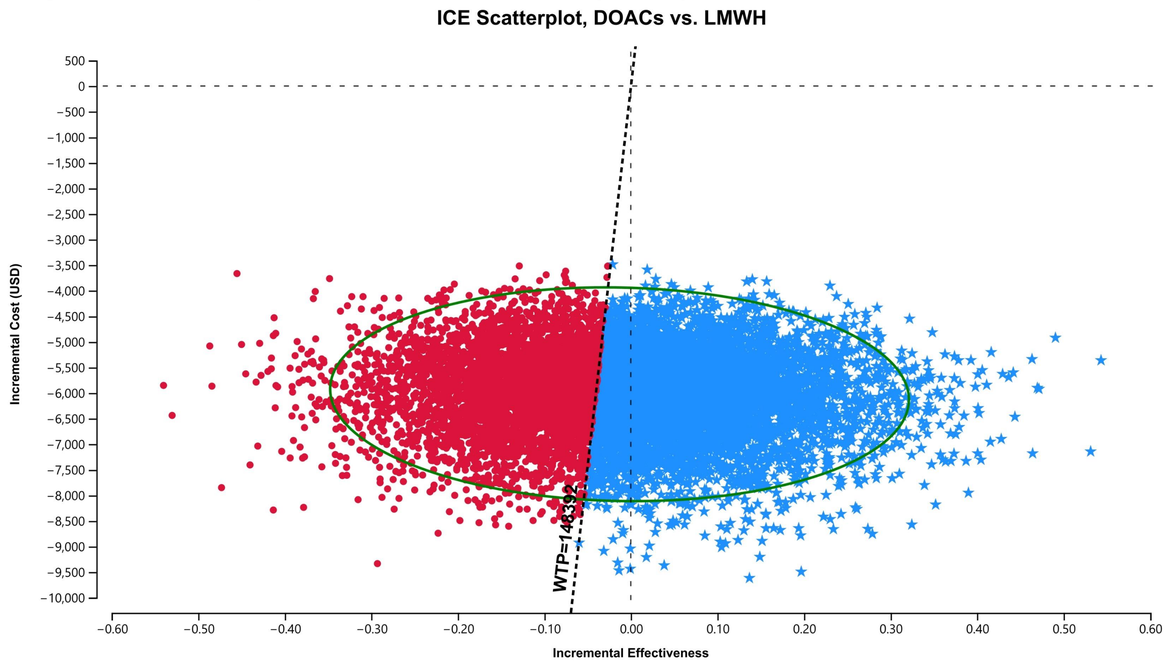


Figure 3. Probabilistic sensitivity analysis of the cost-effectiveness plane

CONCLUSIONS

- Compared to LMWH, DOACs were associated with greater QALY improvements and lower costs. DOACs can be a cost-saving anticoagulant option compared with LMWH in the management of CAT.
- Our results can help decision-makers and clinical practitioners apprehend the benefits associated with DOACs.

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