

# Use of a thromboembolic risk score to improve thromboprophylaxis in surgical patients

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**Key words:** Audit; Thromboprophylaxis; Guidelines

Two hundred admissions to a general surgical ward were audited prospectively before and after the introduction of a thromboembolic risk score. This was based on the Thromboembolic Risk Factors (THRIFT) Consensus Group guidelines for thromboprophylaxis.

The results showed an overall improvement in compliance from 65% to 79%. High risk patients formed 24% of the patients studied. In this group, compliance improved significantly from 14% to 58%.

The overall prevalence of important thromboembolic risk factors was calculated. Of the patients, 26.5% had a Body Mass Index (BMI) of > 25, and 10% gave a past or family history of thromboembolism. Of female patients, 24% were taking oestrogens.

We conclude that quantitative assessment of all patients for thromboembolic risk can improve the implementation of thromboprophylaxis, particularly in high risk patients.

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Prophylaxis of venous thromboembolic disease is recommended in surgical patients who have an increased risk of deep vein thrombosis. Low dose unfractionated heparin reduces the incidence of postoperative deep vein thrombosis and pulmonary embolism (1). In August 1996, the Directorate of Surgery at our hospital agreed to implement the national THRIFT guidelines for the prevention of venous thromboembolism (2).

A study from Leeds in orthopaedic patients, showed that in their initial audit only 43% of patients received the recommended prophylaxis, but this improved significantly after the introduction of guidelines (3). The use of a written protocol for general surgical patients in another

study made little impact on the level of thromboprophylaxis (4). We devised a thromboembolic risk score with the aim of presenting the guidelines in a more digestible format (Fig. 1). We then audited the compliance to the guidelines on a general surgical ward, before and after the introduction of the score.

## Methods

### Audit Stage I

Data from 100 consecutive admissions were collected prospectively. Patients were only excluded if important data were incomplete, for instance if their planned elective surgery was cancelled or they were transferred to another unit. Postoperative complications were not recorded.

### Introduction of the thromboembolic risk score

When stage I was completed, the risk score sheet was introduced, and the preregistration house officers were encouraged to use it when admitting patients. The form included a height-to-weight graph to select patients with a BMI of > 25. This is the level above which mortality risk because of obesity begins to increase (5). The patient's score was calculated and this enabled patients to be placed into high, moderate or low risk categories. Heparin could then be prescribed, and compression stockings used, as recommended.

### Audit stage II

A repeat study was performed along the same lines as the first, starting 2 months after the introduction of the risk score.

The results of stages I and II were compared statistically and *P* values calculated using the *Z* test.

**THROMBOEMBOLIC PROPHYLAXIS**

Patient name and number  
or Addressograph

Date :

Tick box  
No Yes Score

Patient aged >40			1
Elective Surgery <30 mins e.g. Hernia / varicose veins / EUA			1
Elective Surgery >30 mins e.g. Mastectomy / cholecystectomy			2
Elective abdominal or pelvic surgery for cancer			6
Emergency abdominal surgery			5
BMI > 25 (see graph below)			4
History or Family History of DVT or PE			1
Current user of the combined oral contraceptive pill or HRT			1
Heart failure			1
Immobile (likely to be confined to bed > 4 days)			1
Major lower limb amputation			6

Now add up the score for each "yes" ticked

TOTAL SCORE

THROMBOEMBOLIC RISK SCORE	PROPHYLAXIS
0-2 (Low risk)	Early mobilisation
3-5 (Moderate risk)	Mini Hep 5000 b.d
6+ (High risk)	Mini Hep 5000 L.d.s + T.E.D. stockings

**CONTRA-INDICATIONS TO MINI HEP**

1. Active or potential bleeding site. e.g. acute peptic ulcer
2. Less than 6 hours before insertion of epidural catheter ( may be given in theatre after insertion)
3. History of allergy or hypersensitivity to Heparin
4. History of bleeding disorder
5. On Warfarin

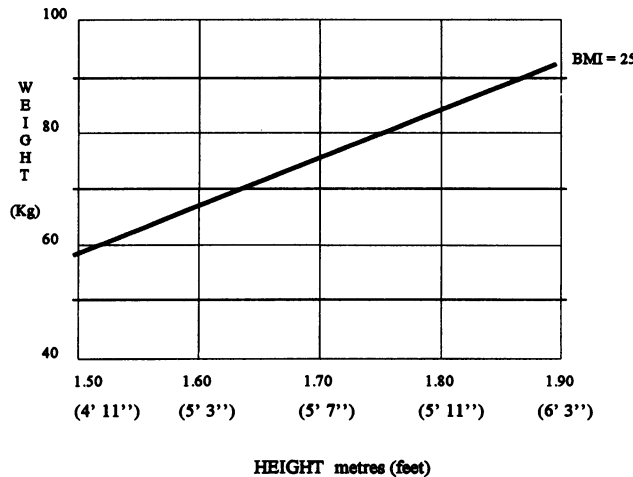


Figure 1. Thromboembolic risk score form.

**Results**

The number of elective and emergency admissions in the two stages are shown in Table I, as well as the number of patients who underwent surgery. The risk categories reveal 50% more high risk cases in stage I. This was owing to twice as many admissions for elective colorectal operations in that period, and the higher incidence of

Table I. Overall patient categories

	Stage I (n = 100)	Stage II (n = 100)
Elective admissions	56	44
Emergency admissions	44	56
Elective surgery	51	41
Emergency surgery	16	20
High risk	29	19
Moderate risk	24	34
Low risk	47	47

patients with a history of thromboembolism. Almost one-half of the patients were in the low risk group and did not require heparin. The patients were predominantly men, with 76% males in stage I and 78% in stage II.

The prevalence of four important risk factors are shown in Table II.

The levels of compliance showed an improvement in stage II in all except one of the patient groups (Fig. 2). This only reached statistical significance in the overall percentage and in the high risk category. However, if the two stages had been better matched for high risk patients the overall improvement may not have reached significance. Nine patients were given heparin unnecessarily and their thromboprophylaxis was considered to have complied with the guidelines. These patients are included in Table III, as well as those who did not receive adequate prophylaxis.

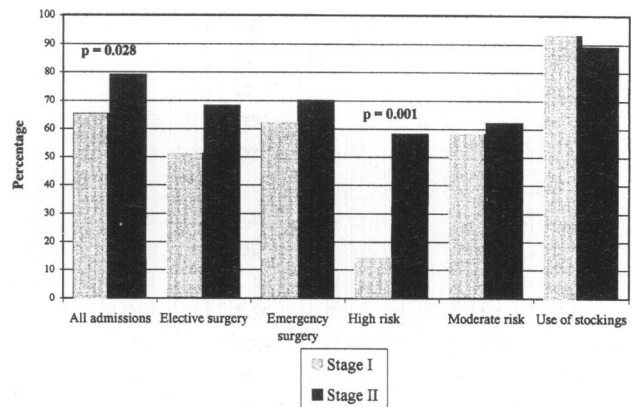


Figure 2. Patients whose thromboprophylaxis complied with the guidelines.

Table II. Prevalence of risk factors

	Stage I	Stage II
Age > 40	83	83 (83)
BMI > 25	17	36 (26.5)
History of thromboembolism	14	6 (10)
Oestrogen usage in female patients	3	8 (24)
Oral contraceptives	2	2
Hormone replacement	1	6

Overall percentage in brackets

Table III. Patients whose thromboprophylaxis did not comply with the guidelines or had unnecessary prophylaxis

	Stage I	Stage II
High risk treated as low or moderate risk	25	8
Moderate risk treated as low risk	6	10
Moderate risk treated as high risk*	0	1
Low risk treated as moderate risk*	3	5
Heparin given > 6 h postoperatively	4	3

\*Patients who received heparin unnecessarily

Epidural anaesthesia was used in 25% of the patients who underwent surgery, 69% of whom were in the high risk category. Our departmental policy is for heparin to be given preoperatively after the placement of the epidural catheter.

## Discussion

Our data demonstrate that almost one-quarter of the patients were in the high risk category. This may be higher than on some general surgical wards because most of our elective colorectal cancer surgery is performed on this ward. It also reflects the fact that 10% of the patients were found to have a family history or past history of venous thromboembolism. There is a significant prevalence of thrombophilia in British caucasians (6), who formed 94% of the patients in the study. It is also important to ask patients about current oestrogen medication. The relative risk of thrombosis appears to be raised two- to fourfold in users of HRT (7), and four- to sixfold in those on oral contraceptives (8). The risk is increased by a factor of 30 in heterozygote carriers of the factor V Leiden gene (9).

There was a highly significant improvement in the compliance levels in high risk patients, albeit with small numbers, from only 14% in stage I to 58% in stage II. This was mainly because many of the high risk patients were treated inappropriately as moderate risk in stage I. In stage II, the use of our score sheet enabled most of these high risk patients to be identified and given appropriate prophylaxis. Further improvement is necessary and this group of patients merits a repeat audit. We were disappointed that there was not a more emphatic improvement overall. This illustrates how difficult it is to implement guidelines effectively. One needs to *over-communicate*, and repeatedly.

The nursing staff complied very well with the use of above-knee graduated compression stockings. The surgical house officers performed less satisfactorily in their prescribing of heparin according to the guidelines. This is probably owing to the fact that they change over every 3 months and were not taught enough about the importance of applying these guidelines.

The future application of this score sheet might be more effective by involving the nursing staff. Nurses are becoming increasingly involved in collecting and recording data, and this could be part of the admitting procedure for all our surgical patients. We would then expect to

come closer to the goal of 100% compliance to the guidelines.

## Conclusion

This study has demonstrated the variation in thromboembolic risk in general surgical inpatients, and the frequency of certain risk factors. A thromboembolic risk score was devised based on the national THRIFT guidelines. This enabled all patients to be assessed on admission and placed into one of the three risk categories. There was a significant improvement in the percentage of patients who received appropriate thromboprophylaxis after the introduction of the score, particularly in the high risk patients.

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We wish to thank Mrs M Jones for her secretarial help, and Professor P Routledge for his expert advice.

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Received 30 April 1998