

ORIGINAL ARTICLE

Indiscriminate Coagulation Screening of Acute Medical Admissions: National Cost Ramifications.

MA Hughes¹, AD Duckworth¹, I Edmond¹, LL Tan¹, DP Ripley², J Tucker³, PJ Leslie⁴

¹Foundation House Officers, Borders General Hospital, Melrose, Roxburghshire, TD6 9BS, UK

²Senior House Officer, Borders General Hospital, Melrose, Roxburghshire, TD6 9BS, UK

³Consultant Haematologist, Borders General Hospital, Melrose, Roxburghshire, TD6 9BS, UK

⁴Consultant Physician, Borders General Hospital, Melrose, Roxburghshire, TD6 9BS, UK

Correspondence to

Dr Mark Hughes
email: hughes81@gmail.com

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Abstract

Background

Routine coagulation screening constitutes poor medical practice and is wasteful of resources. We aimed to determine the extent of inappropriate coagulopathy screening of acute medical admissions in a Scottish general hospital.

Methods

One hundred consecutive medical admissions were prospectively analysed, assessing whether or not a coagulation screen had been conducted on admission and whether or not this was indicated according to current hospital guidelines. Following targeted dissemination of guidelines to appropriate front door medical and nursing staff the audit was repeated.

Results

Pre-education, 58% of those for whom coagulation screening was not indicated were being tested. After targeted education, this figure was reduced to 32%. Pre-education, 81% of all patients in whom coagulation screening was indicated were tested. After targeted education, this figure was 86%.

Conclusion

Indiscriminate coagulation screening is widespread amongst medical admissions to our unit. With simple targeted education, we reduced the rate of inappropriate testing by 26% without reducing the rate of appropriate testing. In a small district general hospital (where the mean local cost for processing a haematology specimen is £8.59) this translates into a saving of £21,000 per annum. Extrapolated nationwide this represents a cost saving of £1.15 million per annum in Scotland.

Key Words

coagulation screen, medical admissions, inappropriate, PT, APTT

Background

Laboratory tests of coagulopathy can provide useful clinical information. However, their usefulness relies on an appropriate clinical context and knowledge of their limitations. It has been shown that up to 95% of potentially significant haemostatic or coagulation abnormalities in medical and surgical patients can be identified by means of a comprehensive history and examination alone.^{1,2} Indiscriminate coagulation screening therefore constitutes poor medical practice and is wasteful of resources.³ Nevertheless, coagulation screening continues to be employed unselectively to predict bleeding.^{4,5} The cumulative costs of coagulation screening are considerable and this assumes greater relevance in the NHS, an organisation susceptible to financial shortfall.⁶

Limitations of coagulation tests:

Tests usually performed for coagulation screening are the activated partial thromboplastin time (APTT) and prothrombin time (PT). Used unselectively as a screening tool, there are considerable general limitations as well as specific limitations related to each individual test.

The 'normal range' used in laboratory practice is defined as results within two standard deviations above and below the mean for a reference population. As a result, 2.5% of healthy people will be found to have abnormally prolonged clotting times.

Many acquired bleeding disorders and all inherited bleeding disorders are low prevalence. Screening for low prevalence pathology indiscriminately within a low-risk population identifies a high number of false positives and has a low positive predictive value.

APTT and PT are insensitive to some clinically important bleeding disorders (e.g. factor XIII deficiency and alpha-2 antiplasmin deficiency). These disorders can cause life-threatening bleeding.

APTT is a test of the intrinsic and common pathways of coagulation and should help to identify the most common and important inherited bleeding disorders. Limitations specific to the APTT include:

- Clinically relevant disease may be masked by normal physiological responses, resulting in a falsely reassuring result (e.g levels of factor VIII increase in response to trauma and physical stress).
- Prolongation of the APTT can be caused by factor deficiencies that are clinically irrelevant and do not cause bleeding.
- Prolongation of the APTT can be artefactual, resulting from contamination with heparin or excess citrate.

PT assesses the extrinsic and common pathways of coagulation and its primary uses are anticoagulant monitoring and the detection of acquired haemostatic disorders (e.g. liver disease, DIC). Limitations specific to the PT include:

- Disorders not associated with bleeding can prolong the PT (e.g. lupus anticoagulant).
- The PT may also be prolonged artefactually as a result of heparin contamination and sampling errors.

Financial considerations:

Aneurin Bevan set up the NHS in 1948 and correctly predicted: "We never shall have all we need. Expectation will always exceed capacity". The NHS budget has doubled between 1997 and 2007. In 2007 and 2008, all NHS organisations are receiving above inflation funding increases. However, in 2006/7 22% of all NHS organisations continued to operate in deficit.⁷

Improving efficiency within the NHS remains imperative and opportunities to cut the cost of healthcare whilst maintaining quality should be embraced. The cumulative cost of unnecessary investigations is considerable. A small but significant element of this is due to unnecessary screening of coagulopathy.

Aim

We aimed to audit the extent of inappropriate coagulation screening of acute medical admissions in a Scottish general hospital.

Methods

One hundred consecutive medical admissions were prospectively analysed; assessing whether or not a coagulation screen had been conducted on admission and whether or not this was indicated according to current hospital guidelines (see table 1).

Table 1

Indications for coagulation screening of acute medical admissions
Bleeding patient
Post major transfusion e.g. 6+ units
Ill patient with suspected DIC
Advanced liver disease
Delayed but not acute paracetamol OD
On or prior to starting heparin or warfarin
Pre liver biopsy/bronchoscopy etc in patient with personal history of bleeding
Prior to thrombolysis

Three months later, relevant front door medical and nursing staff were targeted with a poster outlining the hospital guidelines and the audit was repeated. A further three months later, without prior education and after a change of junior medical staff, the audit was repeated a third time.

Results

Audit 1

Eighty four out of 100 acute admissions did not warrant coagulation screening according to hospital guidelines. Of these, 49 (58%) were screened. Of 16 acute admissions that warranted coagulation screening, 13 (81%) were screened. Of 49 inappropriate coagulation screens, three (6%) returned abnormal results. Of 13 appropriate coagulation screens, six (46%) returned abnormal results.

Audit 2

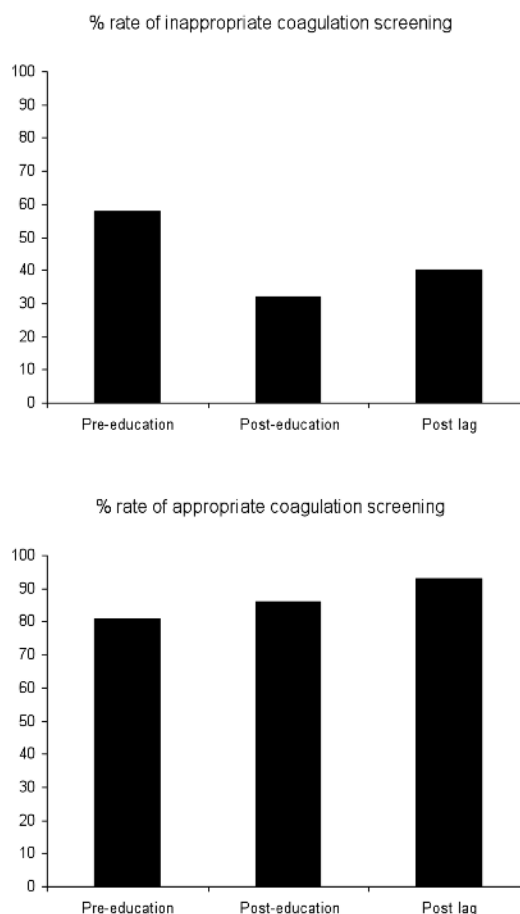
Ninety three out of 100 acute admissions did not warrant coagulation screening according to hospital guidelines. Of these, 29 (32%) were screened. Of the seven acute admissions that warranted coagulation screening, six (86%) were screened. Of the 31 inappropriate coagulation screens, 0 (0%) returned abnormal results. Of the six appropriate coagulation screens, four (67%) returned abnormal results.

Audit 3

Eighty six out of 100 acute admissions did not warrant coagulation screening according to hospital guidelines. Of these, 34 (40%) were screened. Of 14 acute admissions that warranted coagulation screening, 13 (93%) were screened.

In summary, targeted education reduced the rate of inappropriate testing by 26% without reducing the rate of appropriate testing. However, this effect was somewhat short-lived with levels of inappropriate testing increasing after a three month education-free period (see figure 1).

Figure 1



The post-education improvement can be demonstrated statistically (Chi squared = 27.750 with 1 degree of freedom, $P < 0.0001$). Even after the three month lag period, there remained a significant difference from baseline ($p = 0.0003$).

Discussion

The mean local cost of processing a haematology specimen is £8.59.⁸ We have shown that simple education can reduce inappropriate requests by 26%. In a small district general hospital with ~9000 acute medical admissions per annum, this translates into a saving of ~£21,000 per annum. Extrapolated nationwide this represents a cost saving of £1.15 million per annum in Scotland.

It might reasonably be anticipated, and we have shown, that requesting habits return to pre-education levels over time. In order to maintain the benefits illustrated by completion of the audit loop, systems need to be implemented that ensure more appropriate requesting of coagulation screening in the long term. Computer-based requesting of laboratory tests via online patient administration systems (such as MedTrak) is becoming more widespread in the UK. These platforms offer the potential for the selection of a certain test to provoke a 'pop-up' window reminding users of appropriate indications and/or requiring justification of the request. The use of computer-based requesting systems also collects clinician-specific data relating to requesting habits. Increased accountability of the requesting clinician may encourage more appropriate long-term requesting habits.

Conclusion

Indiscriminate coagulation screening is widespread amongst medical admissions to our unit. With simple targeted education, we reduced the rate of inappropriate testing by 26%. Significant cost savings are associated with this improvement. However, the improvements were short-lived. We recommend the use of computer-based systems of laboratory requesting, ensuring that coagulation screening is constantly performed only when indicated.

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