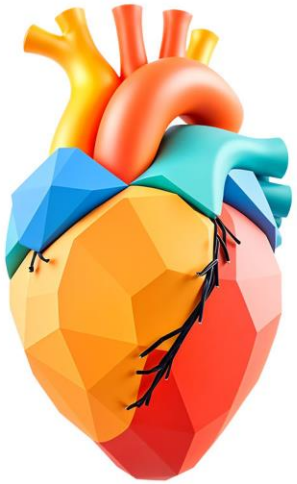

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Direct Oral Anticoagulants versus Low-Molecular-Weight Heparin for Thromboprophylaxis in Cancer-related Surgeries: A Meta-Analysis of Efficacy and Safety Outcomes

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Disclosure

Conflict of interest:

None

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Background

Venous thromboembolism: A persistent challenge after cancer-related surgeries

Guidelines recommend thromboprophylaxis with low-molecular-weight heparin (LMWH) or unfractionated heparin (UFH) post-surgery

Direct oral anticoagulants (DOACs) potential benefits over LMWH

Concerns exist regarding DOAC bleeding risk

Aim: Compare efficacy and safety of DOACs vs. LMWH as thromboprophylaxis following cancer-related surgeries

Materials and Methods

Design:

Systematic Review and Meta-Analysis

Databases:

PubMed, Scopus, Web of Science, Embase

Population:

Adult patients (≥ 18 years old) who underwent cancer-related surgery

Intervention and Comparison:

DOAC vs. LMWH as thromboprophylaxis after cancer-related surgeries

Outcomes:

- Efficacy: Venous thromboembolism (deep vein thrombosis and pulmonary embolism)
- Safety: Bleeding (major bleeding and clinically relevant non-major bleeding), mortality, and hospitalization

Materials and Methods

Subgroups:

- Based on DOAC type: Apixaban or others
- Based on cancer type: gynecological, urological, and others
- Based on follow-up period: 1-month or 3-months
- Based on study design: RCT or not RCT

Statistical analysis:

- Risk ratios (RR) along with 95% confidence intervals (CI)
- Heterogeneity with I^2

Sensitivity analysis:

- Leave-one out study analysis
- Meta regression

Results

Number of included studies:
16 studies (3 RCTs and 13 cohort)

DOAC (case group):
6400 participants with mean age 62.05 years and 28.15% male

LMWH (control group):
5801 participants with mean age 60.78 years and 34.65% male

Quality assessment:

- RoB2 for RCTs: 2 studies with low concern and 1 study with some concern
- NOS for cohort studies: 9 studies with good quality and 4 studies with fair quality

Results

Outcome	Number of studies included	RR (95% CI)	I^2	P-value heterogeneity	P-value outcome
Efficacy outcomes					
VTE	15	0.81 (0.56;1.16)	88%	<0.01	0.24
DVT	11	0.92 (0.59;1.46)	81%	<0.01	0.74
PE	12	0.81 (0.4;1.65)	87%	<0.01	0.57
Safety outcomes					
Total bleeding	14	0.91 (0.70;1.18)	0%	0.58	0.49
Major bleeding	12	1.11 (0.67;1.86)	0%	0.95	0.69
CRNMB	6	0.79 (0.56;1.13)	0%	0.69	0.20
All-cause mortality	4	1.05 (0.77;1.43)	0%	0.93	0.76
Hospitalization	7	1.16 (0.98;1.37)	0%	0.52	0.08

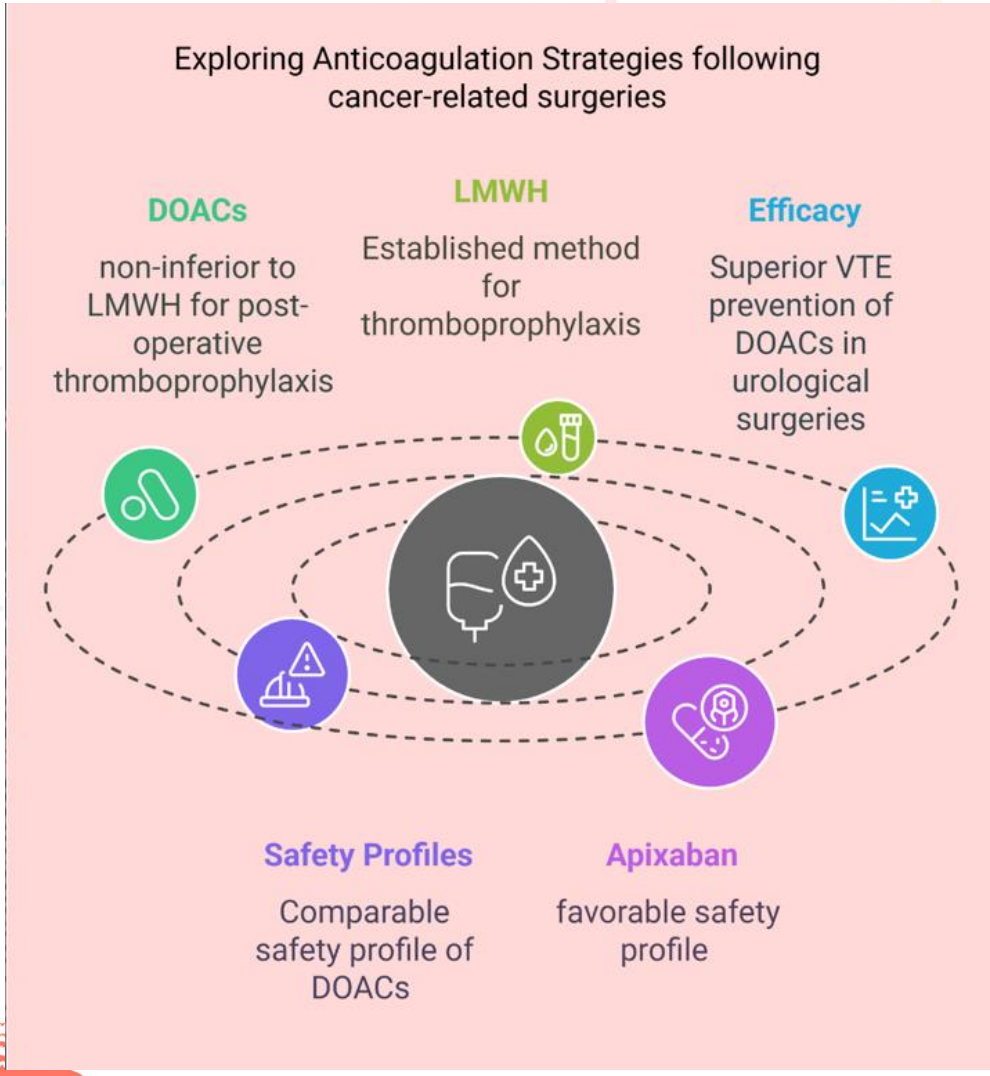
Table 1: Summary of safety and efficacy outcomes
CI=confidence interval, CRNMB=clinically relevant non-major bleeding, DVT=deep vein thrombosis, PE=pulmonary embolism, RR=risk ratio, VTE=venous thromboembolism

Results

Outcome	Number of studies included	RR (95% CI)	I^2	P-value heterogeneity
VTE				
Subgroup based on cancer type:				
Gynecological cancers	8	0.68 (0.41;1.14)	0%	0.95
Urological cancers	4	**0.52 (0.44;0.61)**	0%	0.87
Others	3	1.21 (0.71;2.05)	89%	<0.01
Total bleeding				
Subgroup based on DOAC type:				
Apixaban	7	**0.64 (0.44;0.94)**	0%	0.86
Other DOACs	7	1.17 (0.85;1.61)	0%	0.79

Table 2: Summary of statistically significant subgroup analyses
CI=confidence interval, DOAC=direct oral anticoagulant, RR=risk ratio, VTE=venous thromboembolism

Conclusion


Exploring Anticoagulation Strategies following cancer-related surgeries
DOACs
non-inferior to LMWH for post-operative thromboprophylaxis
LMWH
Established method for thromboprophylaxis
Efficacy
Superior VTE prevention of DOACs in urological surgeries
Safety Profiles
Comparable safety profile of DOACs
Apixaban
favorable safety profile

Conclusion

Aim:

Deciding the best thromboprophylaxis plan for each patient who is already at risk for various complications after cancer-related surgery

Strengths:

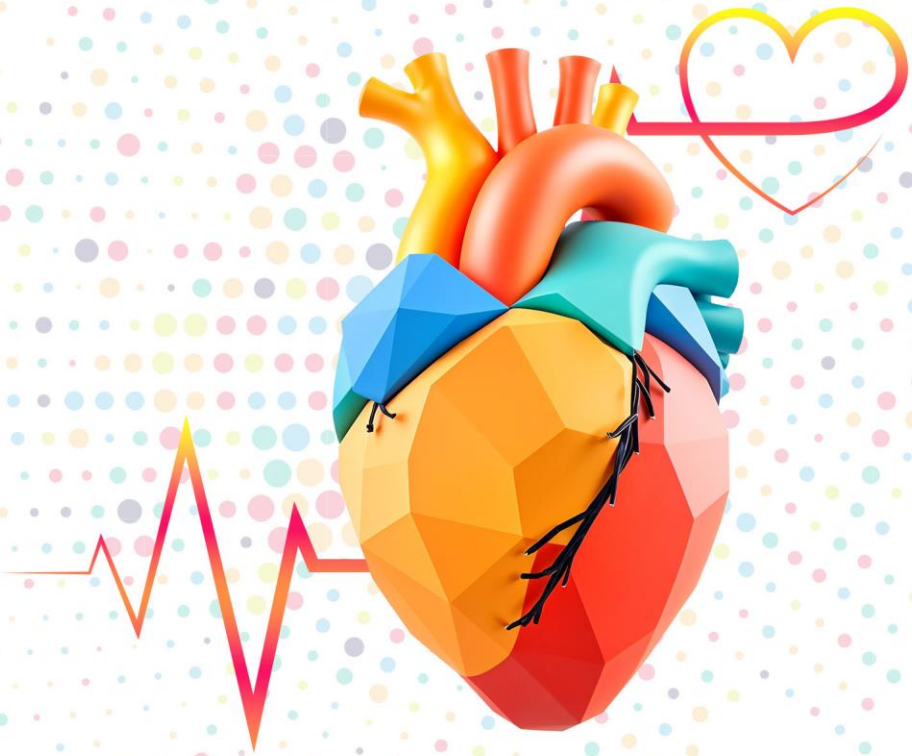
- The most comprehensive study evaluated the thromboprophylaxis efficacy and safety of LMWH and DOAC
- Subgroup analysis based on the cancer type, follow-up period, study design, and DOAC type
- Addresses the gap in previous literature, which did not focus on patients with cancer and comparative thromboprophylaxis use of these drug classes.

Limitations:

- Including observational studies, besides the RCTs
- Publication bias
- Not available to conduct more subgroup analyses based on population's demographics data, and population's medical history

Acknowledgement

Not applicable



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