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Venous thromboembolism in patients immobilised at home

To the Editor:

The natural history of venous thromboembolism (VTE), its impact on outcome and the rationale for prophylaxis are well established for hospitalised, acutely ill medical patients [1–10], but are less clear for nonhospitalised immobilised patients. Current guidelines for antithrombotic therapy recommend the use of prophylaxis in hospitalised, acutely ill medical patients, and suggest against its use in chronically immobilised persons at home and in patients with isolated lower-leg injuries requiring leg immobilisation [11]. However, there are no suggestions on the use of VTE prophylaxis in acutely ill medical patients immobilised at home.

We used the Registro Informatizado de Enfermedad TromboEmbólica (RIETE) registry database to compare the clinical characteristics, use of prophylaxis and 3-month outcome of all VTE patients with recent immobilisation (bed rest with bathroom privileges in the 2-months prior to VTE) for ⩾4 days according to being immobilised at home or in hospital [12–14]. We used multiple logistic regression analyses to identify factors predicting the prescription of VTE prophylaxis and factors predicting the risk of fatal pulmonary embolism (PE) within the first 3 months. The following covariates were selected: sex, age, weight, chronic lung disease, heart failure, creatinine clearance levels, recent bleeding, prior VTE, oestrogen use, cancer, initial VTE presentation, reason, site and duration of immobilisation, and use of anti-platelet or nonsteroidal anti-inflammatory drugs at baseline. SPSS (version 15: SPSS Inc., Chicago, IL, USA) was used for statistical management of data.

Up to January 2014, 50 764 patients with acute VTE were enrolled in RIETE. Of these, 9120 (18%) had recent immobility: 5960 (12%) at home, 2429 (4.8%) in hospital and 731 (1.4%) at a nursing home (nursing home patients were not considered in the study). Among patients immobilised at home, 38% had an acute medical illness, 28% had recent trauma, 25% chronic immobility and 9.5% had other reasons (table 1). Among those immobilised in hospital, 70% had an acute medical illness, 7.7% trauma, 6.5% chronic immobility and 9.5% other. The most common traumatic injuries at home were lower-limb fractures (22%), contusions (19%), sprained ankle (13%) and tendon injuries (10%). The most common in hospital were multiple fractures (43%) and cranioencephalic trauma (19%).

Patients immobilised at home were less likely to present with PE (50% *versus* 53%; OR 0.87, 95% CI 0.79–0.95) and less likely to have chronic lung disease, heart failure, cancer, anaemia or recent bleeding than those immobilised in hospital. Duration of immobility was >4 weeks in 38% of patients at home and in 7.4% in hospital (OR 7.64, 95% CI 6.50–8.98) and the proportion of patients who had received VTE prophylaxis was 12% *versus* 56%, respectively (OR 0.11, 95% CI 0.10–0.12). Among patients immobilised at home, 6.2% of those with an acute medical illness, 27% with trauma, 4.0% with chronic immobilisation and 10% immobilised for other reasons received VTE prophylaxis. Among those in hospital, the proportions were 62%, 58%, 36% and 37%, respectively.

Most patients (90%) in both subgroups received initial therapy with low-molecular-weight heparin, with no differences in mean daily doses. Then, 65% of patients immobilised at home and 52% of those in hospital received long-term therapy with vitamin K antagonists. During the first 3 months of therapy, the rate of VTE recurrences (OR 0.66, 95% CI 0.48–0.92), major bleeding (OR 0.69, 95% CI 0.53–0.89), all-cause death (OR 0.70, 95% CI 0.61–0.80) and fatal bleeding (OR 0.53, 95% CI 0.32–0.87) were significantly lower in patients immobilised at home but the mortality due to PE was similar (OR 1.05, 95% CI 0.74–1.49). The 90-day rate of fatal PE among patients immobilised at home was 2.7% in the acutely ill, 0.4% in those with trauma and 2.4% in those with chronic immobilisation. Among patients immobilised in hospital, rates were 2.1%, 0.5% and 1.3%, respectively.

On multivariable analysis, prior VTE (OR 1.69, 95% CI 1.30–2.18) and recent trauma (OR 5.55, 95% CI 4.35–6.67) were associated with increased rates of VTE prophylaxis at home, while length of immobility <7 days (OR 0.30, 95% CI 0.24–0.43) and use of nonsteroidal anti-inflammatory drugs (OR 0.62, 95% CI 0.45–0.85) were associated with a lower risk. Moreover, initial VTE presentation as PE (OR 15.0, 95% CI 6.58–34.3), immobility for an acute medical illness (OR 4.21, 95% CI 1.80–9.84), cancer (OR 2.96, 95%

CI 1.98–4.42) and renal insufficiency (OR 2.63, 95% CI 1.67–4.13) were independently associated with an increased risk of dying of PE among patients immobilised at home.

Our data reveal that the amount of patients arriving at the hospital with acute VTE developing after immobilisation at home was over two-fold higher than the amount of patients developing PE while staying in hospital. Patients at home had different reasons for immobilisation, fewer comorbidities and a longer length of immobilisation than those in hospital, but their 90-day PE-related mortality was the same. Hence, the amount of patients dying of PE after being immobilised at home was over two-fold higher than in those immobilised in hospital. Interestingly, however, the use of VTE prophylaxis in patients at home was much lower than in hospital (12% *versus* 56%, respectively).

In our series, 6.2% of acutely ill medical patients and 27% of trauma patients did receive prophylaxis, and their rates of fatal PE were 2.7% and 0.4%, respectively. Thus, physicians were less likely to prescribe prophylaxis to patients at the highest risk of dying of PE and most likely to prescribe it to those at lowest risk. This is probably because there are no randomised clinical trials demonstrating the effectiveness and safety of VTE prophylaxis in acutely ill medical patients at home. To our knowledge, no such trials are in progress, probably due to logistical problems of performing studies at home. Hence, we cannot reasonably expect any reduction in the burden of VTE in this population in the near future.

In our series, immobilisation for an acute medical illness was associated with an increased risk of dying of PE, irrespectively of the length of immobility. This is important because patients in bed for <7 days at home received the lowest rates of prophylaxis. Thus, we suggest that some patients with acute medical illnesses (particularly if they also have renal insufficiency or cancer) might benefit from VTE prophylaxis, even if bedridden at home.

The present study has several limitations. Patients were not treated with a standardised anticoagulant regimen and sudden unexplained deaths were not considered as fatal PE in this analysis (only confirmed PEs were considered). Thus, the rate of fatal PE may be underestimated, especially after hospital discharge. Strengths of the current analysis include that a large number of consecutive unselected patients were enrolled and that fatal PE is by far the most important outcome during the treatment of acute PE.

In summary, the amount of patients arriving to the hospital with acute VTE after immobilisation at home was over two-fold higher than the amount of patients with VTE appearing during hospital stay. Those with an acute medical illness and those with renal insufficiency or cancer were at increased risk of dying of PE, but only few had received prophylaxis. Randomised trials should be conducted to assess the

TABLE 1 Use of thromboprophylaxis and 90-day rates of fatal pulmonary embolism (PE), according to the reason, duration and site of immobilisation

	At home			In hospital		
	Patients	**Prophylaxis**	**Fatal PE**	**Patients**	**Prophylaxis**	**Fatal PE**
All patients	5960	717 (12)	111 (1.9)	2429	1351 (56)	43 (1.8)
Acute medical illness	2241	140 (6.2)	60 (2.7)	1690	1041 (62)	35 (2.1)
Infection	609	31 (5.1)	8 (1.3)	797	507 (64)	16 (2.0)
Arthropathy	819	32 (3.9)	6 (0.7)	36	13 (36)	1 (2.8)
Cancer	369	38 (10)	31 (8.4)	199	114 (57)	7 (3.5)
Respiratory insufficiency	200	11 (5.5)	1 (0.5)	163	114 (70)	3 (1.8)
Acute stroke	84	13 (15)	4 (4.8)	182	91 (50)	3 (1.6)
Heart insufficiency	111	12 (11)	9 (8.1)	131	97 (74)	3 (2.3)
Ischaemic heart disease	13	3 (23)	0	89	63 (71)	0
Inflammatory bowel disease	22	0	1 (4.6)	47	16 (34)	0
Other	14	0	0	46	26 (57)	2 (4.3)
Trauma	1677	459 (27)	6 (0.4)	187	108 (58)	1 (0.5)
Chronic immobilisation	1477	59 (4.0)	35 (2.4)	159	57 (36)	2 (1.3)
Dementia	951	39 (4.1)	25 (2.6)	108	27 (25)	1 (0.9)
Lower limb paralysis	526	20 (3.8)	10 (1.9)	51	30 (59)	1 (2.0)
Other reasons	565	59 (10)	10 (1.8)	393	145 (37)	5 (1.3)
Duration of immobilisation						
<7 days	1226	78 (6.4)	22 (1.8)	944	483 (51)	22 (2.3)
1–4 weeks	2398	363 (15)	36 (1.5)	1272	740 (58)	18 (1.4)
5–8 weeks	567	128 (23)	10 (1.8)	112	74 (66)	1 (0.9)
>8 weeks	1670	135 (8.1)	41 (2.5)	67	36 (54)	2 (3.0)

Data are presented as n or n (%).

effectiveness and safety of VTE prophylaxis in patients immobilised at home for an acute medical illness. In the meantime, some of these patients (particularly if they also have renal insufficiency or cancer) might benefit from VTE prophylaxis.

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Fatal PE after immobility at home was more frequent than after immobility in hospital
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