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source: https://doi.org/10.7892/boris.141607 | downloaded: 25.4.2024

Article type : Original Article

Prognosis in patients with cancer-associated venous thromboembolism: comparison of the RIETE-VTE and modified Ottawa score

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This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1111/JTH.14783

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Essentials

- The RIETE-VTE score predicts 30-day mortality in cancer-associated venous thromboembolism (VTE)
- We externally validated the RIETE-VTE score and compared its accuracy to the modified Ottawa score
- Both scores accurately identified low-risk patients for 30-day mortality
- Both scores were less predictive for 90-day overall complications and 6-month VTE recurrence

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Abstract

Background: The RIETE-VTE score was derived to risk-stratify patients with cancer-associated venous thromboembolism (CAT).

Objectives: To externally validate the RIETE-VTE score and to compare its prognostic performance with the modified Ottawa score.

Patients/Methods: We studied 178 elderly patients with CAT in a prospective multicenter cohort and assessed 30-day all-cause mortality, 90-day overall complications (mortality, major bleeding, or venous thromboembolism [VTE] recurrence), and 6-month VTE recurrence. Patients were stratified into RIETE-VTE and modified Ottawa score risk classes (low, intermediate, high). We compared the discriminative power (area under the receiver operating characteristics [ROC] curve) to predict mortality, overall complications, and VTE recurrence.

Results: Fifteen patients (8.4%) died within 30 days, 42 (23.6%) experienced an overall complication by day 90, and 6 (3.4%) had recurrent VTE within 6 months. The RIETE-VTE and the modified Ottawa score classified similar proportions of patients as low-risk (35.4% vs. 31.5%; P=0.37). No low-risk patient died within 30 days. Low-risk patients identified by the RIETE-VTE and modified Ottawa score had similar rates of overall complications (7.9% vs. 8.9%) and VTE recurrence (1.6% vs. 1.8%). The modified Ottawa score and the RIETE-VTE score had similar areas under the ROC curve for predicting all-cause mortality (0.84 vs. 0.75; P=0.21), overall complications (0.74 vs. 0.68; P=0.26), and VTE recurrence (0.67 vs. 0.64; P=0.78).

Conclusions: Both the RIETE-VTE and modified Ottawa score accurately identified elderly patients with CAT who are at low-risk for short-term mortality and who are potential candidates for outpatient care.

Keywords: Elderly, malignancy, prognostic factors, risk assessment, venous thromboembolism

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Background

Cancer-associated venous thromboembolism (CAT) carries a high risk of mortality, recurrence, and bleeding [1, 2]. Given the often limited life expectancy of patients with CAT, treatment at home rather than in the hospital may be preferable [3]. However, cancer is the most common comorbidity that results in hospitalization in patients with deep vein thrombosis (DVT) [4], and patients with CAT are less likely to be treated at home than those without cancer [5]. Moreover, the proportion of patients with CAT who receive outpatient care is highly variable [5-8]. For instance, despite the recommendation to treat DVT at home [9], the proportion of cancer-associated DVT treated as outpatients ranges from 30% to 83% [5, 6, 8], indicating physicians' insecurity whether patients with CAT can be safely managed at home.

Short-term prognosis in patients with CAT is influenced by multiple factors, including patient, tumor, and venous thromboembolism (VTE)-related characteristics, and treatments [10-12]. Thus, the identification of low-risk patients with CAT who are potential candidates for home care is challenging. To facilitate physician decision-making, several clinical risk assessment methods for CAT have been developed [13-17]. The modified 5-item Ottawa score is the best validated risk assessment score for CAT and assigns patients with VTE (pulmonary embolism [PE] and DVT, including upper limb and unusual site thrombosis) into 3 risk categories of 6-month VTE recurrence [13]. Low-risk patients based on this score have a 6-month recurrence risk of 2.2% and a low 30-day overall mortality of <5% [18, 19]. Using data from the Registro Informatizado de la Enfermedad Thrombo-Embolica (RIETE), a 6-item score that classifies patients with CAT into 3 classes of increasing 30-day all-cause mortality has been recently developed [10]. In the derivation and internal validation sample, low-risk patients based on the RIETE-VTE score had a 30-day mortality of 3.4% and 3.9%, respectively [10]. While the RIETE-VTE score showed a promising prognostic accuracy, it has not been independently validated. We aimed to externally validate the prognostic performance of the RIETE-VTE score in a prospective cohort of elderly patients with CAT and to compare it to the modified Ottawa score. We specifically focused on the scores' ability to identify low-risk patients who may be potential candidates for outpatient management.

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Methods

Patients sample

This study is a post-hoc analysis of a prospective multicenter cohort study, which was conducted between September 2009 and December 2013 to assess long-term outcomes of elderly patients with acute, objectively confirmed, symptomatic VTE from 9 Swiss hospitals [20]. VTE was defined as the presence of proximal or distal lower limb DVT or PE. Patients with isolated distal DVT were included only if the incompressible distal vein diameter was at least 5 mm. The institutional review board of all participating study sites approved all study procedures. We obtained informed consent from all participating patients. The study population and methods were described previously [20]. For the present study, we included only patients with a concomitant active solid or hematologic cancer defined as cancer that required active therapy (surgery, chemotherapy, radiotherapy, and/or palliative care) during the past 3 months before the index VTE. Local skin tumors such as basal cell carcinomas and spinal cell carcinomas were not considered as active cancer. All enrolled patients had a life expectancy of at least 3 months.

Patient baseline assessment

Trained research nurses prospectively collected baseline demographic information (age, sex, and body mass index [BMI]), type of the index VTE (PE or DVT), tumor history and treatment (primary site, presence of metastasis, recent chemotherapy, and cancer surgery), relevant clinical parameters (vital signs, heart failure, chronic lung disease, immobilization, and history of previous VTE), laboratory findings (leucocyte and platelet counts), and type of anticoagulation (low-molecular-weight heparin, unfractionated heparin, fondaparinux, and vitamin K antagonists), and the site of care for all enrolled patients. Data were recorded on standardized data collecting forms.

Patient outcomes assessment

The primary study outcome was all-cause mortality at 30 days. Secondary outcomes were overall complications at 90 days (mortality, recurrent VTE, or major bleeding), and VTE recurrence at 6 months after the index VTE. We defined recurrent PE as a new intraluminal filling defect on pulmonary angiography or spiral computed

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tomography, a cut-off of contrast in a vessel more than 2.5 mm in diameter on pulmonary angiography, a new perfusion defect involving 75% or more of a lung segment with corresponding normal ventilation (i.e., high probability lung scan) or confirmation of a new PE on autopsy [21, 22]. Diagnostic criteria for recurrent DVT were the non-compressibility of a new venous segment or a substantial increase (≥4 mm) in the diameter of the thrombus during full compression in a previously abnormal segment on ultrasonography or a new intraluminal filling defect on contrast venography [21, 22]. We defined major bleeding as a fatal bleeding, a bleeding with a reduction of hemoglobin of ≥20g/l or resulting in transfusion of ≥2 units of packed red blood cells or a symptomatic bleeding at critical sites (i.e., intracranial, intraspinal, intraocular, retroperitoneal, intraarticular, pericardial, or intramuscular with compartment syndrome) [23].

We assessed all outcomes at a clinic visit after 90 days and via telephone interview 6 months after the index VTE. Trained study nurses interviewed patients during each visit/contact to obtain information about the date and type of clinical events (death, recurrent VTE, and bleeding). If a clinical event occurred, we complemented this information by reviewing medical charts and interviewing patients' family members and primary care physicians. A committee of 3 independent, blinded clinical experts adjudicated all outcomes and classified the cause of all deaths as definitely or possibly due to PE, cancer, major bleeding, or another cause. Death was judged to be a definite, fatal PE if it was confirmed by autopsy, or if death followed a clinically severe PE, either initially or after an objectively confirmed recurrent event. Death was classified as possible fatal PE in a patient who died suddenly or unexpectedly. Death was considered to be bleeding related if it followed a bleeding episode leading to hemodynamic deterioration, or an intracranial hemorrhage. Final classifications were made based on the full consensus of this committee.

Risk assessment scores

Based on patient baseline demographical, clinical, and laboratory data obtained by chart review, we determined the presence of the 6 RIETE-VTE score risk factors and all 5 individual risk factors comprising the modified Ottawa score (Table 1). For the RIETE-VTE score, "immobility" is defined as ≥4 days of bed rest within the last 2 months before the index VTE [10]. Due to the absence of this variable in the present study, we defined

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immobility as bed rest for >72 hours, voyage in sitting position for >6 hours, or fracture or cast of the lower extremity in the past 3 months prior to the index VTE. For the modified Ottawa score, patients without metastasis were assumed to have a TNM stage I or II, as done in prior validation studies [19, 24, 25]. For the variables constituting the RIETE-VTE and modified Ottawa score, missing values were assumed to be normal. This strategy is widely used in the clinical application of prognostic models [26, 27]. All enrolled patients were then assigned to 3 risk classes (low, intermediate, high) based on the prognostic factors in the RIETE-VTE and modified Ottawa score.

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Statistical analysis

We described the proportion of patients who were classified as low, intermediate, and high risk for 30-day all-cause mortality, 90-day overall complications, and 6-month VTE recurrence by RIETE-VTE and modified Ottawa score risk classes. Based on commonly accepted definitions of low-risk patients (RIETE-VTE score of ≤3; modified Ottawa score of ≤-1), we compared the proportion of patients classified as low-risk by the 2 scores using McNemar's test [28].

To determine the accuracy of each dichotomized score to predict 30-day all-cause mortality, 90-day overall complications, and 6-month VTE recurrence, we estimated sensitivity, specificity, and positive and negative predictive values and likelihood ratios for low- versus intermediate/high risk patients. We compared the discriminative power of each continuous score to predict 30-day all-cause mortality, 90-day overall complications, and 6-month VTE recurrence by calculating the area under the receiver operating characteristic (ROC) curve and a non-parametric test of the equality. We determined the goodness-of-fit of each score using logistic regression and the Pearson chi-square test. Because patients with isolated distal DVT were not included in the derivation sample of the Ottawa score [13], we performed a sensitivity analysis by excluding all patients with an isolated distal DVT. All analyses were done using STATA 15 (Stata Corporation, College Station, TX, USA).

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Results

Study sample and comparison of outcomes

Of the 179 patients with CAT initially enrolled in our cohort study, one withdrew early from the study, leaving a final study population of 178 patients with CAT for our analysis. The patient baseline characteristics are shown in Table 2.

Overall, 15 patients (8.4%) died within 30 days (6 due to possible/definite PE, 5 cancer, and 4 other causes, no death was bleeding-related), 7 (3.9%) had major bleeding, and 2 recurrent VTE (1.1%). Within 90 days, 42 patients (23.6%) had an overall complication (Table 3). Of these, 27 (15.2%) died (6 due to possible/definite PE, 17 cancer, and 4 other causes, no death was bleeding-related), 13 (7.3%) had major bleeding, and 4 (2.2%) recurrent VTE (4 PE, 2 of which were fatal). After 6 months of follow-up, 6 patients (3.4%) suffered a recurrent VTE event (5 PE [2 fatal], 1 proximal DVT) (Table 3).

The RIETE-VTE and the modified Ottawa score classified similar proportions of patients as low-risk (35.4% vs. 31.5%; P=0.37), and none of the low-risk patients based on either score died within 30 days (Table 3). Among the RIETE-VTE intermediate risk patients, 30-day mortality was lower than among the intermediate-risk patients based on the modified Ottawa score (1.8% vs. 9.7%). Low-risk patients identified by the RIETE-VTE score had similar rates of 90-day overall complications (7.9% vs. 8.9%) and 6-month VTE recurrence (1.6% vs. 1.8%) as low-risk patients based on the modified Ottawa score. High-risk patients based on the RIETE-VTE score had a higher 30-day all-cause mortality than high-risk patients based on the modified Ottawa score (23.7% vs. 16.0%) (Table 3) and similar 90-day overall complications (44.1% vs. 38.0%) and 6-month VTE recurrence rates (5.1% vs. 6.0%). After exclusion of the 17 patients with isolated distal DVT, the results did not change markedly (results not shown).

Comparison of predictive accuracy, discriminative power, and goodness-of-fit

When dichotomized as low- vs. intermediate/high risk, both scores were more accurate in predicting 30-day all-cause mortality than in predicting 90-day overall complications and 6-month VTE recurrence (Table 4). Both scores showed a 100% sensitivity, a 100% negative predictive value, and excellent negative likelihood ratios (<0.1) for predicting 30-day all-cause mortality (Table 4). The area under the ROC curve for predicting 30-day mortality did not differ significantly between the RIETE-VTE and the

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modified Ottawa score (0.84, 95% confidence interval [CI] 0.77-0.89 vs. 0.75, 95% CI 0.68-0.81; P=0.21) (Figure Panel A).

Both scores were less accurate at predicting 90-day overall complications and 6-month VTE recurrence (Table 4). When dichotomized as low- vs. intermediate/high risk, the negative likelihood ratio for 90-day complications was 0.28 for the RIETE-VTE and 0.32 for the modified Ottawa score. For 6-month recurrence, the negative likelihood ratio was 0.46 for the RIETE-VTE and 0.52 for the modified Ottawa score (Table 4). The RIETE-VTE and modified Ottawa score had a similar discriminatory power for predicting 90-day overall complications (area under the ROC curve of 0.74 [95% CI 0.67-0.80] vs. 0.68 [95% CI 0.61-0.75]; Figure Panel B) and 6-month VTE recurrence (area under the ROC curve of 0.67 [95% CI 0.60-0.74] vs. 0.64 [95% CI 0.57-0.71]; Figure Panel C). The goodness-of-fit was adequate (P≥0.05) for both scores across all outcomes.

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Discussion

Our prospective cohort study shows that the RIETE-VTE and the modified Ottawa score accurately identify patients with CAT who are at low risk for 30-day mortality. Both scores were less accurate in predicting 90-day overall complications and 6-month VTE recurrence. Given the differing prognosis of PE and DVT, it is debatable whether a prognostic score should cover both PE and DVT. However, in the case of CAT, a common prognostic score for PE and DVT may be justified by the fact that short-term mortality in CAT is mainly driven by non-VTE related causes (e.g., cancer progression) [29, 30] and that the risk of 90-day overall mortality following cancer-related DVT is high and not substantially lower than following cancer-related PE (19.4% vs. 24.5%) [31].

Although both scores were derived to allow for risk-based treatment strategies in patients with CAT, the scores differ in their methods. The Ottawa score was based on data of 543 patients from a single university hospital [13], whereas the RIETE-VTE score was derived using data from 6675 patients from a multicenter registry [10]. The RIETE investigators used recursive partitioning to identify candidate predictors from a broad set of variables, including age, sex, BMI, cancer-related factors, comorbid conditions, treatments, and laboratory parameters. The investigators from Ottawa used univariate analysis and a limited number of pre-defined predictors (sex, prior VTE, cancer-related factors, D-dimer level, and treatments). Of note, the Ottawa score originally used the exact TNM stage, but was modified by classifying patients into those without (TNM stage I/II) or with metastasis (TNM stage III/IV) [13]. Finally, the RIETE-VTE score was derived to predict 30-day all-cause mortality, whereas the derivation of the Ottawa score was based on 6-month recurrence. The differing methods resulted in 2 scores that share only one predictor (tumor stage).

When we compared both scores on a “level playing field” using prospective data from a multicenter cohort, both scores were excellent at identifying patients with CAT who have a low short-term mortality risk. Low and intermediate risk patients based on the RIETE-VTE and low risk patients based on the modified Ottawa score have a low 30-day overall mortality and are potential candidates for home care. The time spent at home in the last 6 months of life has been proposed as a quality indicator in oncology [3]. Home care may not only be preferred by many patients with CAT but is also more cost-effective than inpatient treatment [32]. Outpatient care is now further facilitated by the use of direct

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oral anticoagulants, which are recommended as a treatment option for patients with CAT who do not have a high risk of gastrointestinal or urogenital bleeding [33, 34]. In a recent study from a Dutch hospital two-thirds of outpatients with CAT were managed at home [8]. Overall, 13% of patients who received home care died from VTE or had recurrent VTE or major bleeding within 3 months compared to 19% of patients who were initially hospitalized [8].

It is important to note that the patient's prognosis may not be the main determinant for choosing home care in CAT. Many high-risk patients with CAT who have a limited life expectancy may place a high value on quality of life and prefer to be managed at home. Outpatient management with close follow-up may be a reasonable option under such circumstances.

Somewhat paradoxically, the modified Ottawa score was more accurate at predicting 30-day all-cause mortality than 6-month VTE recurrence, the outcome for which it was originally derived. Given that the majority of patients with CAT die from cancer progression [10, 31], the major predictors that comprise the modified Ottawa score, cancer site and stage, may be even stronger predictors of mortality than of VTE recurrence. Both scores less accurately identified patients who had a low risk of medium-term outcomes, i.e. 90-day complications and 6-month VTE recurrence.

In contrast to the modified Ottawa score, which incorporates clinical variables only, the RIETE-VTE score also comprises laboratory parameters. Leukocytosis, a marker for tumor inflammation [35], is associated with a 2-fold risk of recurrent VTE and a 3-fold risk of short-term mortality in patients with CAT [36]. Cancer-related thrombocytopenia may be caused by a direct cancer effect, treatments, and immune and microangiopathic disorders [37]. Besides being related with an increased bleeding risk [38], it is associated with a 2-fold higher risk of VTE recurrence [10].

Although our patients were older than those in the original derivation and validation samples of the RIETE-VTE and modified Ottawa score, they were less likely to be female (38% vs. 47% and 56%, respectively) and to have lung (12% vs. 17% and 18%, respectively) and metastatic cancer (40% vs. 62% and 66%, respectively) [10, 13]. As a result, both scores classified not only a higher proportion of patients as low-risk in our cohort than in the original derivation and validation samples (35% vs. 27% for the RIETE-VTE and 31% vs. 19% for the modified Ottawa score), our patients had also a lower 30-

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day mortality than in the original RIETE derivation (8.4% vs. 12.5%) and a lower 6-month recurrence rate than in the Ottawa external validation sample (3.4% vs. 10.5%) [10, 13]. Thus, in our cohort, low-risk patients based on the RIETE-VTE score had a lower 30-day mortality risk than in the RIETE (0% vs. 3.4%) and low-risk patients based on the modified Ottawa score had a lower 6-month recurrence risk than in the Ottawa sample (1.8% vs. 5.1%) [10, 13].

This study is the first external validation of the RIETE-VTE score and has several strengths, including the enrolment of patients from diverse hospitals and a near complete prospective data collection. Our study has also limitations. First, our sample included older patients with PE or leg DVT and thus, our results may not be generalizable to younger patients or those with upper limb or unusual site thrombosis. Second, as our original cohort excluded patients with terminal illness (i.e., life expectancy <3 months), the most severely ill patients with CAT are not represented in our sample. Third, the sample size was relatively small and the power to detect statistically significant outcome differences may be limited. Fourth, our study was performed before the wide use of direct oral anticoagulants and immunotherapy as well as targeted therapy in cancer patients and thus, our results may not be applicable to patients who received such treatments. Finally, we aimed to compare clinical prognostic models for overall VTE and therefore did not evaluate PE-specific models for CAT (e.g., the POMPE-C tool) or outpatient treatment (e.g., HESTIA criteria) [39, 40].

In conclusion, this independent validation study demonstrates that both the RIETE-VTE and the modified Ottawa score accurately identify low-risk patients with CAT who are potential candidates for home care. However, before the use of these scores can be recommended in clinical practice, their safety, efficacy, and positive impact on patient care must be further examined.

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Addendum

N. Pfaundler, M. Méan, and D. Aujesky were responsible for study concept and design. A. Limacher and O. Stalder carried out the statistical analyses. N. Pfaundler and D. Aujesky wrote the manuscript. A. Limacher, O. Stalder, M. Méan, C. Baumgartner, and N. Rodondi revised the manuscript. M. Méan and D. Aujesky collected data and obtained funding from the Swiss National Science Foundation.

Acknowledgments

This study was supported by the Swiss National Science Foundation (Grant no. 33CSO-122659/139470). We thank all collaborators of the SWITCO65+ study.

Disclosure and Conflict of Interests

The authors state that they have no conflict of interest.

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Figure Legends

Figure

Panel A. Receiver-operating characteristics curves for 30-day all-cause mortality. The areas under the receiver-operating characteristics curves were 0.84 (95% confidence interval [CI] 0.77-0.89) for the RIETE-VTE and 0.75 (95% CI 0.68-0.81) for the modified Ottawa score (P=0.21).

Panel B. Receiver-operating characteristics curves for 90-day overall complications. The areas under the receiver-operating characteristics curves were 0.74 (95% confidence interval [CI] 0.67-0.80) for the RIETE-VTE and 0.68 (95% CI 0.61-0.75) for the modified Ottawa score (P=0.26).

Panel C. Receiver-operating characteristics curves for 6-month VTE recurrence. The areas under the receiver-operating characteristics curves were 0.67 (95% confidence interval [CI] 0.60-0.74) for the RIETE-VTE and 0.64 (95% CI 0.57-0.71) for the modified Ottawa score (P=0.78)

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Table 1 The modified Ottawa and RIETE-VTE scores

Risk assessment model	Variables (points assigned)	Risk stratification (cut-off points)
Modified Ottawa Score	Female sex (1)	Low (≤-1)
	Lung cancer (1)	Intermediate (0)
	Breast cancer (-1)	High (≥1)
	TNM stage I or II (-1)	
	Previous VTE (1)	
RIETE-VTE score	Leukocytes ≥11.5 G/l (4)	Low (0-3)
	Metastasis (3)	Intermediate (4-6)
	Immobility*(3)	High (≥7)
	Body mass index <18.5 kg/m^2 (3)	
	Any pulmonary embolism (2)	
	Platelets ≤160 G/l (2)	

Abbreviations: TNM, tumor node metastasis; VTE, venous thromboembolism.

*Defined as bed rest with bathroom privileges for ≥4 days in the past 2 months.

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Table 2 Patient baseline characteristics (n=178)

Characteristic*	n (%) or median (interquartile range)
Age, years	74 (69-80)
Male sex	110 (62)
Body mass index <18.5 kg/m^2	6 (3)
Type of index venous thromboembolism	
Deep vein thrombosis only	61 (34)
Pulmonary embolism only	96 (54)
Deep vein thrombosis and pulmonary embolism	21 (12)
Primary cancer site	
Biliary system	2 (1)
Bladder	7 (4)
Brain	5 (3)
Breast	16 (9)
Cervix	2 (1)
Colorectal	14 (8)
Esophagus	5 (3)
Hematological	20 (11)
Kidney	6 (3)
Liver	2 (1)
Lung	22 (12)
Musculoskeletal	3 (2)
Ovary	5 (3)
Pancreas	6 (3)
Prostate	40 (22)
Skin	4 (2)
Stomach	2 (1)
Other/unknown	17 (10)
Metastasis	72 (40)
Chemotherapy†	59 (33)
Cancer surgery†	30 (17)
Immobilization†‡	57 (32)
Prior venous thromboembolism	37 (21)
History of heart failure	18 (10)
History of chronic lung disease	25 (14)
Systolic blood pressure <100mmHg	6 (3)
Leukocytes ≥11.5 G/l	47 (26)
Platelet count ≤160 G/l	46 (26)
Type of initial parenteral anticoagulation	
Low-molecular-weight heparin	86 (48)
Unfractionated heparin	70 (39)
Fondaparinux	17 (10)
None	5 (3)

(cont.)

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(cont.)

Characteristic*	n (%) or median (interquartile range)
Treatment with vitamin K antagonists	91 (51)
Outpatient management	31 (17)

*Data were missing for body mass index in 1% (n=1), chemotherapy in 1% (n=1), metastasis in 1% (n=1), systolic blood pressure in 2% (n=3), leucocyte count in 1% (n=2), and platelet count in 1% of patients (n=2).
†During the last 3 months.
‡Defined as bed rest for >72 hours, voyage in sitting position for >6 hours or fracture or cast of the lower extremity in the past 3 months prior to the index VTE.

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Table 3 Risk classification and clinical outcomes by risk class

	Low risk		Intermediate risk		High risk	
	n/N	% (95% CI)	n/N	% (95% CI)	n/N	% (95% CI)
Risk classification						
RIETE-VTE score	63/178	35.4 (28.7-42.7)	56/178	31.5 (25.1-38.6)	59/178	33.2 (26.7-40.4)
Modified Ottawa score	56/178	31.5 (25.1-38.6)	72/178	40.5 (33.5-47.8)	50/178	28.1 (22.0-35.1)
30-day all-cause mortality						
RIETE-VTE score	0/63	0.0 (0.0-5.8)	1/56	1.8 (0.3-9.5)	14/59	23.7 (14.7-36.0)
Modified Ottawa score	0/56	0.0 (0.0-6.4)	7/72	9.7 (4.8-18.7)	8/50	16.0 (8.3-28.5)
90-day overall complications*						
RIETE-VTE score	5/63	7.9 (3.4-17.3)	11/56	19.6 (11.3-31.8)	26/59	44.1 (32.2-56.7)
Modified Ottawa score	5/56	8.9 (3.9-19.3)	18/72	25.0 (16.4-36.1)	19/50	38.0 (25.9-51.9)
6-month VTE recurrence						
RIETE-VTE score	1/63	1.6 (0.3-8.5)	2/56	3.6 (1.0-12.1)	3/59	5.1 (1.7-13.9)
Modified Ottawa score	1/56	1.8 (0.3-9.5)	2/72	2.8 (0.8-9.6)	3/50	6.0 (2.1-16.2)

Abbreviation: CI, confidence interval; VTE, venous thromboembolism.

*Defined as death, recurrent venous thromboembolism, or major bleeding.

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Table 4 Accuracy to predict clinical outcomes in low- versus intermediate/high-risk patient

	Sensitivity, % (95% CI)	Specificity, % (95%CI)	Positive PV, % (95% CI)	Negative PV, % (95% CI)	Positive LHR, (95% CI)	Negative LHR, (95% CI)
30-day all-cause mortality						
RIETE-VTE score	100.0 (79.6-100.0)	38.7 (31.5-46.3)	13.0 (8.1-20.4)	100.0 (94.3-100.0)	1.63 (1.44-1.84)	0.08 (0.01-1.24)*
Modified Ottawa score	100.0 (79.6-100.0)	34.4 (27.5-41.9)	12.3 (7.6-19.3)	100.0 (93.6-100.0)	1.52 (1.36-1.70)	0.09 (0.01-1.40)*
90-day overall complications†						
RIETE-VTE score	88.1 (75.0-94.8)	42.6 (34.6-51.0)	32.2 (24.3-41.2)	92.1 (82.7-96.6)	1.54 (1.28-1.84)	0.28 (0.12-0.65)
Modified Ottawa score	88.1 (75.0-94.8)	37.5 (29.8-45.9)	30.3 (22.9-39.0)	91.1 (80.7-96.1)	1.41 (1.19-1.67)	0.32 (0.14-0.74)
6-month VTE recurrence						
RIETE-VTE score	83.3 (43.6-97.0)	36.0 (29.2-43.5)	4.3 (1.9-9.8)	98.4 (91.5-99.7)	1.30 (0.90-1.90)	0.46 (0.08-2.80)
Modified Ottawa score	83.3 (43.6-97.0)	32.0 (25.5-39.3)	4.1 (1.8-9.2)	98.2 (90.6-99.7)	1.23 (0.84-1.78)	0.52 (0.09-3.16)

Abbreviations: CI, confidence interval; PV, predictive value; LHR, likelihood ratio; VTE, venous thromboembolism.

*Computed using the continuity correction

†Defined as death, recurrent venous thromboembolism, or major bleeding.

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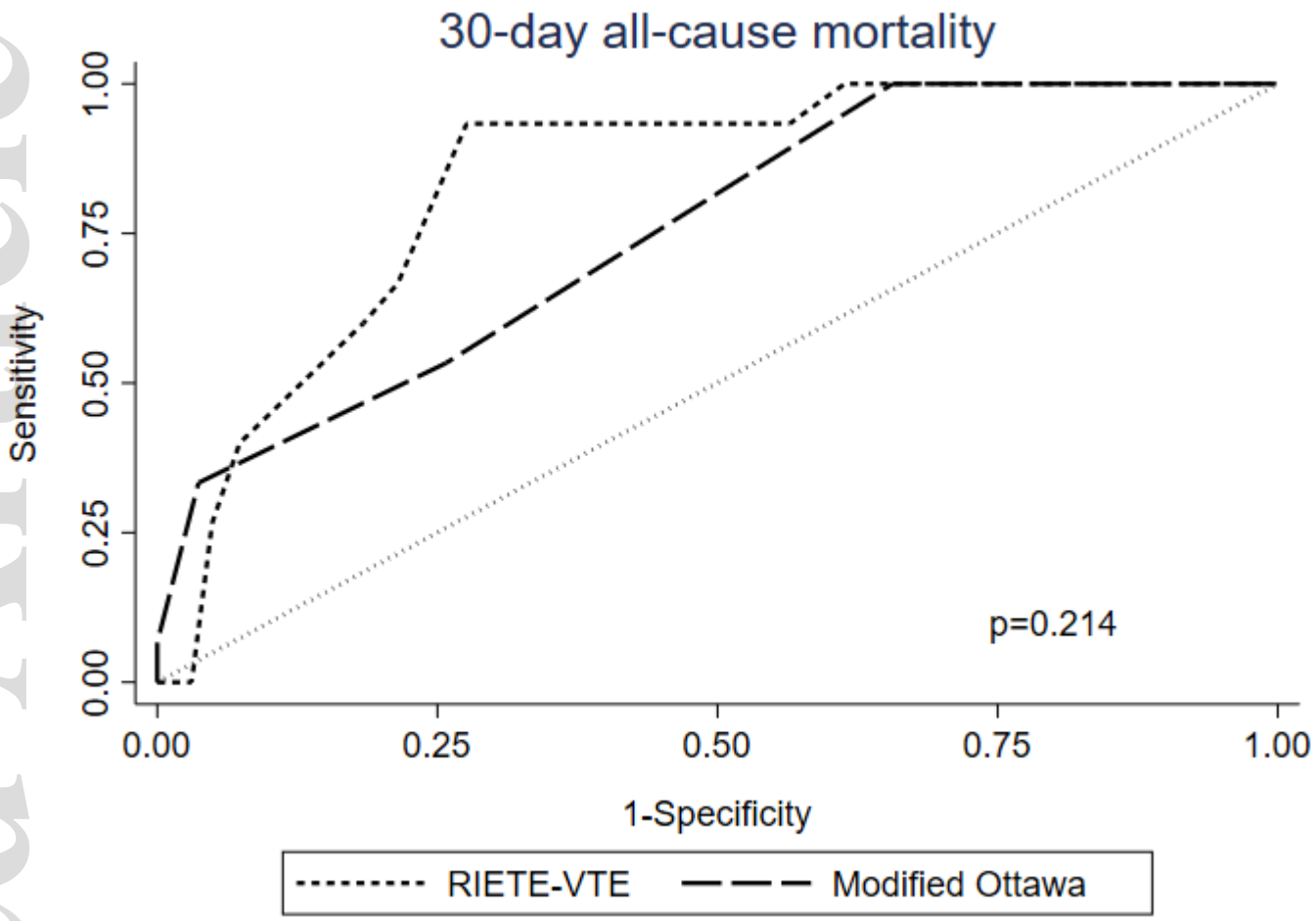

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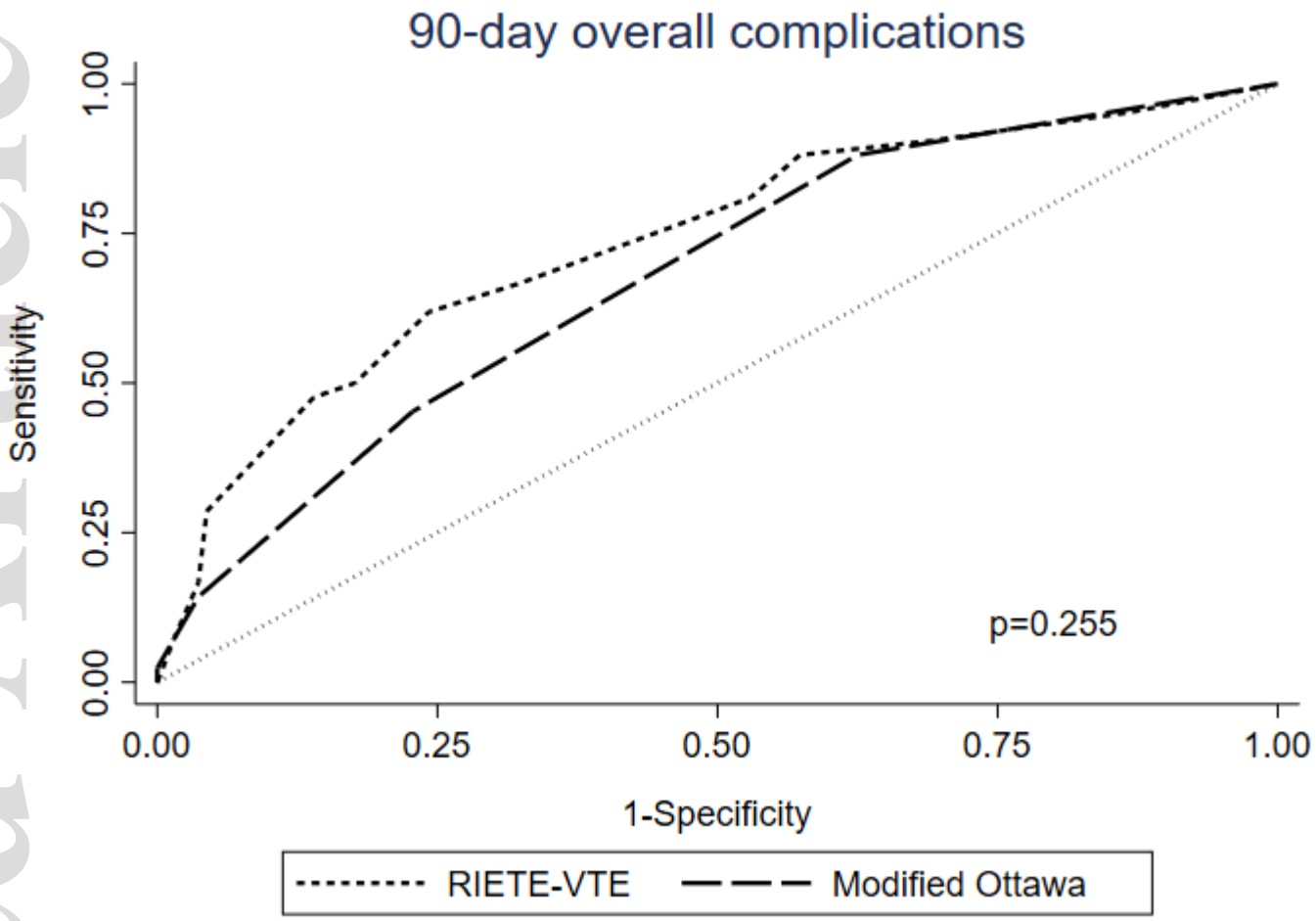

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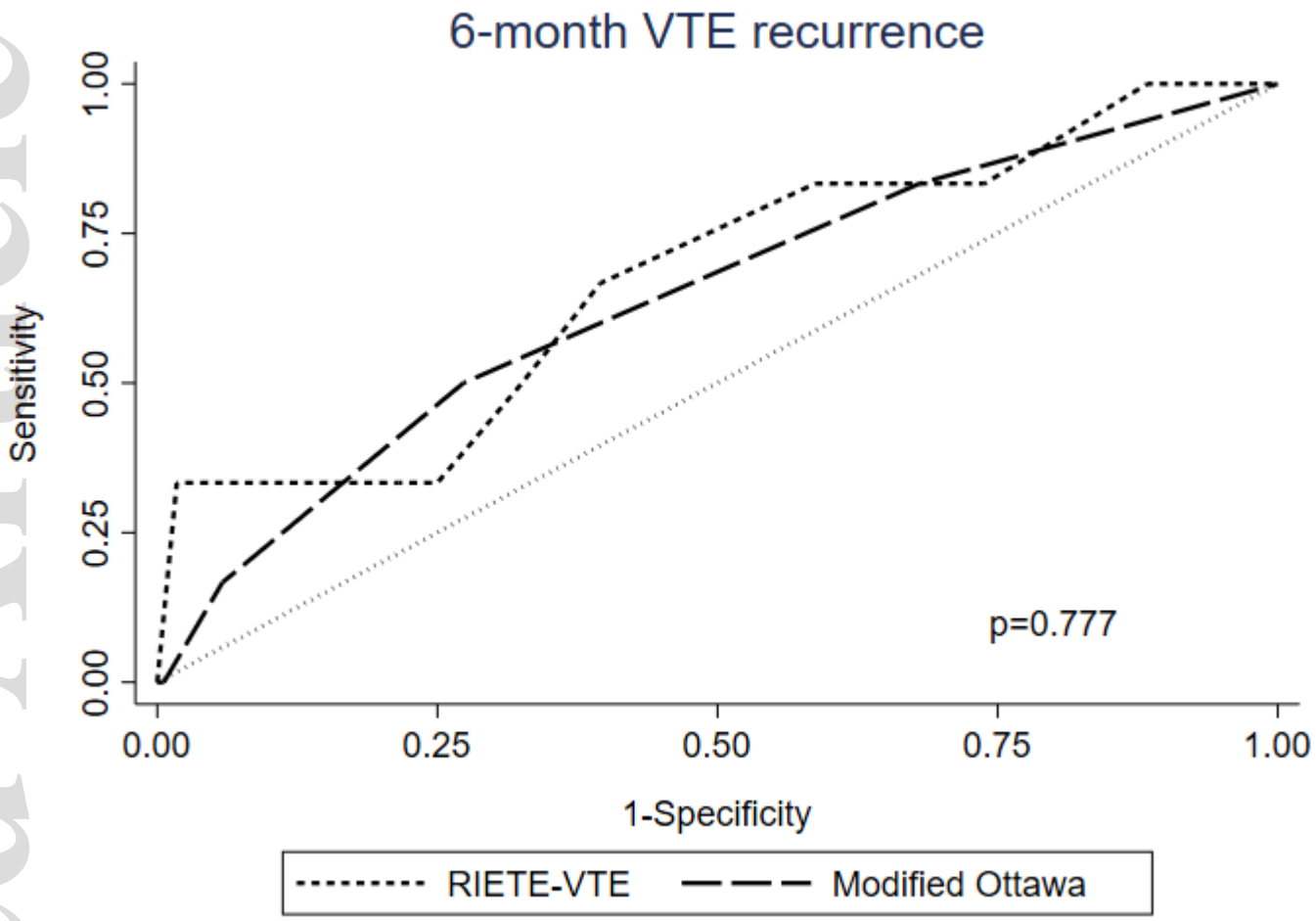

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