

Anticoagulation service: improving the referral process

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Abstract

Oral anticoagulants are extremely common, and it is estimated that there are between 500,000 and 1 million people prescribed them in the UK.[1] These drugs are the most frequently named medication in fatal errors and litigation claims [2] and they require the implementation of additional safety controls.[3] Warfarin is the most commonly prescribed anticoagulant and it requires regular international normalised ratio (INR) monitoring and dosage adjustment to achieve the desired therapeutic range.[4] Under-anticoagulation can cause thrombosis and over-anticoagulation can lead to haemorrhage, both of which can be fatal.[5]

At St. Peter's hospital there is an anticoagulation service providing regular international normalised ratio (INR) monitoring for patients on warfarin. However, the current referral system is paper-based and a baseline audit found that only 66% of patients were successfully referred to the service on discharge from hospital. This identifies a significant patient safety issue which could result in life-threatening consequences.

An electronic referral form was developed within a pre-existing computer based ordering system with the aim of improving the referral rate. The electronic referral tool streamlined the referral process, making the form quicker and easier to fill out and removed the need for faxing lengthy paper forms. Key information on the form was made mandatory. After intervention a re-audit revealed that 84% of patients discharged on warfarin were referred to the clinic, which equates to an increase of 18%. The increased referral rate will improve patient safety and prevent unnecessary hospital admissions.

There should be continued promotion of the importance of referring patients to the anticoagulation clinic. This can be delivered through inductions, teaching sessions, and re-audits. Future goals include an automated referral system triggered on patient discharge.

Problem

All patients on anticoagulation therapy should have a clear management plan when discharged from hospital into primary care. There is marked variation across the country in the activities of anticoagulation services and no standard service model or definition of an anticoagulation service exists. At St. Peter's hospital there is an anticoagulant service providing regular international normalised ratio (INR) monitoring for patients on warfarin. The doctor preparing the discharge summary (TTO) is responsible for arranging appropriate follow-up with the anticoagulation service for patients being discharged on warfarin.

At St. Peter's there were concerns that patients were not being correctly referred to the anticoagulation service on discharge from hospital. Patient safety was compromised as there were clinical incidents highlighted where patients were being discharged on warfarin without an appointment for their INR to be checked. The current referral system is a two page paper form which then needs to be faxed to the team directly. This seemed an inefficient and sometimes haphazard way of ensuring patients are followed up correctly as the form is often filled out incorrectly or never makes it to the clinic

It was clear that there were problems with the current referral system which needed to be addressed. The primary outcome of this project was to improve the referral rate of patients discharged on warfarin to the anticoagulation service.

Background

Oral anticoagulants are extremely common and it is estimated that there are between 500,000 and 1 million people prescribed them in the UK.[1] They are the most frequently named medication in fatal errors and litigation claims.[2] For this reason they are identified in the Department of Health report 'Making Medication Practice Safer' (2004) as high risk medicines that require the implementation of additional safety controls.[3] By far and away the most common oral anticoagulant is warfarin. This has been in use in the UK for over 60 years and has yet to be superseded by the newer direct thrombin inhibitors or direct factor Xa inhibitors. The reversibility of warfarin is one of the key advantages of its persistence within the market. The safe use of these medicines requires the dosage to be carefully monitored and adjusted to achieve the desired therapeutic range.[4] Under-anticoagulation can cause thrombosis and over-anticoagulation can lead to haemorrhage, both of which can be life-threatening.[5]

The issues highlighted above are a constant headache to clinicians and patients alike. The strict monitoring and numerous drug interactions can be very limiting on a patient's lifestyle. Patients require regular trips to their GP or local anticoagulation service for checks on the effect of warfarin on their blood clotting, measured as the international normalised ratio (INR). The relative cheapness of the drug is offset by the cost of clinics and staff that exist for monitoring.

Although the drug is in high circulation, having an efficient and well run anticoagulation service can prevent complications in the community and subsequent hospital readmissions.[6] One of the key tasks of the anticoagulation service is to ensure patients who have been discharged home on warfarin are followed up within a few days to ensure that they are on a regimen that is suitable for them.

At St Peters hospital the referral process to the anticoagulation service involves a two-page form which then needs to be faxed to them directly. We felt that this was an inefficient and sometimes haphazard way of ensuring that patients are followed up as the form is often filled out incorrectly or never makes it to the clinic. A previous colleague noticed this problem and conducted a small project that found that 40% of patients were not appropriately referred to the clinic (17/43) over the course of one week in March 2013.[7]

See supplementary file: ds3609.pdf - "Anticoagulation Paper Referral Form.compressed"

Baseline measurement

We collected our baseline data from the period 3rd February to 10th March. The number of patients referred to the anticoagulation service and the number of patients discharged on warfarin were retrospectively audited during this period. Patients who had INR monitoring with their GP were excluded. This allowed us to calculate the number of missed referrals. Over this period, 66% (42/64) of patients discharged on warfarin were successfully referred to the anticoagulation service.

Doctors were then interviewed to assess their knowledge of the referral process and to highlight any concerns they had regarding it. The anticoagulation service staff were also interviewed to assess the scale of the problem and the consequences it caused. This provided us with qualitative data.

See supplementary file: ds3610.png - "Anticoagulation Electronic Referral"

Design

We felt the best way to solve the problem would be to make the referral system to the anticoagulation service electronic. Requests for particular specialist services can already be made by the patient centre/PAS software at St Peter's. It seemed that the easiest way to achieve this was to integrate the referral system into the existing software. We could then put this into practice after a campaign to increase the awareness of doctors of the new process.

This would hopefully improve the referrals in a number of ways. Firstly, by entering all the information electronically the need to fax a handwritten referral is removed. Secondly, it would ensure a higher quality of referral as we could tailor what key information was required on the form and make this a mandatory field. This would prevent half-finished referrals missing essential information, saving

the clinic time and effort. Thirdly the referrals can be condensed as the patient demographics are readily available within the computer system. This should save clinicians time and increase the referral rate.

Strategy

PDSA cycle 1:

Firstly the possibility and process of creating a new referral on the current computer software was discussed with the IT team at St. Peter's. They informed us that we needed to establish the exact information required on the referral form and educated us regarding the layout. We could see that there may be problems since the software has a maximum of 17 questions and a limited amount of space.

PDSA cycle 2:

There were discussions with the anticoagulation clinic staff to identify the key information required on the form. At first this was difficult because the team were reluctant to remove any of the information that was present on the current form. However, it was essential in order to cut down the referral and make it ready for the computer software. Careful negotiation was required to pin down the exact detail required on the form.

PDSA cycle 3

The first complete draft of the form was welcomed by the anticoagulation service staff. However, it failed to emphasise the importance of the last INR measurement and dose of warfarin. The field was not mandatory on the referral so could be missed. The staff felt this was one of the most important aspects of the referral and one that was commonly missed on the existing paper form. The next draft included mandatory fields for this information.

PDSA cycle 4

The various teams were now happy with the layout of the electronic form itself. Even so, there were concerns that the referral did not list the relevant phone number and state that the doctor must ring the anticoagulation service to book an appointment for the patient. The staff had complained that this was commonly missed by doctors. Further discussion with the IT team allowed us to place an alert to solve this. This means that now when you select the anticoagulation clinic referral on the software, an additional box appears stating that you must ring and book an appointment.

PDSA cycle 5

The printing facilities in the anticoagulation service then had to be linked to the computer software so as to print the referrals forms when requested online. This initially proved difficult as the printer was not linked up to the main trust network. After overcoming this we tested that the correct referral was sent to the correct place in a timely fashion from various medical wards and computers in the hospital. Once happy with the results we asked other doctors to use

the referral system and provide feedback.

PDSA cycle 6

We received positive feedback from the doctors and the anticoagulation service staff. After achieving success in testing, we initiated the intervention. The changes were communicated via the trust newsletter, trust-wide emails, posters, and presentations at junior doctor teaching.

See supplementary file: ds3517.docx - "PDSA 1-6"

Post-measurement

The intervention was rolled out on the 10th March. The referrals to the anticoagulation service were retrospectively re-audited from 7th April to 12th May. During this period, 84% (67/80) of patients who were discharged on warfarin were successfully referred to the anticoagulation service. This equates to an 18% increase in referrals to the service following the intervention.

An interview with the anticoagulation service staff after the intervention showed that there was a consensus that the new system had markedly improved the quality of the referrals.

See supplementary file: ds3446.xlsx - "Anticoagulation referrals"

Lessons and limitations

Initially it was difficult to encourage senior staff to engage in the quality improvement process and they were resistant to change. However, following the completion of the project it has become clear that even as a junior doctor it is possible to make changes to existing hospital systems to improve patient safety.

The project involved extensive change to the process of organising safe monitoring and follow-up of patients on warfarin discharged from hospital. The changes were implemented with a degree of success, but there is still room for improvement. The electronic referral system clearly achieved its objectives when it was used. It streamlined referrals to the clinic and removed the need for faxing a lengthy paper form. The intervention was welcomed by the junior doctors and we received much support from senior members of staff. The electronic referral system is now widely used in the trust and the paper form has been phased out.

The reasons for continued missed referrals despite the new system are multifaceted. Suggested reasons are:

- Often patients are in hospital for very short periods of time where there is no change to their warfarin dose and INR continues to be within therapeutic range. In these situations, doctors may judge that the patient does not require a referral to the anticoagulation service

- Human error: doctors continue to forget to refer or do not know that they have to refer.

Considerations for the future are for an automatic trigger or referral when patients are discharged on warfarin. The problem with this is making sure that all the necessary information is sent to the anticoagulation service. One way of achieving this is to add the referral to the discharge summary, triggering a mandatory completion of the referral form if warfarin is listed in the medications on discharge.

One of the limitations of the project include the fact that it is small scale. There are only 10 to 20 referrals made to the anticoagulation service on a typical week and so it would be useful to audit referral rates for a longer period of time. Furthermore, we had a single outcome measure for this quality improvement project: the referral rate. While this is the most important measure, it would have been useful to collect quantitative data regarding the quality of referral and total time taken to refer. This would have allowed additional parameters to assess the impact of the intervention.

There must be continued dialogue between the clinical staff and the staff of the anticoagulation service to ensure that the referrals are still being made appropriately and that patients are not lost to follow-up. An update at junior doctors teaching sessions once every four to six months would be a good start to this process.

Conclusion

The initial problem was the poor referral rate of patients discharged on warfarin to the anticoagulation service. The electronic referral to the anticoagulation service is a simple, cheap, and effective improvement on the existing paper system. The referral rate increased from 66% to 84%, an improvement of 18%. Furthermore, the quality of the referrals had improved significantly, paper usage was reduced, and the length of time taken to fill out the form shortened. We were also able to restructure the form (much to the satisfaction of the staff in the clinic) to ensure that they had the most important and most relevant information available to them every time.

We understand that the process is still in its infancy and a further improvement in referral rate may occur with time. Once the new cohort of staff are introduced to the process we would expect to see a rise in the referral rate. The nature of the IT system it has been built into will make it relatively easy for future clinicians to make alterations to the form if necessary.

Although the results are encouraging there is still a wide scope for further advances in this area, such as an automated referral system removing the element of human error. The referral rate has improved but more work needs to be done, thus highlighting the continual process of quality improvement.

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Declaration of interests

Nothing to declare.

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