Prevention of venous thromboembolism in Wales: results of a survey among general surgeons

E V Williams, R S Williams, J L Hughes, K L Williams, M E Foster, M H Lewis

OBJECTIVE: To examine the current attitudes towards the prevention of venous thromboembolism among a cohort of surgeons.

DESIGN: A postal survey, comprising a questionnaire covering various aspects of venous thromboembolism prophylaxis was sent to all (n=84) consultant general surgeons in Wales.

RESULTS: Replies were received from 57 surgeons (68%), all of whom routinely used prophylaxis, the most frequent modalities used being heparin (100%) and graded compression stockings (79%). A combination of physical and pharmacological methods was used by over 89% of surgeons, with 60% starting prophylaxis more than two hours before operation. All surgeons continued prophylaxis after surgery, 53% until patients were mobile, 45% until they were discharged, and one surgeon continued prophylaxis for seven days after discharge. The thrombosis risk factors considered most important by surgeons when deciding about prophylaxis were (i) a previous history of venous thromboembolism, (ii) hypercoagulability, and (iii) malignancy.

CONCLUSIONS: This study confirms that Welsh surgeons conform to standard methods, but also highlights some uncertainties that are present in current surgical practice. Those who responded all routinely used prophylaxis, the timing of which was variable. The main risk factors identified when considering prophylaxis were previous history of deep vein thrombosis/pulmonary embolism, hypercoagulability, and the presence of malignancy. Suggestions for future practice are made.


Postoperative venous thromboembolism represents a serious threat to patients undergoing a surgical procedure. Without antithrombotic prophylaxis, up to 15% of patients after major abdominal surgery develop a deep vein thrombosis (DVT), with the risk of fatal pulmonary embolism approaching 1%.

The prevalence of venous thromboembolism will probably increase in the future as the age of the population is increasing, more elderly patients are admitted for major surgical procedures, and many patients, young and old, are discharged from surgical wards (including day surgery) before they are fully ambulant.

In the past 20 years, many studies have shown that several prophylaxis modalities (pharmacological and physical) have significantly reduced the rate of postoperative venous thromboembolism. Despite this, there is a worldwide variation in practice among surgeons. The purpose of this study was to assess the current attitudes towards postoperative prevention of venous thromboembolism in a national survey of busy general surgeons.

SUBJECTS AND METHODS

A two page questionnaire (fig 1) was designed by EVW in collaboration with a statistician to ensure its validity. It was then sent to all practising general surgeons in Wales between January and April 1999. The survey consisted of 10 questions regarding awareness and risk factors for venous thromboembolism, the timing and duration of prophylaxis, together with preferred modalities for general and specific clinical situations. The questionnaires were dispatched with a covering letter explaining the purpose of the survey.

All replies were received anonymously and were tabulated into an Excel database. Statistical analysis was carried out using SPSS 6.0 for Windows (SPSS, Chicago, Illinois, USA). The results for risk factor assessment (question 6) were determined from the scores (where 1 was the most important and 9 the least important values) given by each surgeon and the total score (sum) was calculated. The risk factors with the lowest means were then considered the most important indicators for prophylaxis. Non-parametric analysis of data for risk factor assessment was performed using the Wilcoxon signed rank test. Kendall’s W test was used to determine the degree of agreement between the surgeon’s rankings.

RESULTS

Replies were received from 57 surgeons, a response rate of 68%. All routinely used prophylaxis, 100% using heparin (unfractionated and/or low molecular weight (LMWH)) and over 89% utilising a combination of both pharmacological and physical methods (table 1). Six surgeons (11%) used only one modality (heparin), 19 (33%) used two modalities, and the remaining 32 (56%) used a combination of three or more methods.

With regard to timing, all surgeons started prophylaxis before surgery, one surgeon (2%) started prophylaxis on the patient’s admission to hospital, 34 (60%) more than two hours before operation, and the remaining 22 (39%) started prophylaxis with the premedication. All surgeons continued prophylaxis after surgery, 30 (53%) until the patient was mobile, and 25 (43%) until the patient was discharged. One surgeon continued prophylaxis for seven days after discharge, and another would continue prophylaxis in high risk cases for 14 days after discharge.

The most common diagnostic investigation made to confirm a suspected DVT was B-mode ultrasonography (58%). Forty per cent of surgeons used a combination of contrast venography and ultrasonography, and 2% used duplex scanning.

Abbreviations: DVT, deep vein thrombosis; LMWH, low molecular weight heparin
Prevention of venous thromboembolism

Venous thromboembolism survey among Welsh surgeons

1. Do you consider venous thromboembolism a problem in your unit? Yes/No
2. What is your specialty?
   - General
   - Breast
   - Vascular
   - Gastrointestinal
   - Endocrine
   - Oncology
   - Haematology
   - Other
3. What prophylaxis do you use?
   - H = Heparin (UFH) L = Low molecular weight heparin (LMWH)
   - A = Aspirin OA = Oral anticoagulants
   - S = Graduated compression stockings P = Pneumatic compression
   - N = None
4. Have you experienced any complications following DVT prophylaxis? Yes/No
   - If yes, tick box and state which agent/method [H, L, A, S, etc]
   - Wound oozing
   - Wound haematoma
   - Major haemorrhage
   - Death
5. At what time would you start prophylaxis?
   - > 2 hours preoperatively
   - With premedication
   - Intraoperatively
   - Postoperatively
   - P = Pneumatic
6. Would you continue prophylaxis after the surgery? Yes/No
   - If yes, when would you stop?
   - When mobile
   - After specific duration (please state)
7. Do you have thromboprophylaxis protocol in your unit? Yes/No
8. Which diagnostic modality do you use to diagnose DVT?
   - Outflow plethysmography
   - Doppler ultrasound
   - Contrast venography
   - Clinical examination only
9. What risk factors would you consider most important when deciding to use prophylaxis? (please score 1–9 in boxes, 1 = most important, 9 = the least etc)
   - Previous venous thromboembolism
   - Duration of operation
   - Age
   - Malignancy
   - Obesity
   - Hypercoagulability
   - Pelvic surgical procedure
   - Varicose veins
   - Immobilisation
10. With the following clinical scenarios, would you prescribe prophylaxis?
   - Patients on oral contraceptive pill
   - Lap cholecystectomy (> age 40)
   - Colectomy
   - Lap cholecystectomy (> age 40)
   - Laparotomy (> age 40)
   - Surgery with epidural anaesthesia

Table 1 Modalities of prophylaxis used by Welsh surgeons

<table>
<thead>
<tr>
<th>Modality</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elastic stockings</td>
<td>45 (79)</td>
</tr>
<tr>
<td>Pneumatic compression</td>
<td>31 (54)</td>
</tr>
<tr>
<td>Unfractioned heparin (UFH)</td>
<td>33 (58)</td>
</tr>
<tr>
<td>Low molecular weight heparin (LMWH)</td>
<td>17 (30)</td>
</tr>
<tr>
<td>Combined UFH and LMWH</td>
<td>7 (12)</td>
</tr>
<tr>
<td>Aspirin</td>
<td>2 (4)</td>
</tr>
<tr>
<td>Dextran</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Warfarin</td>
<td>1 (2)</td>
</tr>
</tbody>
</table>

Figure 1 Questionnaire sent to general surgeons in Wales (HRT, oestrogen replacement therapy).

DISCUSSION

This survey has shown that current prophylactic measures are universally employed by all responding Welsh surgeons. The preferred thromboprophylactic modalities utilised were heparin, graded compression stockings, and intermittent pneumatic compression (table 1). These results are similar to those found in Australia and New Zealand and in America with the high implementation of physical methods. All Welsh surgeons used heparin (in one form or other), with less than half using LMWH. The reasons for this poor uptake are not clear, it may be related to cost, as LMWH is certainly more expensive than the conventional unfractionated heparins. There seems little doubt that the LMWHs are the most convenient of the pharmacological methods to administer: they are given once daily and require no laboratory monitoring. We feel that there should be a wider adoption of LMWH for prophylaxis, which is justified on the basis of greater safety, patient acceptability, and saving of nursing time. It is also surprising to note that two surgeons are still using aspirin. This modality has been found to be ineffective in preventing venous thromboembolism in general surgical patients, and is therefore not recommended as an appropriate strategy.

All surgeons as expected start prophylaxis before surgery, with the majority starting it more than two hours before operation. There appears to be no adverse consequence of giving the first dose two hours before operation, and there may be an additional benefit of preventing DVT developing during operation or in the immediate postoperative period. However high risk patients (where higher doses are required) would probably benefit more if prophylaxis started earlier (10–12...
hours before an operation), in order to avoid excessive intraoperative bleeding.\textsuperscript{10} The restoration of mobility is seen as the commonest indication for stopping prophylaxis. There is evidence that the thrombotic risk persists for many weeks after surgery,\textsuperscript{11} despite this prophylaxis being stopped by the majority within days of operation.

Regarding risk factor assessment, it is no surprise that previous venous thromboembolism is the most important indicator for prophylaxis, as several studies have shown that the incidence of postoperative DVT in these patients is over 50%.\textsuperscript{12, 13} What is surprising, however, is the low percentage who consider age as an important risk factor, particularly as several studies have shown an association between advancing age and increased risk of venous thromboembolism.\textsuperscript{13, 14}

It is interesting to assess the surgeons' opinions in specific clinical situations, where a noticeable trend is the combined use of pharmacological and physical modalities, with only a few having a preference for physical methods alone. A major concern, however, is that two surgeons (4%) would perform a colectomy without prophylaxis. There has been an association between venous thromboembolism and age and increased risk of venous thromboembolism.\textsuperscript{13, 14}

Table 2 Risk factors that are considered most important indicators for prophylaxis for venous thromboembolism (VTE)

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>No</th>
<th>Total score given</th>
<th>Mean</th>
<th>SD</th>
<th>Kendall’s W test mean rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous VTE</td>
<td>40</td>
<td>52</td>
<td>1.30</td>
<td>0.82</td>
<td>1.36</td>
</tr>
<tr>
<td>Hypercoagulability</td>
<td>36</td>
<td>113</td>
<td>3.13</td>
<td>1.69</td>
<td>3.30</td>
</tr>
<tr>
<td>Malignancy</td>
<td>38</td>
<td>140</td>
<td>3.68</td>
<td>1.93</td>
<td>3.96</td>
</tr>
<tr>
<td>Pelvic surgical procedure</td>
<td>38</td>
<td>175</td>
<td>4.61</td>
<td>1.97</td>
<td>4.79</td>
</tr>
<tr>
<td>Duration of operation</td>
<td>36</td>
<td>190</td>
<td>5.28</td>
<td>2.12</td>
<td>5.36</td>
</tr>
<tr>
<td>Obesity</td>
<td>38</td>
<td>206</td>
<td>5.42</td>
<td>1.95</td>
<td>5.70</td>
</tr>
<tr>
<td>Immobility</td>
<td>36</td>
<td>203</td>
<td>5.64</td>
<td>2.19</td>
<td>5.76</td>
</tr>
<tr>
<td>Age</td>
<td>37</td>
<td>222</td>
<td>6.00</td>
<td>2.05</td>
<td>6.30</td>
</tr>
<tr>
<td>Varicose veins</td>
<td>36</td>
<td>293</td>
<td>8.14</td>
<td>1.81</td>
<td>8.39</td>
</tr>
</tbody>
</table>

No, number of respondents. Kendall’s coefficient of concordance, W=0.531, p=0.000.

Table 3 Prophylactic modalities prescribed in specific clinical situations (%)

<table>
<thead>
<tr>
<th>Clinical scenario</th>
<th>No prophylaxis</th>
<th>No answer</th>
<th>Pharmacological</th>
<th>Physical</th>
<th>Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilateral varicose veins</td>
<td>63</td>
<td>7</td>
<td>30</td>
<td>24</td>
<td>13</td>
</tr>
<tr>
<td>Bilateral varicose veins</td>
<td>49</td>
<td>7</td>
<td>44</td>
<td>22</td>
<td>18</td>
</tr>
<tr>
<td>Patients on OCP</td>
<td>5</td>
<td>5</td>
<td>90</td>
<td>44</td>
<td>2</td>
</tr>
<tr>
<td>Patients on HRT</td>
<td>23</td>
<td>4</td>
<td>73</td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td>Colectomy</td>
<td>4</td>
<td>4</td>
<td>92</td>
<td>35</td>
<td>2</td>
</tr>
<tr>
<td>Lap chole &lt;40</td>
<td>35</td>
<td>4</td>
<td>51</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>Lap chole &gt;40</td>
<td>9</td>
<td>3</td>
<td>88</td>
<td>32</td>
<td>6</td>
</tr>
<tr>
<td>Laparotomy &lt;40</td>
<td>18</td>
<td>5</td>
<td>77</td>
<td>32</td>
<td>3</td>
</tr>
<tr>
<td>Laparotomy &gt;40</td>
<td>4</td>
<td>5</td>
<td>91</td>
<td>35</td>
<td>2</td>
</tr>
<tr>
<td>Hernia repair</td>
<td>49</td>
<td>4</td>
<td>47</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>Epidural anesthesia</td>
<td>37</td>
<td>9</td>
<td>54</td>
<td>14</td>
<td>13</td>
</tr>
</tbody>
</table>

*Includes 7% given after implementation of epidural. HRT, oestrogen replacement therapy; OCP, oral contraceptive pill.

Most surgeons would regard this as an anaesthetic issue and would therefore do whatever their anaesthetist instructs.\textsuperscript{20} With regard to the numerous (40%) complications sustained, these are merely speculative remarks on behalf of the surgeons. Unfortunately in the absence of evidence, no conclusions can be drawn.

This survey shows good evidence on the practice of consultant surgeons in Wales, and allows comparisons with other surgeons throughout the world. It also confirms the uncertainties that are present in today's current surgical practice. This type of survey has several limitations. Our response rate of 68% is favourable, however it is possible (but unlikely) that the 32% of the non-responders were antiprophylaxis, and hence would have given a totally different complexion to our results. It is also important to realise that although all surgeons state that their use of prophylaxis is universal, this does not always equate to the proportion of patients who actually receive prophylaxis. Despite these limitations, some suggestions for future practice are listed (box 1).

Finally consideration for using a “default” system should be encouraged. One possible method is that absolutely everybody gets prophylaxis, which could become an integral part of the treatment chart. All patients would therefore receive heparin unless it is actively crossed off. So, the “fail safe” situation is that all patients are given heparin and not that they are not given heparin.
needed to exclude those patients with a bleeding tendency, active peptic ulceration, severe hypertension, heparin induced thrombocytopenia, or known hypersensitivity to heparin.

CONCLUSION

The results of this survey indicate that Welsh surgeons conform to standard practice, as all the respondents routinely use prophylactic measures with over 89% using a combination of pharmacological and physical methods. Venous thromboembolism is considered a major problem and over 84% of surgeons adhere to protocols that are available in their units. Worryingly and potentially with medicolegal implications is that nine surgeons (16%) do not have a departmental protocol. The main risk factors when considering prophylaxis are previous venous thromboembolism, hypercoagulability, and malignancy.

ACKNOWLEDGMENTS

We would like to thank all the participating consultant surgeons who took their time to complete and return the questionnaire. We are also grateful to Miss Nicola Richardson for her assistance in the dispatch and collection of the questionnaires, and also to Dr T B Vaughan for his initial statistical advice.

Authors’ affiliations

E V Williams, R S Williams, J L Hughes, M E Foster, M H Lewis, Department of Surgery, Royal Glamorgan Hospital, Ynysmaerdy, Llantrisant, UK

K L Williams, Department of Medical Statistics, University of Wales College of Medicine, Cardiff, UK

Box 1: Suggestions for future practice

• All surgical units to establish departmental protocols.
• A risk assessment chart to be evaluated for each patient on admission.
• All patients should receive prophylaxis according to their risk, based on the THRIFT guidelines.
• Consider pharmacological (LMWH) and physical methods of prophylaxis.
• Duplex ultrasound should be the principal tool to investigate for DVT.
• Encourage early postoperative mobilisation.
• Reasons not to give/withdraw prophylaxis should be fully communicated and recorded.
• Audit of surgical practice is essential.

REFERENCES

Prevention of venous thromboembolism in Wales: results of a survey among general surgeons

E V Williams, R S Williams, J L Hughes, K L Williams, M E Foster and M H Lewis

Postgrad Med J 2002 78: 88-91
doi: 10.1136/pmj.78.916.88

Updated information and services can be found at:
http://pmj.bmj.com/content/78/916/88

These include:

References
This article cites 13 articles, 0 of which you can access for free at:
http://pmj.bmj.com/content/78/916/88#ref-list-1

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Topic Collections
Articles on similar topics can be found in the following collections
Venous thromboembolism (51)

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/