

How improved compliance was achieved in prescribing to reduce the risk of Venous thromboembolism (VTE) in post abdominal cancer surgery: A quality improvement project

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Abstract: Prescribing Extended VTE prophylaxis (EVTE) for 28days in abdominal cancer surgery is a NICE guideline NG89. In Europe, there are 544,000 VTE-related deaths every year (55-60% during or following hospitalisation), 25 000 in the UK. In the UK average annual costs for VTE treatment, hospital bed days, sanctions and litigation for 2016/17 was £938,357 per CCG. 71% of patients assessed to be at medium or high risk of developing VTE did not receive any form of mechanical or pharmacological VTE prophylaxis.

Objectives: To improve extended VTE prophylaxis prescription in the General surgery ward for patients who have undergone abdominal cancer surgery. At the time of the first audit cycle compliance was 79%. The aim was to achieve 100% compliance upon implementing our initiatives.

Methods: This involved both qualitative and quantitative methods. We utilised a process map and a driver diagram to achieve our goals. Audit cycle one was completed in December 2018. Cycle 2 was completed in May 2019 after introducing our initiatives. We reviewed Lower GI mortality and morbidity data. We compared this data with Electronic discharge notes for all cancer surgery within this period. This included date of surgery and date of discharge and Anticoagulation on discharge.

Results: NICE Guidelines are to prescribe 28 days of VTE prophylaxis postoperatively for patients discharged post lower GI cancer surgery. Audit cycle 1 in December 2018 looked at 53 patients. 11 of the 53 were non-complaint = 21%. After our Quality initiatives the audit cycle 2 in May 2019 looked at 118 patients. Only 1 was non-complaint = 1%.

Conclusions: The project was able to improve compliance in prescribing to reduce the risk of VTE in post abdominal cancer surgery from 79% to 99% within 5 months. This was achieved by following the well tested pathway to successful teams. Leadership communicated clear measurable goals to a dedicated team and most importantly by keeping the project simple and not reinventing the wheel. The initiatives we implemented can be applied to improve services in other departments and other hospitals.

Keywords: EVTE: Extended Venous Thromboembolism, PE: Pulmonary Embolism DVT: Deep Venous Thrombosis, LMWH: Low Molecular Weight Heparin, EDN: Electronic Discharge Notification, QIP: Quality Improvement Project, CCG: Clinical Commissioning Group.

1. INTRODUCTION

Venous thromboembolism (VTE) is a common complication among hospital inpatients and contributes to longer hospital stays, morbidity, and mortality. Some VTEs may be subclinical, whereas others present as sudden pulmonary embolus (PE) or symptomatic deep vein thrombosis (DVT). DVTs commonly occur in major abdominal surgery and lower limb orthopaedic surgery that is performed without antithrombotic prophylaxis. DVT of the lower limb is also common in patients with acute myocardial infarction, and acute ischaemic stroke. DVTs normally start in the calf veins and can extend proximally sometimes to develop into fatal PEs. Appropriate antithrombotic measures can reduce this complication but must be balanced against the risk of bleeding especially post surgery. Some conditions like cancer,

thrombophilia and previous DVTs can predispose a patient to further DVT. The guidelines at William Harvey hospital are to prescribe 40mg of enoxaparin (low molecular weight heparin LMWH) daily for 28 days post-surgery for any patient who is having a cancer of the abdomen surgically removed.

The pathophysiology of developing a DVT is determined by what is termed Virchow’s triad i.e. Hypercoagulability, Haemodynamic changes (stasis, turbulence) and Endothelial injury/dysfunction. Cancer is one of major independent risk factors for DVTs. Endothelial injury is the basis of any surgery. Based on these major risk factors NICE guideline NG89 (1.14.4) recommends extended VTE (EVTE) LMWH prophylaxis of 28 days postoperatively for all major cancer abdominal surgery. Randomised trials show that this reduces the risk of proximal DVT. There are other risk factors that predispose a patient to DVTs, for example obesity, other medical conditions like heart failure, medication containing oestrogens, older age and some inherited hypercoagulable states.

Clinical presentation of a DVT usually presents with pain, redness and swelling of the affected limb. PE usually presents with sudden onset of breathlessness with or without haemoptysis. Pleuritic chest pain or collapse with shock is sometimes noted.

In Europe, there are 544,000 VTE-related deaths every year (55-60% during or following hospitalisation), 25 000 in the UK. Average annual costs for VTE treatment, hospital bed days, sanctions and litigation for 2016/17 was £938,357 per CCG. 71% of patients assessed to be at medium or high risk of developing VTE did not receive any form of mechanical or pharmacological VTE prophylaxis.

This project was undertaken in a busy general surgery ward at a District General Hospital in England, United Kingdom. Our project noted that even though there are existing processes, guidelines and safety nets to prevent DVTs, the challenge we faced was that there was no one to bring it all together and remind everyone of the existence of these processes.

Aim

The primary aim was to improve extended VTE prophylaxis prescription in the General surgery ward for patients who have undergone abdominal cancer surgery.

2. METHODS

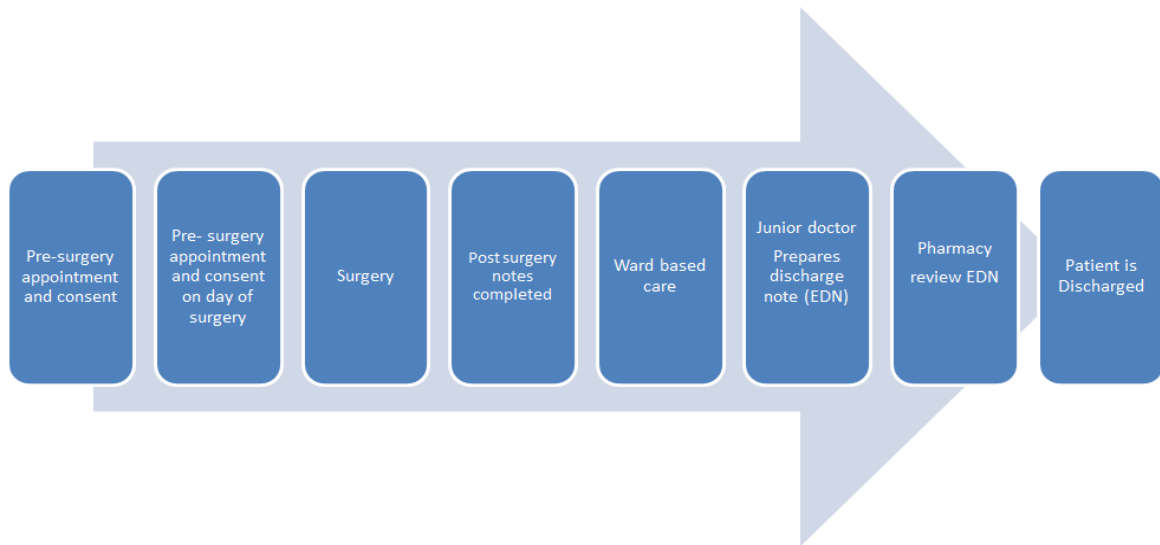
Design

The project was designed as a quality improvement project. The model used is a matrix type structure that is common in most wards around the hospital. The pathway begins when a patient diagnosed with an operable lower GI cancer is consented for surgery. It ends with the hospital discharge of the patient on appropriate anticoagulant.

Matrix Design of consultant led patient care (confirm dates and figures)

| Pre-surgery Appointment And consent | Pre-surgery Appointment And consent on day of Surgery | Surgery | Post-surgery notes completed | Ward based Care | Junior doctor Prepares discharge note (EDN) | Pharmacy review EDN | Patient is Discharge |
|-------------------------------------|---|-----------|------------------------------|-----------------|---|---------------------|----------------------|
| Patient A | | | | | | | |
| | Patient B | | | | | | |
| | | Patient C | | | | | |
| | | | Patient D | | | | |
| | | | | Patient E | | | |
| | | | | | Patient F | | |
| | | | | | | Patient G | |
| | | | | | | | Patient H |

This is further demonstrated by the process flow chart below.



Setting

Audit cycle 1 in December 2018 looked at 53 patients who were discharged post lower GI cancer surgery between 4th of May 2018 and 12th of October 2018. Admission included both elective and emergency cases. Audit cycle 2 in May 2019 looked at 118 patients discharged between 12th of December 2018 and 5th of May 2019. The project reviewed Lower GI mortality and morbidity data. We compared this data with Electronic discharge notes for all cancer surgery within this period. This included the date of surgery and date of discharge and reviewing anticoagulation prescribed on discharge.

Patients diagnosed with abdominal cancer deemed suitable for surgery are consented weeks before the actual surgery using standard forms of consent. The day before or shortly before elective surgery the patient is consented again in another standard form. After the surgery the surgeon completes another post surgery form outlining the management plan of the patient post surgery. The patient is then cared for on the ward and seen daily by the consultant, junior doctors who prescribe medication and nurses who administer the medication. There are other various MDT members involved in the care of the patient. The consultant decides the day of discharge and on that day they communicate management of the patient post discharge including the medication to take home. The junior doctor then prepares the electronic discharge note (EDN). This note requires the junior doctor to answer the following specific questions:

- | |
|---|
| Has the patient had cancer surgery? |
| Does the patient need extended VTE prophylaxis? |

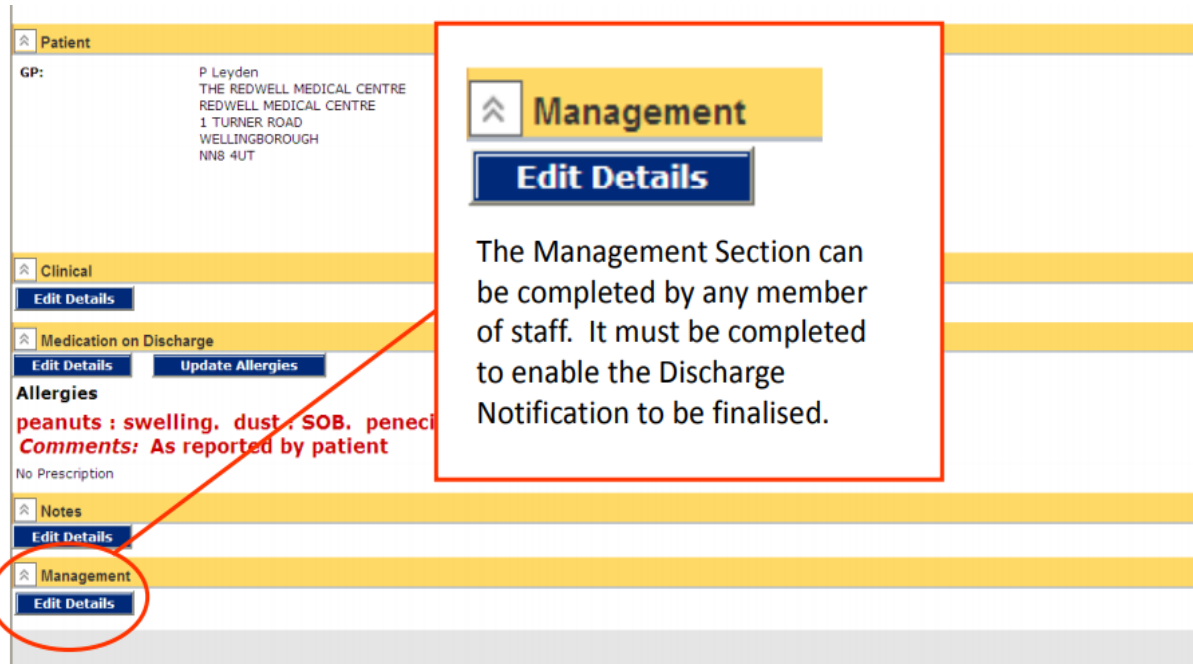
Having completed the EDN the junior doctor alerts the pharmacist so they can do their EDN checks and order the appropriate medication. Once satisfied the nurse in charge compiles and checks the medication and gives it to the patient who is subsequently discharged with the correct medication including any extended VTE prophylaxis.

The EDN has a section to select if the patient is an oncology patient:

Select any extra form(s) to add to the clinical data for this discharge notification

| | | | |
|---|--|------------------------------------|---|
| <input type="checkbox"/> Warfarin Checklist | <input type="checkbox"/> Notification of Death | <input type="checkbox"/> MDT Notes | <input type="checkbox"/> Occupational Therapy |
| <input type="checkbox"/> Oncology | <input type="checkbox"/> Acute Coronary Syndrome | <input type="checkbox"/> COPD | <input type="checkbox"/> Heart Failure |
| <input type="checkbox"/> Dementia | | | |

The EDN also has a section under 'management' where the prescriber can stipulate patient management post discharge including EVTE for 28 days.



The EDN will also state the mode of admission including the presenting problem where a primary diagnosis of cancer must also be clearly documented.

► Mode of Admission

Presenting Problem

Previous co-morbidities for this patient (order of list is not significant)

Please state the Primary Diagnosis causing the presenting problem

► Primary Diagnosis

► Co-Morbidities No Yes

Select Co-Morbidities

► Co-Morbidities

Please list Past Medical History

Select Past Medical History

The EDN above directs the prescriber to clearly state if this is a cancer patient. The pharmacist has a chance to look at this data and advise on appropriate EVTE if it has been missed. This is a fail safe model to aid safe prescribing of EVTE.

Ethics

There was no need for a review by the ethics committee as this is a quality improvement project that utilises existing hospital practices and treatments.

Intervention

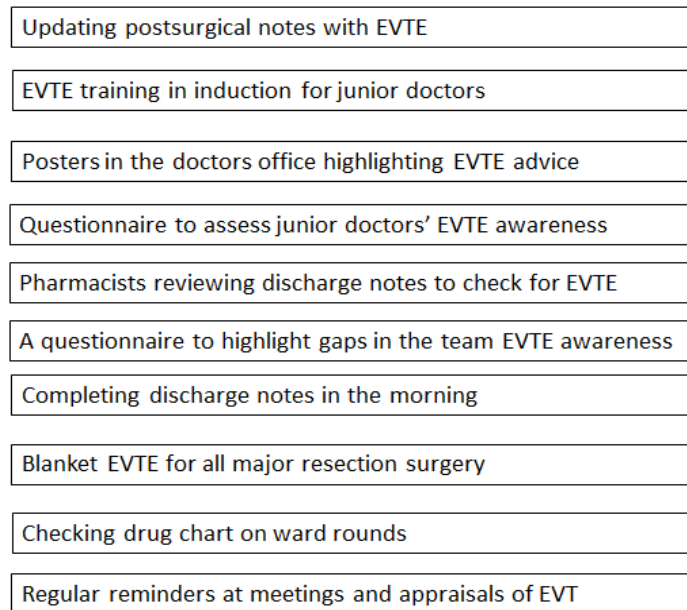
Prescribing extended VTE prophylaxis for all (100%) patients who have had surgery to remove cancer in the abdomen is the target. 79% was the finding of the first audit cycle. The first cycle showed that there was room for improving both patient safety and avoiding costly penalties associated with non-compliance. This target was also be used as a marker of how efficient the designed process is working. A process map identified the steps and opportunities where an intervention could be implemented to improve the system starting from when the surgery is confirmed all the way to when the patient

is discharged from hospital with appropriate EVTE. A driver diagram was produced to highlight the primary drivers for improvement.

These primary drivers were numbered as follows: 1. Update of post-surgical notes, 2. Inclusion of VTE guidelines in junior doctor induction, 3. Use of visible posters highlighting VTE guidelines, 4. Pharmacy checking for compliance before approving EDNs, 5. Checking drug charts on daily ward rounds 6. Completion of EDNs in the morning 8. Introducing VTE guidelines during junior doctor induction and appraisals 9. Use of regular questionnaires to gauge understanding of VTE guidelines.

Diagram below shows the Primary Drivers:

Primary Drivers



Pathway from surgery to discharge

There is a pre assessment days before the surgery has to take place. This assesses the suitability of the patient for surgery, It is also an opportunity to explain the procedure and consent the patient for the procedure. Relevant blood tests are also done. On the day of the surgery both the surgeon and anaesthetist explain the procedure again to the patient and gain the patient's consent to proceed with the surgery.

The surgery then goes ahead and upon completion the surgeon completes a form outlining the post surgery management plan. The patient is then moved to the surgical ward where they are seen by the consultant during the daily morning ward round.

On the ward the consultant is responsible for overall management of the patient and guides the team of junior doctors in the management of the patient including prescribing appropriate VTE prophylaxis.

The nurses on the ward use their experience to administer prescribed medication including appropriate VTE prophylaxis.

At the correct time the consultant decides when the patient is to be discharged and thereby triggering a cascade of events leading to the eventual discharge of the patient. Junior doctors prepare the discharge notes and the medication to take home.

Once the note is completed the pharmacist checks the note and approves the medication that the patient should take home.

The above protocol was the basis of achieving the success of the quality improvement project in this report. Looking at each step of the way we identified areas of improvement culminating in a 99% success in appropriate prescribing to prevent DVT. We established step by step decision making algorithms for correct prescribing so that the process could be repeated for any patient undergoing general surgery for abdominal cancer. The process would be so water tight that any new team member would be able to quickly and easily follow the steps required.

Change drivers

Questionnaire testing awareness

It was important to do a spot assessment of the team's awareness of EVTE. We conducted a questionnaire which showed that even though nearly everyone was aware of the EVTE the results of 79% compliance showed that more needed to be done to achieve the 100% target.

Updating post surgical notes

The documented surgeon's management plan after the surgery is the most important element of post-surgery management to prevent DVT. This is documented on a standard form that if filed in the patient notes. Audit cycle 1 found that some of the post-surgery notes did not specify EVTE. Junior doctors rely on this plan for day to day management of patients. Audit recommendation were that all surgeons must stipulate EVTE in the post-surgery notes. This documentation is double checked during the post surgery ward rounds and any changes must be communicated to the junior doctors and nursing team managing the patient.

Junior doctor induction and Appraisal

The audit recommended incorporation of EVTE training into the junior doctor induction program. Audit cycle 1 found that most new junior doctors were not aware of the EVTE guideline. Audit cycle 2 found that the new doctors that joined after the change drivers were implanted achieved 99% compliance.

Ward round and morning of discharge

Audit cycle 1 found that several the patients that were discharged with inadequate VTE had been either discharged late in the day or at weekends. The report recommended that patients to be discharged should be selected during the daily morning ward round and EVTE confirmed in the same morning with the subsequent EDN being processed immediately after to reflect correct EVTE.

Role of Pharmacists

Pharmacists play a major role in checking EDNs and approving them. They are the final gateway before nurses discharge the patient. They have access to the EDN and review that each medication tallies with the diagnosis. They work hand in hand with junior doctors in ensuing safe EVTE prescription.

Role of Nurses and MDT

Nurses administer the medication and they know the patients more than most other MDT members. Empowering nurses to challenge unsafe EVTE prescription is part of their training. They know which patient has had surgery for bowel cancer and can support junior doctors in safe prescribing. The project recommended involving the nursing team in the ward round so they can also pass on management in their hand over.

Blanket EVTE prophylaxis

Cycle 1 also recommended a blanket EVTE prescription for all types of abdominal cancer patients regardless of whether its benign or malignant. This ensured that no cancer patient was missed in trying to determine EVTE plan.

Visible posters

Audit cycle 1 recommended use of visible posters in strategic locations within the doctor's office outlining the need for EVTE for all abdominal cancer surgery patients.

Combining the above change drivers achieved an increase of compliance from 79% to 99% in a space of five months. Recommendations of this QIP can be replicated at any other setting in any hospital.

Governance structure

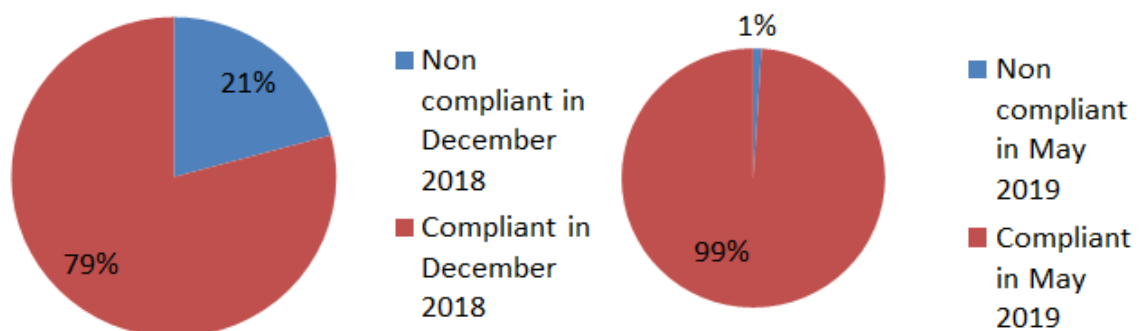
Junior doctors undergo induction before undertaking the surgical rotation. They also partake in appraisals during their surgical rotation. There are daily patient handover meetings and weekly departmental meetings that offer an opportunity to emphasise EVTE. A named consultant is in charge of each patient. Each of the encounters above present an opportunity for discussing EVTE for any patient in question. EVTE must become part of the culture for it to work.

3. RESULTS

Audit cycle 1 in December 2018 looked at 53 patients. 11 of the 53 were non compliant with EVTE = 21%

After our Quality initiatives the audit cycle 2 in May 2019 looked at 118 patients. Only 1 was non-compliant with EVTE = 1%

From 79% to 99% Total compliance in 5 months



4. DISCUSSION

This project highlighted the possibility of using a quality improvement project to streamline the process of safe prescription to prevent DVTs. Increase in compliance in prescription improved from 79% to 99% within a space of 5 months of implementing the new initiatives.

What is clear in the QI is that there is no need to reinvent the wheel. Success was achieved by streamlining current processes and procedures. The success of the QI depends on clear leadership and defined goals that need to be communicated clearly to the team who in turn need to forge a common purpose which in this case is correctly prescribing EVTE. Proactivity on the part of all the team members in owning the success of the project was very important in achieving the desired target of correct prescribing. Most importantly the QI utilised existing processes and it was important to keep the whole process simple.

In summary, post-surgery forms already exists so it was easy to emphasis addition of EVTE as one of the plans. Junior doctors already manage patients on the ward daily and they are better placed to check if patients are on correct medication. Nurses know these patients very well and also administer the medication therefore they are in a better place to realise if a cancer patient is not on EVTE. The pharmacist is already assigned to check the EDN before discharging the patient. All these team members are already managing different aspect of patient care.

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