Deep vein thrombosis : diagnostic and prognostic challenges

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Evaluation of the new simple and objective clinical decision rule 'I-DVT' in patients with clinically suspected acute deep vein thrombosis

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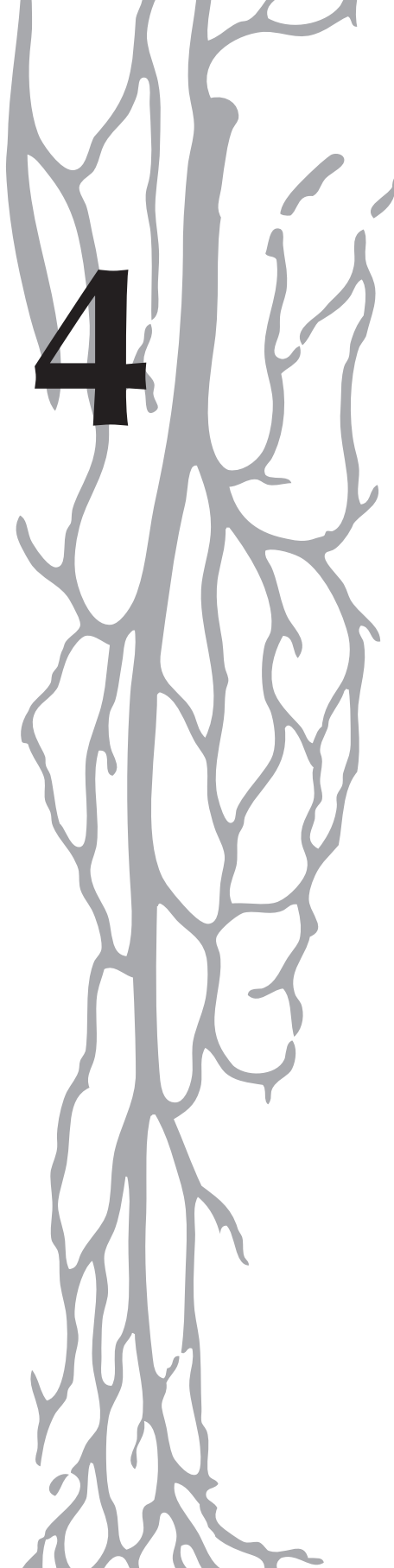

ABSTRACT

Introduction

The Wells rule is the recommended first step in the work-up of suspected deep vein thrombosis (DVT). However, it is often incorrectly used leading to an excessive number of diagnostic tests used in daily practice and diagnostic failures. A simpler objective risk stratification tool may improve adherence to the guidelines. We evaluated the diagnostic performance of the I-DVT score, which consists of four easy assessable variables: Immobilization, >3 cm Difference in calf circumferences, prior Venous thromboembolism (VTE) and active malignant Tumor.

Methods

We performed an observational study in 617 consecutive patients with suspected DVT. All patients were managed according to the recommended algorithm starting with the Wells rule followed by D-dimer test and/or compression ultrasonography (CUS). The I-DVT score was prospectively calculated at baseline and evaluated post-hoc.

Results

The DVT prevalence was 36%. DVT could be excluded in 13% of patients without CUS by the Wells rule and a normal D-dimer test, with a 3-month VTE incidence of 1.2% (95%CI 0.03-6.5%). Using the I-DVT score, DVT would have been excluded in 9.1% of patients without additional CUS, with a 3-month VTE incidence of 0% (95%CI 0.0-6.4%). The area under the ROC curve (AUC) was 0.70 (95%CI 0.66-0.74) and 0.65 (95%CI 0.61-0.70) for the Wells rule and I-DVT score respectively (difference 0.049, 95%CI -0.01-0.11; p=0.13).

Conclusions

The simple I-DVT score and Wells rule have comparable diagnostic accuracy. It's safety, efficiency and associated potential improvement of guideline adherence in clinical practice has to be further evaluated in a prospective management study.

INTRODUCTION

The Wells rule for deep vein thrombosis (DVT) is the most widely studied pre-test probability assessment score for the purpose of pre-test probability assessment in patients with suspected DVT, which is the recommended first step in the diagnostic algorithm for DVT (**Table I**).[1] It has been widely shown that DVT can be ruled out in case of a Wells 'DVT unlikely' score -1 point or less- in combination with a D-dimer concentration <500 µg/L.[2] Patients with either a D-dimer concentration ≥500 µg/L or a 'DVT likely' pre-test probability should be referred for imaging testing since the specificity of the Wells rule of 45-72% does not allow for definite confirmation of DVT.[3] Several other clinical decision rules have been evaluated for the assessment of clinically suspected DVT, but none outperformed the Wells rule nor have been validated in large prospective outcome studies, leaving no alternatives for the Wells rule.[4,5]

Despite its central role in the diagnostic work-up of suspected DVT, the Wells rule has several limitations. First, it consists of 10 items making it less practical to use in a busy emergency ward. Second, it contains one subjective item, i.e. the judgment of the physician whether an alternative diagnosis is less or more likely than DVT, leaving room for inter-observer variability. As a result, the Wells rule is frequently used incorrectly or not at all in day-to-day clinical practice.[6] Recent studies have reported that the implementation of diagnostic algorithms for DVT is poor at best.[7-11] For instance, in response to a standardized questionnaire that was sent out to all 394 physician members of the Italian Society of Thrombosis and Haemostasis, 22% of the physicians claimed never to use a CDR in patients with suspected DVT at all.[12]

Reasons for non-compliance to the validated diagnostic management algorithms are non-attendance to – or miscalculation of – the Clinical Decision Rule (CDR) and/or D-dimer test. This may result in 1) referring patients directly for an imaging test without prior calculation of the CDR score and/or performing a D-dimer test; 2) conducting an imaging test despite a 'DVT unlikely' CDR score and negative D-dimer test result; or 3) refraining from imaging testing in case of a 'DVT likely' CDR score but a negative D-dimer test result. Deviating from any of the validated diagnostic algorithms comes at the cost of the efficiency and safety of the management of patients with suspected venous thromboembolism (VTE) because it has been shown that adhering to a validated algorithm is associated with both a significant decrease in the number of applied diagnostic tests as well as -and more importantly- in the 3-month VTE incidence and perhaps even mortality.[8,13]

The aim of our study was to evaluate a new simple and objective clinical prediction rule, called the I-DVT score, for assessment of pre-test probability in patients with clinically suspected DVT. The goal of deriving a new score was to provide a CDR that can be easily applied, with the potential to improve the adherence to diagnostic algorithms and the related efficiency and safety of the diagnostic management of DVT in the future.

METHODS

Derivation of the I-DVT score

We derived a simple and therefore 'easy to use' clinical prediction score that contains only objective items. In analogy to the derivation of the Wells rule, three experts (MT, FK and MH) independently selected the most relevant predictors of a positive DVT diagnosis based on the clinical relevance, the objectivity of the items and a literature review.[14,15] We predefined, based on the design of the Wells rule, that the selected items would be designated 1 point each, and that an 'unlikely' clinical probability would be defined as a patient who did not score any points at all. The following 4 items were recognized by each individual physician to be associated with a high risk of DVT: Immobilization (minimal 3 days and/or major surgery <4 weeks), Difference in the calve circumferences of at least 3 cm compared to the asymptomatic leg, Venous thromboembolism in the past and active malignant Tumor (treatment ongoing or within previous 6 months or palliative), which were combined in the 'I-DVT' rule (**Table 1**).

Table 1. Original Wells rule, the I-DVT and Adjusted-I-DVT score for clinically suspected DVT.

Item	Wells rule[15]	I-DVT score	Adjusted I-DVT score
Active cancer (treatment ongoing, within previous 6 months, or palliative)	1	1	1
Paralysis, paresis, or recent plaster immobilization of the lower extremities	1		
Recently bedridden for >3 days and/or major surgery within 4 weeks	1	1	1
Localized tenderness along the distribution of the deep venous system	1		
Thigh and calf swollen (should be measured)	1		
Calf swelling 3 cm> symptomless side (measured 10 cm below tibial tuberosity)	1	1	1
Pitting edema confined to the symptomatic leg	1		
Collateral superficial veins (non varicose)	1		1
Previously documented DVT		1	1
Alternative diagnosis as likely as or greater than that of DVT/ *Adjusted I-DVT score: DVT more likely than alternative diagnosis*	-2		1
Use of oral contraceptive pill			1
Clinical probability categories			
DVT 'unlikely'	0-1	0	0-2
DVT 'likely'	≥2	≥1	≥3

Note: DVT: deep vein thrombosis; I-DVT: Immobilisation (minimal 3 days and/or major surgery<4 weeks), difference in Diameter of the calfs of at least 3 cm, Venous thromboembolism in the past and active malignant Tumor

Exploration of the accuracy of the I-DVT score

The primary aim of this study was to explore the safety and efficiency of the recommended diagnostic algorithm for suspected DVT **(Fig 1)** when applying the I-DVT score versus the Wells rule. The safety of the algorithm is expressed by the rate of symptomatic VTE in patients in whom DVT was ruled-out based on an 'unlikely' clinical probability by the decision rule and a normal D-dimer test with a threshold of <500 µg/L. The efficiency of the algorithm is expressed by the number of patients who can be managed without compression ultrasonography (CUS). The secondary aims of this study were to compare the overall diagnostic accuracy of the Wells rule and I-DVT score and to study whether the items of the Wells rule not included in the I-DVT score still would have additional incremental diagnostic value to the new score.

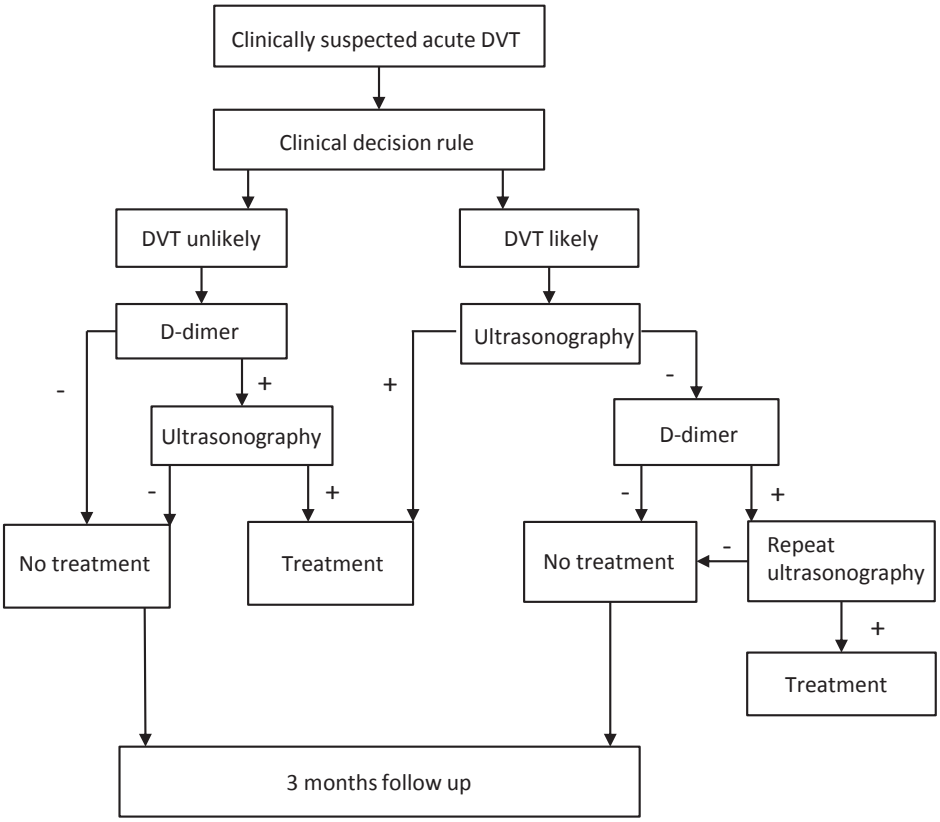

Figure 1. Diagnostic strategy of suspected DVT as applied in this study.
Note: DVT: Deep vein thrombosis

Patients

For the purpose of this study, consecutive patients who presented with a clinically suspected first or recurrent episode of acute DVT during the study period from January 2009 until December 2010 in 1 academic hospital and 2 large teaching clinics in The Netherlands (Leiden University Medical Center (LUMC), Leiden; Diakonessenhuis Hospital, Utrecht; and Rijnland Hospital, Leiderdorp) were eligible for inclusion if they were 18 years or older. Patients were excluded if they were pregnant, had received more than 24 hours of anticoagulant therapy in therapeutic dose before presentation, or in whom pre-test risk stratification had already been performed by the general practitioner.[16] The clinical items of both the Wells rule and I-DVT score were registered on standard clinical registration forms. The probability category of the Wells rule was determined as standard and obligatory first step of the diagnostic assessment. Because of the largely overlapping items, the I-DVT score was calculated at the same moment by the same physician before further laboratory or imaging tests were performed. The I-DVT score result was then extracted from the medical chart on a separate clinical registration form by the researchers. The treating physician was unaware of this score. Follow-up of the patient was performed without knowledge of the I-DVT score. Because this concerned an observational study, the Institutional Review Board (IRB) of the LUMC waived the need for informed consent.

Patients with suspected acute DVT were managed according to current local guidelines **(Fig 1)**, which were based on the Wells rule. D-dimer levels (Tina-Quant Assay (Roche Diagnostica, Mannheim, Germany) or STA Liatest D-Di (Diagnostica Stago, Asnieres-sur-Seine, France)) were only assessed in patients with an 'unlikely' pre-test probability by the Wells rule, defined by 1 point or less. The diagnosis of DVT was established in case of an incompressible venous segment of the proximal deep veins (popliteal vein or higher).[17] Radiologists performing the ultrasound examination were not blinded for the outcome of the Wells rule but unaware of the results of the I-DVT score.

All patients in whom DVT was excluded were followed for three months and instructed to return to the hospital if symptoms of VTE occurred. At the end of the follow-up period, the results from the follow-up visit, that always included mentioning of the occurrence of endpoints: recurrent VTE events and mortality were extracted from the medical charts or assessed by contacting the patients and/or the local Thrombosis Services. These physicians were not blinded for the baseline clinical test results although they were unaware of the results of the I-DVT score. In case of suspected acute DVT during the 3-month follow-up period, a CUS of the symptomatic leg was performed. In case of suspected acute pulmonary embolism (PE), standard contrast enhanced computed tomography pulmonary angiography (CTPA) was performed.

Statistical analysis

We aimed to evaluate the I-DVT score in at least the same amount of patients (N=529) as studied to validate the Wells rule.[18] Based on the numbers of patients that weekly present with a clinical suspicion of DVT in the three participating hospitals, we decided on an inclusion period of two years.

For the primary safety and efficacy endpoint, the 3-month incidence of symptomatic VTE and the number of patients in whom DVT was excluded by the Wells rule and by the I-DVT score, in combination with a normal D-dimer test at baseline, were assessed and expressed with 95% confidence interval (95%CI). A relevant difference was predefined as a point estimate of the safety or efficacy endpoint of one of the two rules lying outside the 95% confidence interval of that of the other rule. For these analyses, only patients in whom the algorithm was (for the Wells rule) or would have been (for the I-DVT) correctly followed were considered.

For the secondary endpoints, the diagnostic accuracy of the Wells rule versus I-DVT score were calculated by the AUC of the ROC curve and compared using the method proposed by Hanley & McNeil.[19] The net reclassification improvement of the I-DVT score over the Wells rule was derived from a reclassification table. Finally, the incremental predictive value of the individual items of the Wells rule who were not included in the I-DVT score, as well as of other relevant baseline characteristics, were assessed using a backward stepwise logistic regression analysis. The independent predictors for DVT were added to the I-DVT score, creating the 'adjusted-I-DVT' score. The optimal threshold of the adjusted-I-DVT score was determined by the highest area under the ROC curve. The AUC of the ROC curves of the I-DVT and the adjusted-I-DVT scores were compared and the net reclassification improvement of the I-DVT score was calculated. All statistical analyses were performed with SPSS software version 17. A p-value <0.05 was considered statistically significant.

RESULTS

Patients

During the 2-year study period, 698 outpatients with suspected acute DVT of the lower extremities were eligible for inclusion. Ten patients were pregnant, 19 patients had received therapeutic anticoagulation for more than 24 hours before they could be included and 52 patients had already been stratified as 'DVT likely' by the general practitioner and had a direct indication for CUS. These patients were excluded leaving a total of 617 patients for analysis (Table 2). Their mean age was 58 years and 43% was male.

Table 2. Baseline characteristics of study patients.

Characteristic	Value (n=617)
Age, mean (SD)	58 (18)
Male, n (%)	262 (43)
Outpatient, n (%)	617 (100)
Immobilization > 3 days or surgery, n (%)	141 (23)
Paralysis, paresis or recent plaster, n (%)	30 (4.9)
Calf swelling 3 cm > symptomless side, n (%)	294 (48)
Localised tenderness along the distribution of the deep venous system, n (%)	324 (53)
Pitting oedema (greater in the symptomatic leg), n (%)	339 (55)
Entire leg swollen, n (%)	136 (22)
Collateral superficial veins (non-varicose), n (%)	57 (9.2)
Malignancy, n (%)	49 (7.9)
Alternative diagnosis as likelyor greater than that of deep-vein thrombosis, n (%)	49 (7.9)
History of venous thromboembolism, n (%)	126 (20)

Note: n: number; SD: standard deviation

Outcome of the algorithm using the Wells rule

Using the Wells rule, 212 patients (34%, 95%CI 31-38) had a 'DVT unlikely' pre-test probability of whom 83 (13%, 95%CI 11-16) had a normal D-dimer result and were left untreated without additional CUS. In 37 patients with an 'unlikely probability' the D-dimer test was not performed due to protocol violations and these patients were directly referred for CUS confirming DVT in 10 patients. In 92 patients of the 'DVT unlikely' group, the D-dimer test was abnormal and DVT was confirmed in 20 of them by CUS. Additionally, 405 patients (405/617; 66%, 95%CI 62-69) had a 'DVT likely' score; these patients underwent CUS, of whom 187 were shown to have DVT. From the remaining 218 patients who had a 'DVT likely' score but normal CUS, D-dimer levels were measured in 165 patients, in 53 patients D-dimer was not tested due to protocol violations. Forty-one patients had a normal D-dimer test and were left untreated (41/617; 6.6%, 95%CI 4.8-8.9). In the other 124 patients D-dimer test was abnormal; repeated CUS after a week showed DVT in 5 additional patients. Repeated CUS was not performed in 40 patients due to protocol violation: all these patients were left untreated.

A total of 11 patients (1.8%) were lost to follow up, of whom three were in the group with 'DVT unlikely' score and were managed without CUS. Two patients had a symptomatic DVT during 3-months follow up (0.3%). One patient originated from the 'DVT unlikely' group and was supposed to be left untreated on the basis of an unlikely probability (Wells rule 1 point) and a negative D-dimer test (460 µg/L). He was however nonetheless referred for CUS at baseline, on which a small partial incompressibility in the femoral vein was objectivated. Notably, this patient had a prior history of DVT in

the venous segment. Based on the symptoms, his treating physician decided to confirm the diagnosis of recurrent ipsilateral DVT and initiate anticoagulant therapy. The other patient originated from the 'DVT likely' group, with no DVT on first ultrasonography but a tissue abnormality that was later confirmed to be an Ewing sarcoma of the leg. Due to this alternative diagnosis, D-dimer test and repeat ultrasonography were not performed. This patient was diagnosed with symptomatic DVT by CUS on day 38 and died on day 58 as a result of the advanced Ewing sarcoma. One additional patient died of post-operative infection at day 83.

The overall prevalence of acute symptomatic DVT was 36% (224/617; 95%CI 33-41): 217 with DVT at baseline, 5 with DVT after repeat ultrasonography and 2 patients with symptomatic DVT during 3-month follow-up. The 3-month incidence of symptomatic VTE during follow-up in patients in whom DVT was excluded by means of a low probability Wells rule in combination with a normal D-dimer test at baseline, was 1.2% (1/83; 95%CI 0.03-6.5%) and for the whole algorithm 0.36% (1/275; 95%CI 0.01-2.0%). The sensitivity of the whole algorithm (Wells rule in combination with d-dimer test and compression ultrasonography) therefore was 99.5% (95%CI 98.1-99.5%) with an associated negative predictive value of 99.6% (95%CI 98.5-99.6%).

Outcome of the algorithm using the I-DVT score

Using the I-DVT score 173 patients (28%, 95%CI 25-32) would have been categorized as 'DVT unlikely' of whom 56 patients (9.1%, 95%CI 6.9-12) had a normal D-dimer result and would be left untreated without additional CUS. D-dimer tests were missing in 38 patients. A total of 79 patients had an abnormal D-dimer test, of whom 16 patients were diagnosed with DVT. Of the 444 patients categorized as a 'DVT likely' (72% 95%CI 68-75), 186 (30%) were diagnosed with DVT by initial CUS, and 5 (0.8%) by repeat CUS.

A total of 8 patients who would have completed the algorithm according to the I-DVT score were lost to follow up. Five would have been in the group with a 'DVT unlikely' pre-test probability and negative D-dimer test. The 3 remaining patients would have been in the group with a 'DVT likely' pre-test probability, of which 2 had a negative D-dimer test and normal ultrasonography and 1 had an abnormal D-dimer test and normal repeat ultrasonography. Both patients who had a symptomatic DVT during 3-month follow-up period would have been categorized as 'likely probability' by the I-DVT score and therefore referred for CUS. This would have resulted in a sensitivity of 100% (95%CI 98.6-100%) and a negative predictive value of 100% (95%CI 98.6-100%) for the diagnostic accuracy of the I-DVT score in combination with a highly sensitive D-dimer test. If the five patients who were lost to follow up in this group, in worst case scenario, all should have had a VTE, the sensitivity and negative predictive value would have been 96.3% (95%CI 94.5-96.3) and 97% (95%CI 95.6-97.0) respectively. **Fig 2 and 3** show the

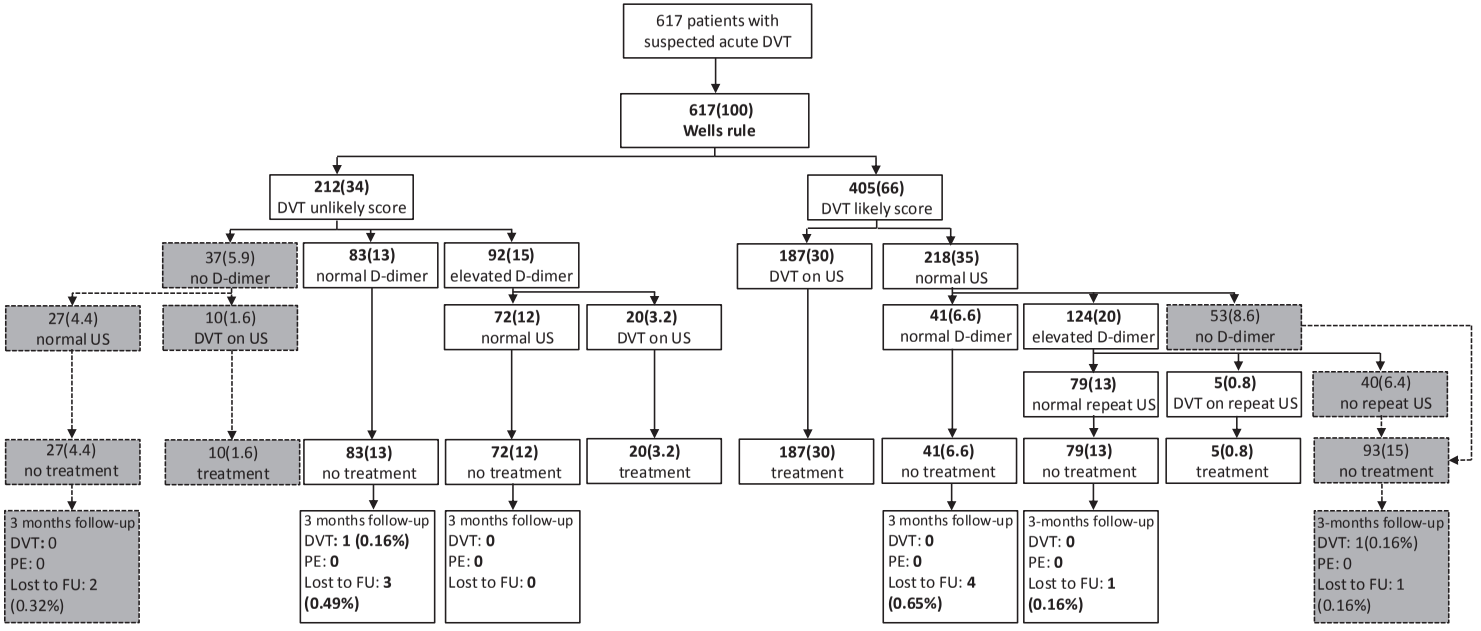

Figure 2. Results of the diagnostic strategy using the Wells rule.
Bold numbers are the number:n(%)of patients in each step of the algorithm managed by the Wells rule. Gray boxes with dashed lines are protocol violations.
Note: DVT: deep vein thrombosis; FU: follow up; PE: pulmonary embolism; US: ultrasonography

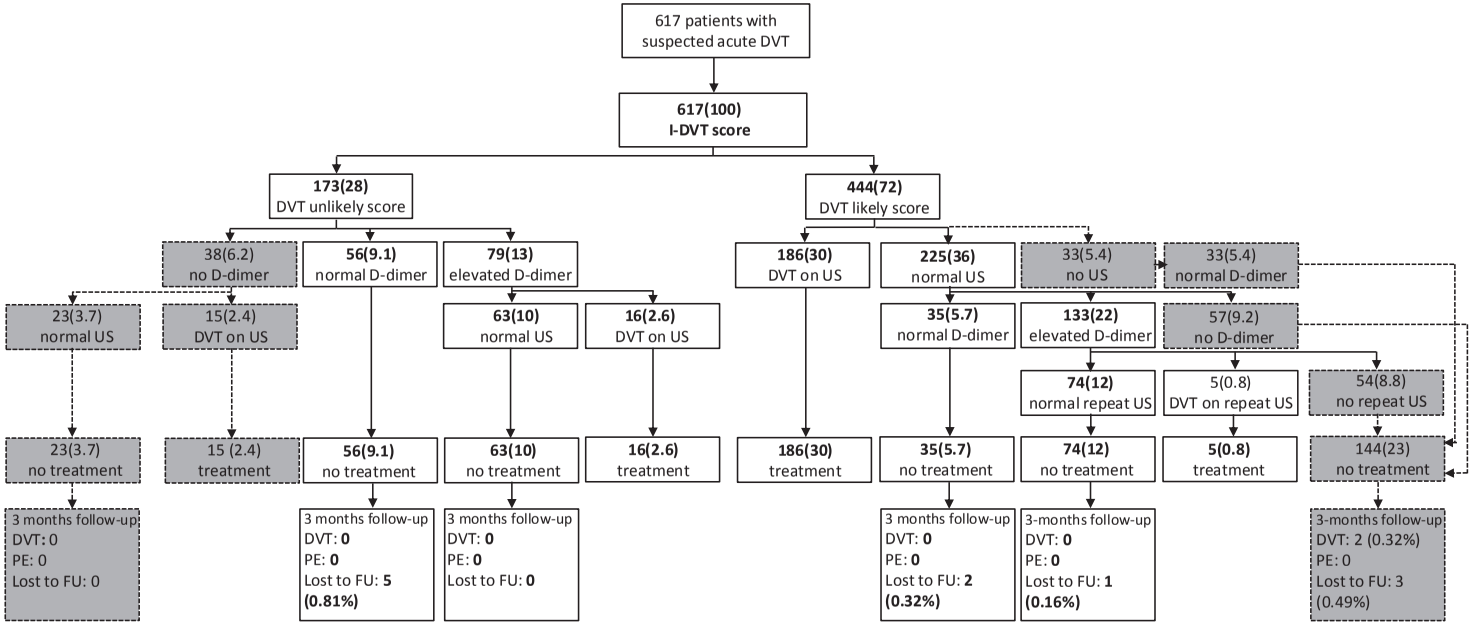

Figure 3. Results of the diagnostic strategy when the I-DVT score would have been used. The bold numbers are the number: n(%) of patients in each step of the algorithm using the I-DVT score. Gray boxes with dashed lines are protocol violation.

Note: DVT: deep vein thrombosis; FU: follow up; PE: pulmonary embolism; US: ultrasonography

flowcharts with an overview of the patient numbers in the different groups according to the Wells rule and I-DVT score.

Comparison of Wells rule and I-DVT score

Using the Wells rule, 86% (95%CI 83-88%) of patients needed examination with CUS. Using the I-DVT score, this percentage increased to 90% (95%CI 88-93%), for an absolute difference of 4% (95%CI 2.9-7.8). The area under the ROC curve (AUC) was 0.70 (95%CI 0.66-0.74) for the Wells Rule and 0.65 (95%CI 0.61-0.70) for the I-DVT score for a difference of 0.049 (95%CI -0.01-0.11, p=0.13; **Fig 4**). The net reclassification improvement of the I-DVT score compared with the Wells rule was -0.956, roughly indicating that 10% of patients were incorrect reclassified in another probability group by the I-DVT score compared to the Wells score.

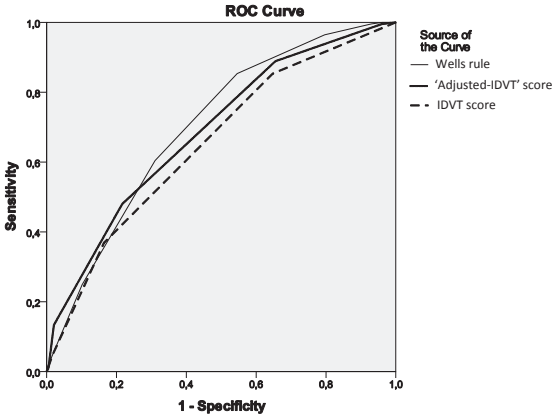

Figure 4. Receiver operating characteristic curves for the Wells rule and I-DVT score

Optimisation of the I-DVT score

The logistic regression analysis identified the following independent predictors of DVT: presence of collaterals, DVT more likely than alternative diagnosis, use of the oral contraceptive pill and the I-DVT score itself (**Table 3**). In the so called 'adjusted-I-DVT' score these additional three variables were included for a weight of 1 point each in addition to the I-DVT score. The AUC of this new score was 0.69 (95%CI 0.65-0.73), which was not significantly better than that of the I-DVT score for a difference of -0.035 (95%CI -0.99-0.028; p=0.29; Fig 4). With an optimal threshold of ≥3 points, the adjusted-I-DVT score was associated with a net reclassification improvement of 0.038 compared to the I-DVT score, roughly indicating that less than 4% of patients would be reclassified correctly by the adjusted-I-DVT score compared to the I-DVT score. Using the adjusted-IDVT score 79% (95%CI 75-82) needed examination with CUS with an absolute difference of 12% (95%CI 7-16).

Table 3. Logistic regression analysis: independent predictors of DVT.

Item	Regression Coefficient (SE)	OR (95%CI)	P-value
Presence of collaterals	1.5 (0.6)	4.7 (1.5-15.0)	0.01
Alternative diagnosis more likely than deep-vein thrombosis	2.5 (1.1)	12.6 (1.5-100)	0.02
Use of the oral contraceptive pill	0.96 (0.4)	2.6 (1.1-5.9)	0.02
I-DVT score	1.4 (0.44)	4.0 (1.7-9.4)	0.002

Note: DVT: deep vein thrombosis; SE: standard estimate; OR: odds ratio

DISCUSSION

In this analysis, the short and objective I-DVT score seemed to have a comparable overall diagnostic accuracy to the Wells rule. In addition, this study implies that a prospective study to evaluate the safety of ruling out DVT by an I-DVT of 0 points, in combination with a normal highly sensitive D-dimer test is feasible. The efficiency of the I-DVT score seems to be slightly lower than that of the Wells rule with an absolute 4% increase in the number of required ultrasound examinations by the algorithm. Extending the I-DVT score with all items from the Wells rule that proved independently associated with a DVT diagnosis by logistic regression analysis on top of the I-DVT score only marginally changed its overall diagnostic performance but significantly lowered the number of required number of ultrasound examinations.

Although the safety and efficiency of diagnostic management algorithms for patients with clinically suspected VTE have been validated in several high-quality trials, adherence to these guidelines is poor which is partly due to the limitations of the Wells rule.[14] The earlier observation that non-adherence to the recommended diagnostic algorithm is associated with diagnostic failures and excessive diagnostic testing was confirmed in our observational study, with both symptomatic VTE diagnosis during follow-up in patients in whom the algorithm was not applied correctly. Therefore, improving adherence to the diagnostic algorithm remains highly relevant. The current study provides arguments that the I-DVT score may be a promising alternative for the Wells rule. We anticipate better adherence to the recommended diagnostic algorithm due to its simplicity and objectivity, although this was not the subject of the current study. The potential benefit of better adherence may largely compensate for the decrease in the number of patients that may be managed without imaging tests.

Despite the fact that the 'adjusted-I-DVT score' may be associated with even a decrease in the number of required radiological examinations, it is debatable whether this compensates for the loss of simplicity (3 additional items) and objectivity (inclusion of the subjective item) with regard to expected adherence in clinical practice. The adjusted I-DVT score may be regarded as a simplification of the Wells rule as was published for

the Wells rule for PE and the revised Geneva score for PE, in which all variables were awarded one single point.[20,21] For these latter scores, it was shown that both the overall accuracy as well as the safety of ruling out PE based on an unlikely clinical probability in combination with a normal D-dimer test were unaffected by the simplification.[22] As for the subjective item, the associated moderate reproducibility resulting from interobserver variability and lack of standardization have been the major reported points of criticism to the Wells rule throughout the years. It has for instance been suggested that the diagnosis of DVT could have been missed in patients who were only assessed by physicians in training alone without supervising physician advice, based on different judgment of the likelihood of DVT or an alternative diagnosis leading to significant differences in the rates of DVT among pre-test probability groups.[23] Since the overall performance of the adjusted I-DVT rule was only marginally better with only a small net reclassification benefit, we consider the simple 4-component I-DVT score to have the most clinical potential.

Strengths of our exploratory study are its prospective design, the large sample size and the DVT prevalence of 36% which is representative for European clinical practice. Our study has limitations as well. First, the I-DVT score was not derived using the recommended logistic regression analysis.[24] Even so, Wells applied an identical approach by including items assembled from information obtained by a literature review and from the collective experience of the participating investigators in his new clinical model.[18] Second, the study patients were managed on the basis of the Wells rule, which resulted in missing D-dimer tests in a relevant number of patients who would have been categorized as 'unlikely' clinical probability by the I-DVT score. This may have caused bias in the estimation of the diagnostic accuracy of the I-DVT score, since patients with missing D-dimer tests were excluded from further analysis. Besides, not all key metrics of quality in accuracy studies could be met because as patients were managed by local guidelines, different persons doing the successive tests could not be blinded to the results of the initial tests. Third, 20.7% of patients included in the study were not managed by the study protocol and were excluded from our final analysis. This resulted in a low number of patients in the group of patients with a 'DVT unlikely' Wells score and a negative d-dimer test (n=83), leading to a high upper level of the confidence interval of the failure rate of this particular group. Nonetheless, the low point estimate of this failure rate was actually in line with that reported by Wells.[25] Lastly, it would have been interesting to compare the I-DVT score to other previously suggested but never validated simplified CDRs for assessing the pre-test probability of DVT.[4]

In summary, we have derived and evaluated a new, simple and objective diagnostic tool for suspected DVT, which has similar overall diagnostic accuracy compared to the widely recommended Wells rule for DVT. Because of its simple character, the I-DVT score may be a promising alternative for the Wells rule, since the adherence to the guidelines

– and with that the safety and efficacy of our clinical practice – may improve. The safety and efficiency of the I-DVT score and its associated effect on guideline adherence in clinical practice have to be further evaluated in a prospective management study before the new diagnostic score may be used in daily practice.

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