


Clinical Outcomes of Incidental Venous Thromboembolism in Cancer and Noncancer Patients: The SWISS Venous Thromboembolism Registry (SWIVTER)

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Abstract

Objective In patients with cancer-associated venous thromboembolism (VTE), the risk of recurrence is similar after incidental and symptomatic events. It is unknown whether the same applies to incidental VTE not associated with cancer.

Methods and Results We compared baseline characteristics, anticoagulation therapy, all-cause mortality, and VTE recurrence rates at 90 days between patients with incidental ($n = 131$; 52% without cancer) and symptomatic ($n = 1,931$) VTE included in the SWISS Venous Thromboembolism Registry (SWIVTER). After incidental VTE, 114 (87%) patients received anticoagulation therapy for at least 3 months. The mortality rate was 9.2% after incidental and 8.4% after symptomatic VTE for hazard ratio (HR) 1.10 (95% confidence interval [CI] 0.49–2.50). After adjustment for competing risk of death, recurrence rate was 3.1 versus 2.8%, respectively, for sub-HR 1.07 (95% CI

Keywords

- ▶ anticoagulation
- ▶ incidental diagnosis
- ▶ mortality
- ▶ venous thromboembolism

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0.39–2.93). These results were consistent among cancer (mortality: 15.9% vs. 12.6%; HR 1.32, 95% CI 0.67–2.59; recurrence: 4.8% vs. 4.7%; HR 1.02, 95% CI 0.30–3.42) and noncancer patients (mortality: 2.9% vs. 2.1%; HR 1.37, 95% CI 0.33–5.73; recurrence: 1.5% vs. 2.3%; HR 0.63, 95% CI 0.09–4.58). Patients with incidental VTE who received anticoagulation therapy for at least 3 months had lower mortality (4% vs. 41%) and recurrence rate (1% vs. 18%) compared with those who did not.

Conclusion In SWIVTER, more than half of incidental VTE events occurred in noncancer patients who often received anticoagulation therapy. Among noncancer patients, early mortality and recurrence rates were similar after incidental versus symptomatic VTE. Our findings suggest that anticoagulation therapy for incidental VTE may be beneficial regardless of the presence of cancer.

Introduction

Venous thromboembolism (VTE) contributes to mortality, morbidity, and costs globally,^{1,2} especially if one considers the dramatic increment in VTE incidence,^{3,4} owing at least in part to the steep rise in the use of imaging tests in both cancer and noncancer patients.⁵

Among cancer patients, the prevalence of incidental VTE on routine computed tomography imaging is approximately 5%,⁶ and there is growing evidence that the recurrence risk in this subgroup of population is significant despite anticoagulation therapy.⁷ Patients with cancer-associated incidental VTE may have similar risks of recurrence, bleeding, and mortality as those with symptomatic VTE.^{7–9} Therefore, the American Society of Clinical Oncology recommends virtually the same therapy for incidental and symptomatic VTE in cancer patients,¹⁰ and recent major phase III trials on novel anticoagulant agents for cancer-associated VTE accepted the enrolment of patients from either group.¹¹

The course of incidental VTE and the risk–benefit balance of therapeutic anticoagulation remain to be investigated in the noncancer setting, such as among patients with chronic obstructive pulmonary disease, stroke, coronary artery disease, pulmonary infection, or major trauma or surgery.¹² Despite this, the current guidelines of the American College of Chest Physicians suggest the same initial and long-term anticoagulation strategy in patients with incidental VTE as for patients with symptomatic VTE.^{13,14} In the absence of evidence from confirmatory trials,¹⁵ there is need for further data from observational studies to estimate the risk of complications after incidental VTE.

In this subgroup analysis from the SWISS Venous Thromboembolism Registry (SWIVTER), we described the rate and predictors of early recurrence and death in patients with incidental VTE, with a primary focus on its prognostic relevance in the absence of known cancer. Further, a confirmatory analysis of the subgroup of cancer patients was performed.

Methods

Patients

Between November 2012 and February 2015, a total of 2,062 consecutive in- and outpatients with VTE were prospectively

enrolled and followed in the SWIVTER from 13 acute care hospitals in Switzerland. Inclusion criteria were age \geq 18 years and objectively confirmed deep vein thrombosis (DVT) and/or pulmonary embolism (PE) by diagnostic imaging; this included compression ultrasound or venography for DVT, and contrast-enhanced chest computed tomography, ventilation-perfusion scan, or conventional pulmonary angiography for PE, and complete follow-up at 90 days. No exclusion criteria were applied. SWIVTER had no screening failure log, that is, there is no information on eligible patients which were not included in the registry. The diagnosis and management of acute VTE was performed according to the standard of care at each participating hospital.

After approval from local ethics committees, the study was conducted in accordance with the principles of the Declaration of Helsinki.

Data and Definitions

SWIVTER collected individual level data sets for all enrolled patients. Those data sets included demographics, comorbidities, and VTE-specific information including (1) type, severity, and risk factors of VTE; (2) type and duration of anticoagulation therapy; and (3) reperfusion therapy. For hospitalized patients, the duration of hospital stay was recorded. Clinical outcomes were overall mortality, recurrent VTE, and bleeding complications at 90 days. Deidentified data was entered into a web-based case report form system by each participating hospital.

The present analysis was not prespecified in the SWIVTER protocol. For the purpose of this post hoc analysis, patients were allocated into two groups according to the diagnosis of incidental or symptomatic VTE. Incidental VTE was defined as DVT or PE that was clinically unsuspected at the time of diagnosis, but objectively confirmed through one of the diagnostic imaging methods described above under the inclusion criteria. Being purely observational, SWIVTER did not mandate performance or collect information on the original indication for the imaging tests in patients with incidental VTE. Patients were classified as having active cancer in the presence of positive clinical finding plus positive imaging or biomarker plus need for any cancer treatment. Provoked VTE was defined as thrombosis associated with surgery, estrogen therapy, pregnancy, immobilization

for > 3 days, or prolonged (> 8 hours) flight, all within 30 days prior to VTE diagnosis.^{13,14} Maintenance anticoagulation was defined as treatment with vitamin K-antagonist, or low-molecular-weight heparin, or direct oral anticoagulant (DOAC) beyond the initial 7 days. The definition of clinical outcomes including recurrent VTE and major bleeding has been previously described elsewhere.^{16,17}

Statistical Analysis

Normally distributed continuous data are described by mean and standard deviation, and skewed data by median with interquartile range. Comparisons of continuous data were conducted by use of the *t*-test or rank-sum test, where appropriate. Discrete variables are displayed as frequencies with percentages, and comparisons were performed by use of the chi-square or Fisher's exact test. The 90-day cumulative risks of death, recurrent VTE, and major bleeding were estimated with the Kaplan–Meier method. Cumulative risks were reported both unadjusted and adjusted for demographics and comorbidities, and compared by use of a log-rank test.

Univariate Cox regression analysis accompanied by the corresponding hazard ratios (HRs) and 95% confidence intervals (CIs) was performed for the 90-day clinical outcomes. Cumulative events rates through 90 days were presented using the Kaplan–Meier event curve. To take into consideration the relatively high mortality rate in patients with incidental VTE, competing risk regression analysis reporting sub-HRs (SHRs) and 95% CI for VTE recurrence based on the Fine and Gray's proportional subhazards model was applied with adjustment for competing risk of death. VTE recurrence rates through 90 days were presented using the cumulative incidence curves.

For sensitivity analysis, and to allow for a less biased comparison between the groups, an additional verification based on propensity score matching was conducted: in this analysis, all patients with incidental VTE were matched with corresponding controls. The propensity scores were estimated using logistic regression with the dependent variable of VTE diagnosis and the independent variables analogous to the baseline characteristics. Study cohorts were matched using nearest-neighbor one-to-one matching without replacement.

Univariate Cox regression analysis reporting HR with 95% CI was conducted to identify clinical factors associated with 90-day mortality in patients with incidental VTE. Subsequently, multivariate Cox regression analysis was performed to identify independent clinical predictors for the occurrence of mortality. Univariate factors with a *p*-value of < 0.05 were included in the regression procedure, and a backward elimination procedure was used to stepwise discard variables without significance from the model.

All reported *p*-values are two-tailed. Data were analyzed using STATA 13.0 software (STATACorp LP, College Station, Texas, United States).

Results

Patient Characteristics

Overall, 2,062 patients with confirmed VTE were recruited; the mean age was 63 ± 17 years and 978 (47%) were female.

Overall, 131 (6%) patients had incidental VTE, which was more frequently present in patients with versus without cancer (13% vs. 4%). The demographic and baseline characteristics of the study population stratified by the presence of incidental VTE are displayed in ►Table 1.

A total of 1,246 (60%) patients had PE, of whom 257 (21%) had also DVT. The proportions of proximal (58% vs. 63%) and isolated distal (31% vs. 29%) leg DVT, and upper extremity (12% vs. 9%) DVT were similar in patients with incidental versus symptomatic VTE. PE was diagnosed in 105 (80%) patients with incidental VTE, and 1,141 (59%) patients with symptomatic VTE. Among the 922 patients with available imaging or biomarker data, right ventricle dilatation or dysfunction was present in 0 versus 25%, and positive troponin or natriuretic peptides in 13 versus 23% patients with incidental versus symptomatic VTE, respectively.

Patient characteristics from the propensity score-matched cohorts are summarized in ►Supplementary Table S1 (available in the online version).

Treatment of VTE

Overall, the proportion of hospitalization among patients with incidental and symptomatic VTE was similar, 80 versus 75%, respectively. Of the 1,246 patients with PE, the rate of in-hospital treatment was lower after incidental VTE (80% vs. 93%). Almost all patients (98%) were treated with anticoagulants. Out of 45 patients who were left untreated, 33% had cancer, 33% severe renal impairment, 13% recent surgery, and 13% active bleeding upon VTE diagnosis. Patients with incidental VTE were less frequently treated with DOACs for both initial (5% vs. 12%) and maintenance (8% vs. 21%) anticoagulation than those with symptomatic VTE.

Patients with incidental VTE less often received anticoagulation therapy for a minimum of 3 months than those with symptomatic disease (87% vs. 93%; *p* = 0.014). This was consistent for both cancer (84% vs. 90%) and noncancer (90% vs. 94%) patients. Among the 17 patients (10 cancer, 7 noncancer) with incidental VTE who did not complete 3-month anticoagulation therapy, 3 patients (1 cancer, 2 noncancer) had no anticoagulation therapy at all, and 14 (9 cancer, 5 noncancer) patients had initial anticoagulation therapy (for less than 1 month); of note, 4 of those patients had active bleeding upon VTE diagnosis and 6 had recent surgery. Patients with incidental VTE were more often prescribed maintenance anticoagulation therapy for an indefinite duration than those with symptomatic disease (47% vs. 35%; *p* < 0.001) despite a similar proportion of unprovoked thrombosis in both groups (33% vs. 34%), respectively; this was consistent among cancer (54% vs. 48%) and noncancer (40% vs. 32%) patients.

Clinical Outcomes up to 90 Days

The cumulative 90-day mortality rate was 9.2% after incidental and 4.5% after symptomatic VTE, corresponding to a HR of 1.07 (95% CI 0.57–2.00) after conditioning for cancer, acute coronary syndrome, acute cardiac failure, and diagnosis of PE. In the propensity score matched cohorts, the mortality rate was 9.2% after incidental and 8.4% after

Table 1 Demographics, chronic, and acute comorbidities

	Incidental N = 131		Symptomatic N = 1,931		Total N = 2,062	
Demographics						
Age, mean years ± SD	67	14	63	18	63	17
Elderly (age ≥ 65 y), n (%)	84	64.1	1,037	53.7	1,121	54.4
Women, n (%)	54	41.2	924	47.9	978	47.4
Duration of hospital stay, median days (IQR)	11	8–20	7	4–13	8	4–14
Chronic comorbidities						
Systemic hypertension, n (%)	67	51.1	717	37.1	784	38.0
Cancer, n (%)	63	48.1	430	22.3	493	23.9
Prior VTE, n (%)	31	23.7	449	23.3	480	23.3
Congestive heart failure, n (%)	22	16.8	303	15.7	325	15.8
Diabetes mellitus, n (%)	29	22.1	254	13.2	283	13.7
Chronic lung disease, n (%)	27	20.6	222	11.5	249	12.1
Severe renal impairment, n (%)	17	13.0	223	11.5	240	11.6
Hormone replacement, n (%)	8	6.1	146	7.6	154	7.5
History of stroke/TIA, n (%)	16	12.2	107	5.5	123	6.0
Hepatic impairment, n (%)	2	1.5	57	3.0	59	2.9
Acute comorbidities within 30 d						
Prior hospitalization, n (%)	41	31.3	394	20.4	435	21.1
Bed rest > 3 d, n (%)	24	18.3	353	18.3	377	18.3
Acute infection/sepsis, n (%)	26	19.8	263	13.6	289	14.0
Surgery, n (%)	24	18.3	236	12.2	260	12.6
Acute respiratory failure, n (%)	10	7.6	149	7.7	159	7.7
ICU admission, n (%)	16	12.2	107	5.5	123	6.0
Central venous catheter, n (%)	10	7.6	84	4.4	94	4.6
Acute inflammatory/rheumatic disease, n (%)	10	7.6	70	3.6	80	3.9
Bleeding at the time of VTE diagnosis, n (%)	12	9.2	66	3.4	78	3.8
Ischemic stroke or palsy, n (%)	11	8.4	57	3.0	68	3.3
Acute heart failure, n (%)	3	2.3	64	3.3	67	3.2
Acute coronary syndrome, n (%)	9	6.9	57	3.0	66	3.2
Thrombocytopenia, n (%)	7	5.3	51	2.6	58	2.8

Abbreviations: ICU, intensive care unit; IQR, interquartile range; SD, standard deviation; TIA, transient ischemic attack; VTE, venous thromboembolism.

symptomatic VTE, corresponding to a HR of 1.10 (95% CI 0.49–2.50) (►Fig. 1A).

In the overall cohort, the cumulative 90-day rate of VTE recurrence was 3.1% after incidental and 2.8% after symptomatic VTE, corresponding to a HR of 1.07 (95% CI 0.39–2.95) and to a SHR of 1.07 (95% CI 0.39–2.93) after accounting for competing risk of death (►Fig. 1B).

In noncancer patients, mortality was 2.9% after incidental and 2.1% after symptomatic VTE (HR 1.37, 95% CI 0.33–5.73; $p = 0.66$). In cancer patients, mortality was 15.9% after incidental and 12.6% after symptomatic VTE (HR 1.32, 95% CI 0.67–2.59; $p = 0.42$) (►Fig. 2A).

VTE recurrence was lower in patients without cancer (2.3% vs. 4.7%; $p = 0.007$), but similar after incidental versus symptomatic VTE in both noncancer (1.5% vs. 2.3%; HR 0.63, 95% CI 0.09–4.58; $p = 0.65$) and cancer (4.8% vs. 4.7%; HR 1.02, 95% CI 0.30–3.42; $p = 0.98$) patients, respectively (►Fig. 2B). The rates of other fatal and nonfatal 90-day clinical outcomes are summarized in ►Table 2.

Among patients with incidental VTE, the multivariable model identified acute coronary syndrome, cancer, and increasing age as independent risk factors for 90-day mortality (►Table 3). After incidental VTE, both mortality (4% vs. 41%; $p < 0.001$) and recurrent VTE (1% vs. 18%; $p < 0.001$) at

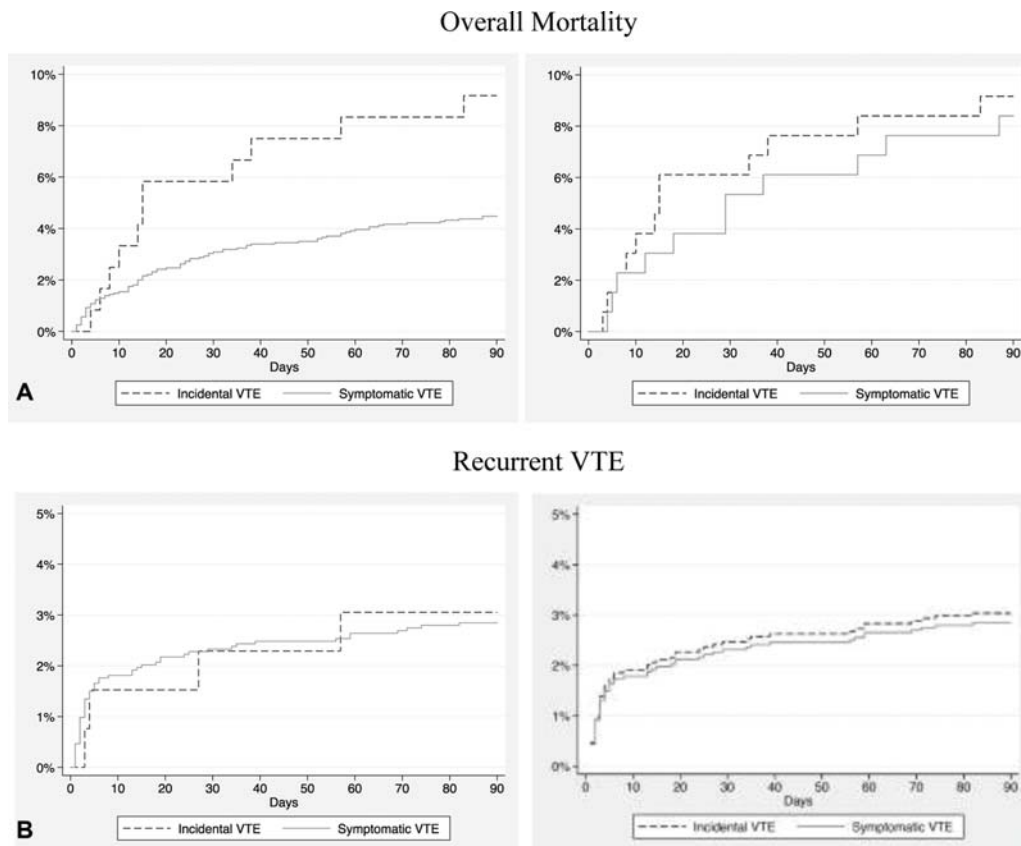


Fig. 1 Kaplan–Meier cumulative 90-day rates of clinical outcomes according to the venous thromboembolism (VTE) diagnosis unadjusted (left) and in adjusted population (right). (A) Unadjusted, the risk of overall mortality at 90 days was higher after incidental versus symptomatic VTE (9.2% vs. 4.5%; hazard ratio [HR] 2.09, 95% confidence interval [CI] 1.12–3.91; $p = 0.021$). The risk was similar after incidental and symptomatic VTE in the propensity score-adjusted population (9.2% vs. 8.4%; HR 1.10, 95% CI 0.49–2.50; $p = 0.81$). (B) The risk of recurrent VTE at 90 days was similar after incidental and symptomatic VTE both unadjusted (3.1% vs. 2.9%; HR 1.07, 95% CI 0.39–2.95; $p = 0.90$) and after adjustment for competing risk of death (3.1% vs. 2.8%; sub-hazard ratio [SHR] 1.07, 95% CI 0.39–2.93; $p = 0.90$). VTE, venous thromboembolism.

90 days were lower in patients who received a minimum of 3-month anticoagulation therapy compared with those in whom anticoagulation was withheld; among noncancer (mortality: 6% vs. 70%; $p < 0.001$; recurrent VTE: 2% vs. 20%; $p = 0.014$) and among cancer patients (mortality: 3% vs. 0%; $p = 0.63$; recurrent VTE: 0% vs. 14%; $p = 0.003$), respectively.

Discussion

In the present analysis of a multicenter cohort study, we found that 6.4% of VTE, mainly PE events, were incidentally diagnosed. More than half of incidental VTE events occurred in noncancer patients. Patients with incidental VTE were older and had more comorbidities as compared with symptomatic VTE patients. The 90-day rates of recurrent VTE, major bleeding, and overall mortality were similar between incidental and symptomatic VTE, both in noncancer and cancer patients. After incidental VTE, the mortality and recurrence rates appeared lower in patients who received anticoagulation therapy for at least 3 months compared with those in whom anticoagulation was withheld.

To the best of our knowledge, SWIVTER is one of the first studies specifically reporting clinical outcomes after inci-

idental VTE in noncancer patients. Mortality and the risks of recurrent VTE and major bleeding at 3 months were similar after incidental and symptomatic VTE. The rate of short-term recurrent VTE, approximately 2%, during anticoagulation therapy in noncancer patients with incidental VTE is in line with population-based studies.¹⁸ It has been previously shown that patients with asymptomatic DVT detected during hospitalization were characterized by a higher mortality rate compared with those without DVT.¹⁹ While further data are needed here, our findings do not indicate that initial and maintenance anticoagulation therapy should be withheld in noncancer patients with incidental VTE.

Our findings also confirm that having cancer is a major determinant of early outcomes and survival. This is in line with previous literature,^{20–23} according to which cancer patients had a fivefold mortality and recurrent VTE rates, and a twofold risk of major bleeding. We also confirmed the results of previous studies of cancer patients with incidental events, who are characterized by a similar prognosis as those with symptomatic PE.^{7–9,24–26} Further, incidental PE is associated with a worse prognosis than no VTE, as the median survival was 8 months in patients with incidental PE and 12 months for the controls of patients with matched cancer but without PE.⁸ In this context, our data suggest that cancer-

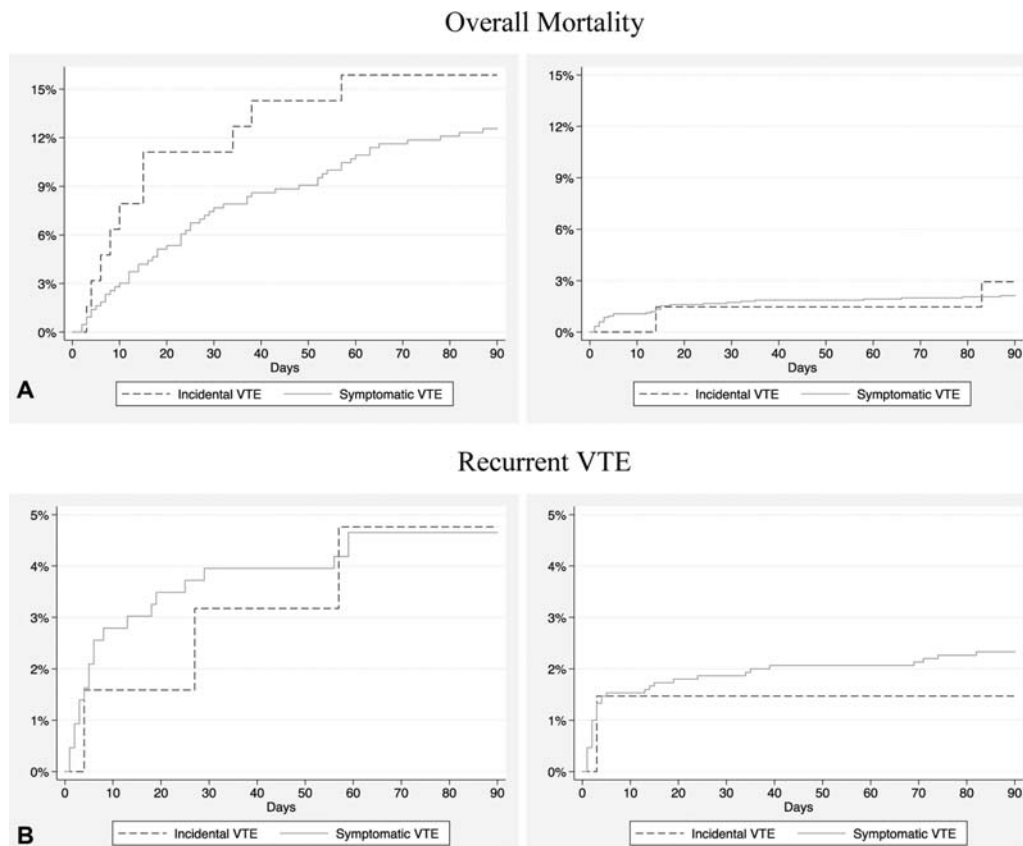


Fig. 2 Kaplan–Meier cumulative 90-day rates of clinical outcomes according to the venous thromboembolism (VTE) diagnosis in cancer (left) and noncancer patients (right). (A) The risk of overall mortality in patients with incidental versus symptomatic VTE was similar among cancer (15.9% vs. 12.6%; hazard ratio [HR] 1.32, 95% confidence interval [CI] 0.67–2.59; $p = 0.42$) and noncancer (2.9% vs. 2.1%; HR 1.37, 95% CI 0.33–5.73; $p = 0.66$) patients. (B) The risk of recurrent VTE in patients with incidental versus symptomatic VTE was similar among cancer (4.8% vs. 4.7%; HR 1.02, 95% CI 0.30–3.42; $p = 0.98$) and noncancer (1.5% vs. 2.3%; HR 0.63, 95% CI 0.09–4.58; $p = 0.65$) patients. VTE, venous thromboembolism.

Table 2 Rates of 90-day clinical outcomes in unadjusted population

	Incidental <i>N</i> = 131		Symptomatic <i>N</i> = 1,931		<i>p</i> -Value ^a
Mortality, <i>n</i> (%)	12	9.2	86	4.5	0.014
VTE-related, <i>n</i> (%)	1	0.8	23	1.2	0.66
Bleeding-related, <i>n</i> (%)	0	0.0	5	0.3	0.56
Nonfatal recurrent VTE, <i>n</i> (%)	3	2.3	32	1.7	0.59
Nonfatal recurrent PE ^b , <i>n</i> (%)	2	1.5	22	1.1	0.69
Nonfatal recurrent DVT ^b , <i>n</i> (%)	1	0.8	20	1.0	0.76
Nonfatal major bleeding, <i>n</i> (%)	1	0.8	35	1.8	0.38
Nonfatal bleeding requiring medical attention, <i>n</i> (%)	6	4.6	67	3.5	0.51
Recurrent VTE, <i>n</i> (%)	4	3.1	55	2.8	0.89
Major bleeding, <i>n</i> (%)	1	0.8	40	2.1	0.30
Bleeding requiring medical attention, <i>n</i> (%)	6	4.6	72	3.7	0.62

Abbreviations: DVT, deep vein thrombosis; PE, pulmonary embolism; VTE, venous thromboembolism.

^a*p*-Value for comparison of patients with incidental versus symptomatic VTE.

^bPatients might have had recurrent DVT with or without recurrent PE.

Table 3 Predictors of 90-day mortality in patients with incidental VTE

Analysis Factor	Univariate analysis			Multivariate analysis		
	HR	95% CI	p	HR	95% CI	p-Value
Acute coronary syndrome	7.67	2.30–25.53	0.001	5.73	1.68–19.51	0.005
Cancer	5.82	1.27–26.58	0.023	5.38	1.17–24.72	0.030
Increasing age (per year)	1.06	1.01–1.12	0.018	1.06	1.00–1.13	0.035

Abbreviations: CI, confidence interval; HR, hazard ratio; VTE, venous thromboembolism.

associated incidental VTE should be treated similarly to symptomatic VTE.

In our study, patients with incidental VTE had advanced age and a substantial burden of acute and chronic comorbidities, or recent need for surgical interventions, explaining the high mortality rate which was not related to VTE in most cases. It does not come as a surprise that age, cancer, and acute coronary syndrome, rather than VTE severity or recurrence, were the main predictors of death after incidental VTE, in line with prior studies in symptomatic patients.^{27–29} From this perspective, the presence and severity of comorbidities should be accounted for when planning the subsequent follow-up of patients with incidental VTE, taking into consideration the current strategies recommended after symptomatic VTE.

With regards to management strategy, patients with incidental VTE were more often prescribed maintenance anticoagulation therapy for an indefinite duration, and were less frequently treated with DOACs, likely due to a high proportion of patients with cancer, and in line with guidelines recommendations available at the time.¹³ Today, several phase III trials have shown the noninferiority of oral factor Xa inhibitors for the treatment of cancer-associated VTE and secondary prevention. Consequently, they are suggested as first-line treatment, provided that the risk of major bleeding, notable gastrointestinal, is considered low.³⁰ In our cohort, almost all patients after incidental VTE received anticoagulation therapy for at least 3 months, independently on the presence or absence of cancer, fully in accordance with guidelines recommendations.^{13,14} After incidental VTE, patients in whom anticoagulation was withheld had higher early mortality and recurrent VTE than those who received anticoagulation therapy for at least 3 months, likely due to the higher proportion of cancer, active bleeding upon VTE diagnosis, or recent surgery in the former group. The few patients who remained untreated had comorbidities known to be associated with a poor prognosis or bleeding complications that likely affected the administration of anticoagulants.

Our analysis has several limitations. First, we could not compare the management patterns and patient outcomes between various thrombus severities because no information was available on the exact anatomical extension of thrombosis. Second, the group allocation was based on a single workup upon VTE diagnosis, and SWIVTER had no central adjudication of clinical outcomes. Therefore, we

cannot rule out that some events classified as incidental VTE by treating physicians were in fact symptomatic. In addition, SWIVTER did not capture reasons for the performance of VTE imaging tests. Because cancer, pneumonia, and acute or chronic lung disease were the most frequent comorbidities in patients with incidental VTE, it is also likely that these comorbidities represented the most frequent indications for the imaging tests. Third, patients were classified as having active cancer based on the prespecified variable description available at the time of study initiation in the year 2012, using a more restrictive definition of cancer than in other studies; this may have influenced the external validity of our results. Indeed, patients with active cancer represented the vast majority of those enrolled in recent randomized trials evaluating novel anticoagulation agents in a cancer setting, in line with our definition.^{31,32} Fourth, we cannot exclude that several fatal and nonfatal VTEs were missed during the follow-up because autopsy was not routinely performed and SWIVTER did not mandate standardized diagnostic approach in patients with suspected recurrence. Fifth, propensity score-adjusted analysis may partially account for unbalanced confounders at the price of reducing the population size and, therefore, limiting the statistical power. However, this additional analysis performed to scrutinize sensitivity permitted to further confirm the direction of our findings in accordance with the crude rates and results of the multivariable analysis on mortality. Sixth, the numbers of patients after incidental VTE in whom anticoagulation was withheld were small, and consequently, the outcome analysis should be interpreted with caution. This limitation should be read in the context of confounding by indication which is present in all observational studies not mandating for a specific treatment regimen. Finally, SWIVTER was conducted in Switzerland only and the results may not be directly generalizable to other countries characterized by different health care systems and potential major deviations in the baseline prevalence of comorbidities.

Conclusion

In SWIVTER, the risk of early recurrence and death was similar in patients with incidental and symptomatic VTE. This applied to both cancer and noncancer patients.

Our results may have implications on the management of incidental VTE in noncancer patients, suggesting that

patients with incidental VTE might benefit from standard-course anticoagulation.

What is known about this topic?

- In patients with cancer-associated venous thromboembolism (VTE), the risk of recurrence is similar after incidental and symptomatic events.
- However, it is unknown whether the same applies to incidental VTE not associated with cancer.

What does this paper add?

- In the multicenter Swiss Venous ThromboEmbolic Registry, more than half of incidental VTE events occurred in noncancer patients who often received anticoagulation therapy.
- Early mortality and recurrence rates were similar after incidental versus symptomatic VTE in both cancer and noncancer patients, suggesting that patients with incidental VTE may benefit from standard-course anticoagulation irrespective of the presence of cancer.

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Conflict of Interest

D.S. is an employee of Sanofi-Aventis (Suisse) SA, Vernier, Switzerland. S.B. reports personal fees from BTG Pharmaceuticals and Leo Pharma, personal fees and nonfinancial support from Bayer HealthCare, and nonfinancial support from Daiichi-Sankyo, outside the submitted work. J.H.B. reports grants from the Swiss National Science Foundation and the Swiss Heart Foundation, grants and personal fees from Boehringer Ingelheim, Pfizer, Bayer, and Daiichi-Sankyo, outside the submitted work. R.P.E. reports personal fees from Bayer, Daiichi-Sankyo, and Sanofi-Aventis, outside the submitted work. W.K. reports personal fees and nonfinancial support from Bayer, Pfizer, Shire/Takeda, Roche, Daiichi-Sankyo, and Novo Nordisk, outside the submitted work. M. H. reports personal fees from Sanofi-Aventis, Daiichi-Sankyo,

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