Thromboprophylaxis in ambulatory emergency department patients managed with lower limb immobilisation after injury: a national survey

Symptomatic venous thromboembolism (VTE) occurs in 1%–2% of ambulant patients managed with lower limb immobilisation after injury.[1 2] Pharmacological thromboprophylaxis can approximately halve this risk, but questions remain about selection of patients, modality of prophylaxis and duration of therapy.[3] In the UK, the National Institute for Health and Care Excellence (NICE)[4] recommends VTE risk assessment to determine prescribing, but is not prescriptive on method and advocates only parenteral prophylaxis. To date, there have been no prospective comparisons of prescribed thromboprophylaxis agents and limited external validation of different risk assessment methods (RAMs). We sought to evaluate UK practice via a survey.

A cross-sectional electronic survey composed of 10 questions (online supplemental material) was developed by a diverse co-applicant team preparing a National Institute for Health and Care Research application,[5] including topic experts from orthopaedic and vascular surgery, emergency medicine (EM), thrombosis and haemostasis, and patient representatives. The survey was conducted using Smart Survey® between 1 February and 25 March 2022, disseminated by email through the Trainee Emergency Research Network[6] and WhatsApp® via the Royal College of Emergency Medicine clinical leads network. Responses were cross-referenced against a list of all 'Type 1' (consultant led with 24-hour resuscitation capabilities) EDs in the UK, and non-responding sites were sent targeted emails during the survey period. Duplicate departmental responses were excluded.

After removal of 15 duplicates, responses from 116 EDs were analysed (England 89, Scotland 15, Wales 6 and Northern Ireland 6) accounting for 69.5% of type 1 UK departments. The vast majority of respondents identified as EM consultants (n=100, 86%) and specialist EM trainees (n=14, 12%). Not every question was answered by each respondent resulting in some variation in denominator between questions.

Table 1 Responses to questions 3, 5, 7 and 9

Question 3. Would you consider thromboprophylaxis with the following? (116 responses)		**n (%)**
Above-knee plaster of paris or resin cast		114 (98)
Below-knee plaster of paris or resin cast		110 (95)
Below-knee equinus plaster of paris or resin cast		110 (95)
Walking boot		61 (53)
Removable knee splint		23 (20)
No immobilisation, but crutches and weight bearing as tolerated		6 (5)
Question 5. What risk assessment method do you use? (102 responses)		
Locally developed tool (unpublished)		32 (31)
NICE guidelines		25 (25)
I do not know which one we use		23 (22)
GEMNet		7 (7)
Plymouth Score		7 (7)
L-TRiP (cast) Score		1 (1)
TRiP (cast) Score		1 (1)
Modified Caprini Score		0 (0)
Other		6 (6)
Question 7. What thromboprophylaxis agent is first line recommended at your institution? (112 responses)		
Low molecular weight heparin (LMWH)		78 (70)
	Enoxaparin	42 (38)
	Dalteparin	26 (23)
	Tinzaparin	10 (9)
Direct oral anticoagulant (DOAC)		33 (29)
	Rivaroxaban	27 (24)
	Apixaban	6 (5)
Aspirin		1 (1)
Question 9. Which projects would your ED be willing to engage in? (109 responses)		
A comparison of different risk assessment models (RAMs)		66 (61)
A comparison of DOACs versus LMWH in all patients		66 (61)
A comparison of DOACs versus LMWH for selected patients at higher risk of VTE		55 (51)
An observational study of those not receiving VTE prophylaxis to determine modern event rates		46 (42)
A mixed methods study evaluating multiple objectives as above		45 (41)

GEMNet, Guidelines in Emergency Medicine Network; L-TRiP(cast) Score, Leiden-Thrombosis Risk Prediction for patients with cast immobilisation score; NICE, National Institute for Health and Care Excellence; TRiP(cast) Score, Thrombosis Risk Prediction for patients with cast immobilisation score; VTE, venous thromboembolism.

Most (≥95%) respondents reported considering thromboprophylaxis in ambulatory patients managed in a lower limb rigid cast of any sort, while half (n=61, 53%) would do so for a walking boot and 20% (n=23) when using removable knee splints (table 1). Most respondents (n=96, 83%) reported use of a RAM as standard in their ED. Of 102 respondents to the question, 23 (23%) did not know what RAM was used in their ED. The most frequently used RAMs were a locally developed tool (n=32, 32%), followed by NICE guidance (n=25, 25%),[4] but only 16% (n=16) of departments used one of the published RAMs derived specifically for this population. Ten respondents reported routine thromboprophylaxis administration in all patients with temporary lower limb immobilisation without use of any RAM. Three did not use thromboprophylaxis at all for this indication, irrespective of risk.

Of 112 responding departments using pharmacological thromboprophylaxis, 78 (70%) used low molecular weight heparin (LMWH), 33 (29%) used direct oral anticoagulant (DOAC) therapy and one department used aspirin. Thromboprophylaxis was continued 'until fracture clinic review' in 69% (n=77), for 'the duration of immobilisation' in 13% (n=14) and for '28 days routinely' in 6% (n=7) of responding departments. Of 109 responding departments, 61% (n=66) reported willingness to participate in future studies evaluating different RAMs and comparing LMWH with DOAC therapy.

Strengths of our survey include a high departmental response rate for all

four UK nations and a large consultant contribution, potentially increasing accuracy. Limitations include the open access nature of the survey platform (allowing duplicate entries), lack of mandatory answers to all questions (allowing selective responses) and the possibility that responses gathered via senior clinicians may not reflect routine practice across the whole department, particularly in departments without a subject-specific protocol.

This survey highlights practice variation in risk assessment and delivery of pharmacological prophylaxis for patients placed in temporary lower limb immobilisation after injury, across the UK. Further research is required to identify the most clinical and cost-effective approach to this common problem, and appears feasible based on responses.

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Ethics approval This study involves human participants. Completion of the NIHR tool considered this 'not research'. The proposal was reviewed by the University of Aberdeen Research Governance Committee and who considered this work a service evaluation not requiring formal ethical approval. The project was registered as a service evaluation with NHS Grampian (organisational ID 5577). This was an online survey targeted to emergency physicians.

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