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Improving prescribing of extended prophylaxis for venous thromboembolism at discharge in patients who underwent surgery for colorectal cancer

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Abstract

Aims/Background Prophylaxis at discharge is important in mitigating venous thromboembolism events from colorectal cancer and major abdominopelvic surgery, both of which are risk factors for venous thromboembolism. Foundation doctors frequently rotate between departments, and so rely on departmental induction and/or handing down of knowledge to prescribe extended venous thromboembolism prophylaxis upon discharge.

Methods A retrospective audit of all patients who underwent surgery for colorectal cancer at The County Hospital, Hereford, between 1 August 2018 and 31 August 2019, was undertaken to assess departmental compliance with guidance from the National Institute for Health and Care Excellence.

Results A total of 181 patients underwent elective surgery and 29 patients had emergency surgery. The initial audit revealed a cyclical 4-monthly decline that coincided with foundation doctors' rotations. Six multidisciplinary interventions were implemented. Reaudit demonstrated 100% compliance with prescribing of extended venous thromboembolism prophylaxis at discharge. No venous thromboembolism events 30 days post operation were noted.

Conclusions A multidisciplinary approach involving educating health professionals about the importance of extended venous thromboembolis prophylaxis in patients who have undergone surgery for colorectal cancer can be effective in improving compliance with prescribing practices at discharge.

Key words: Colorectal cancer; Elective surgery; Emergency surgery; Patient safety; Venous thromboembolism

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Introduction

Colorectal cancer accounts for 11% of all new cancer cases in the UK and its incidence has remained stable over the last two decades (Cancer Research UK, 2020). This group of patients is not only at higher risk of venous thromboembolism from the cancer itself, but the risk is compounded by comorbidities, advanced disease and surgical intervention (Kawai and Watanabe, 2014). Abdominopelvic surgery for colorectal cancer is an independent significant risk factor in developing postoperative venous thromboembolism (Bergqvist, 2006; Fleming et al, 2010). Postoperative complications resulting from venous thromboembolism are associated with significant morbidity and mortality. Therefore, the focus remains on perioperative prophylaxis to mitigate the risk of venous thromboembolism in patients who have undergone surgery for colorectal cancer.

Across the UK, enhanced recovery pathways have become the norm for patients undergoing elective colorectal surgery (NHS, 2019). Advances in perioperative care, operative techniques and improved patient education of patients with colorectal cancer have improved outcomes in elective surgery (Association of Coloproctology of Great Britain and Ireland, 2018). Extended prophylaxis for 28 days following surgery is a cost-effective strategy for reducing the risk of venous thromboembolism (Trepanier et al, 2019) that has been advocated by several professional bodies (National Institute for Health and Care Excellence, 2010; Lyman et al, 2013; Fleming et al, 2018; Carrier et al, 2019).

The meticulous inpatient care given to mitigate complications of venous thromboembolism needs to be continued in the community after discharge from hospital (Daliri et al, 2019).

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Extended thromboprophylaxis prescribing at discharge is a key step in ensuring patient safety during postoperative recovery. Studies have demonstrated poor adherence with extended prophylaxis at discharge (Kalka et al, 2009; Patel et al, 2013; Mukkamala et al, 2020). A robust multidisciplinary approach with adequate checkpoints in the patient journey provides safety netting against prescribing errors. Patient journeys have been made complex by changes in departmental medical and allied health professional staff. This continually poses challenges for maintaining effective continuity of care between different teams in hospitals, and between hospital and community teams.

In the UK, it is common for foundation year doctors (globally known as house officers or interns) to rotate every 4 months. Foundation doctors are expected to achieve their generic core competencies through primarily ward-based care of elective and emergency surgical patients under the close supervision of seniors (UK Foundation Programme Curriculum, 2016). Surgery-specific on-the-job learning can be variable and is dependent on engagement from both foundation doctors and surgical faculty at the departmental level. Therefore, in the context of postoperative care of elective and emergency surgical patients with colorectal cancer, foundation doctors are not routinely expected to have knowledge of local protocols when starting the surgical rotation, but are expected to learn these specialty-specific practices. These can be learnt in one of several ways, summarised in Table 1.

The studied institution is a small, rural English district general hospital housing a 40-bed surgical unit. Four consultant colorectal surgeons lead the team of junior doctors comprising registrars (training and non-training grades) and foundation doctors. New members to the surgical team are updated on departmental practices at a dedicated departmental induction. The surgical team work closely with allied health professionals. Enhanced recovery pathways for patients undergoing elective surgery for colorectal cancer were introduced in 2017 and departmental education delivered at the time.

Preoperatively, all elective patients undergo counselling with colorectal nurse specialists and a comprehensive anaesthetic assessment. Written information is provided to the patient, but this does not specially address extended postoperative prophylaxis for venous thromboembolism. At the time of hospital admission, all patients have a mandatory electronic and paper-based venous thromboembolism risk assessment completed by the admitting clinician – although this is subject to variability. Often the discharging clinician will only refer to the drug history rather than the venous thromboembolism risk assessment score when drafting the discharge letter, thereby potentially missing out key information that would trigger an indication for prescribing extended prophylaxis for venous thromboembolism. Discharge planning, usually involving a pharmacist, a nurse and the patient, encompasses counselling and education the patient on self-administering extended prophylaxis for

Table 1. Ways in which foundation doctors learn specialty-specific practices that may not form part of the core Foundation Programme competencies

Departmental induction
Handing down of information from peers
Formal departmental teaching
Departmental guidelines and protocols
Informal teaching and on-the-job learning, for example from allied health professionals
Journal clubs
Clinical governance meetings
Workplace-based assessments
Self-directed learning
Undertaking audit, research or other academia
Mentoring medical students

venous thromboembolism. Where patients cannot self-administer the prophylaxis, referrals are made to the community district nurse. At the time of discharge, ward nurses and/or colorectal nurse specialists are responsible for ensuring patients are discharged with the relevant medication, if it has been prescribed by the discharging clinician.

This quality improvement project audited the departmental compliance with prescribing extended prophylaxis for venous thromboembolism at discharge for all patients undergoing surgery for colorectal cancer, and acted on the audit results to improve or refine current processes to ensure robustness in delivering safe and effective patient care.

Methods

A retrospective audit was performed of all patients who underwent elective or emergency surgery for colorectal cancer between 1 August 2018 and 31 August 2019. Patient data were obtained from electronic patient records and the National Emergency Laparotomy Audit database (https://data.nela.org.uk/). All discharge summary prescriptions, correspondence and imaging records were analysed to identify venous thromboembolism events in the 30-day postoperative period. The audit standard was 100% compliance as per national guidance (National Institute for Health and Care Excellence, 2010).

Results of the initial audit were presented at local departmental educational and clinical governance meetings. Based on the initial findings, the authors sought to correct deficiencies in the processes accounting for the initial results. A six-point action plan was agreed upon between the department's consultant surgeons (Table 2). This was implemented in October 2019 and a prospective reaudit was performed from 1 September 2019 to 29 February 2020. The authors decided to stop the reaudit in February, as the COVID-19 pandemic was beginning to affect elective surgical services across the UK and locally.

The incidence of 30-day postoperative venous thromboembolism was assessed by screening each eligible patient's electronic records. These included all correspondence from follow-up clinics or telephone calls with colorectal nurse specialists or surgeons, emergency attendance and/or admission records, electronic records of postoperative imaging specifically querying a venous thromboembolism and general practice records electronically linked to the hospital's medical records.

Results

Throughout the audit period, a total of 181 patients (100 men, 81 women) underwent elective surgery and 29 patients (15 men, 14 women) had emergency surgery for colorectal cancer. Just over half of each group were men. The median age was 78 years (range 57–87 years). Overall compliance with prescribing of extended prophylaxis for venous thromboembolism at discharge for patients undergoing emergency surgery was better than for those having elective surgery, but the absolute number of emergency cases was much lower than the number of elective cases for each month of the audit (Table 3). During the first 12-month period of the audit, it became apparent that adherence to the audit standard varied in 4-month cycles, with the peak compliance coinciding with the changeover of foundation

Table 2. The six interventions performed as part of the action plan following initial audit

1. Documentation of clear postoperative instructions by the operating surgeon in the operation note
2. Documentation of duration of venous thromboembolism prophylaxis on the drug kardex if the patient was not already taking anticoagulation medication before surgery
3. Hospital pharmacist engagement and involvement in monitoring the medical records and drug kardex to increase compliance with extended prophylaxis prescribing at discharge
4. Modification of the electronic discharge summary by inserting prompts – where a diagnosis of 'cancer' was entered or a colorectal surgical procedure was entered, a reminder to the discharging clinician would appear
5. Education of ward nursing, pharmacy and medical teams
6. Patient education to increase awareness

doctors (Figure 1). Declining compliance and troughs occurred towards the last 2 months of each 4-month rotation. Two of the authors liaised with the head of nursing and pharmacy services to account for other reasons for this cyclical variation – there were no rotational or major staff changes that would account for this cyclical pattern.

One author (CTO) and another member of the surgical team were assigned responsibility as the surgical department's venous thromboembolism champions for raising awareness regarding the interventions. An educational presentation about the importance of prescribing extended prophylaxis for venous thromboembolism in patients with colorectal cancer was delivered to foundation doctors, ward nurses, colorectal nurse specialists and the hospital pharmacists. Following implementation of the six actions outlined in Table 2, a reaudit demonstrated significant improvements in adherence to the audit standard (Figure 1). Preintervention vs postintervention compliance for elective surgery improved from an average of 86% to 100% respectively, and for emergency cases from 88% to 100% respectively. No 30-day venous thromboembolism events were noted throughout the audit period.

Discussion

To the authors' knowledge and from the evidence in the literature, this quality improvement project is the first to highlight the rotation of foundation doctors in surgery as a contributing factor to the variability in prescribing extended prophylaxis for venous thromboembolism at discharge in patients following colorectal cancer-related surgery. Continuity of care from

Table 3. The absolute number of cases performed each month for elective and emergency colorectal cancer

	Elective		Emergency	
Month and year	Total cases (*n*)	Compliance with prescribing extended prophylaxis for venous thromboembolism (%)	Total cases (*n*)	Compliance with prescribing extended prophylaxis for venous thromboembolism (%)
August 2018	4	100	1	100
September 2018	7	90	1	100
October 2018	12	80	1	100
November 2018	15	73.3	3	100
December 2018	3	90	9	80
January 2019	14	90	2	50
February 2019	11	91.7	3	100
March 2019	9	75	0	0
April 2019	15	50	0	0
May 2019	9	100	0	0
June 2019	8	100	2	100
July 2019	8	100	2	100
August 2019	8	100	4	100
September 2019	13	100	1	100
October 2019	11	100	0	0
November 2019	6	100	0	0
December 2019	9	100	0	0
January 2020	7	100	0	0
February 2020	9	100	0	0

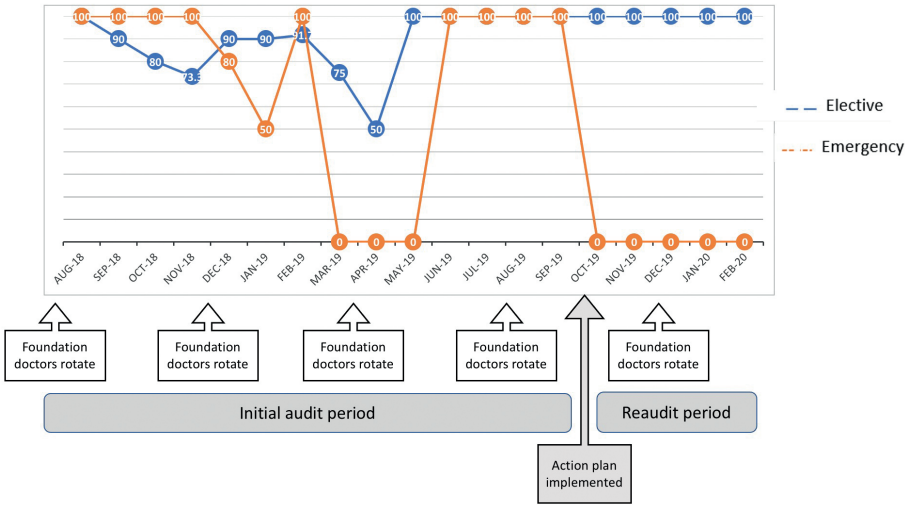

Figure 1. Timeline of the variation in compliance with extended venous thromboembolism prophylaxis prescribing at discharge before and after implementation of the action plan.

the hospital to the community at discharge is paramount for operative outcomes and patient recovery (Van Walraven et al, 2010). By undertaking a simple retrospective audit of the compliance and adherence to audit standards, the authors were able to identify multiple factors responsible for the results seen in the initial audit.

Operative notes not only serve as records of the intraoperative findings and surgical procedure but also guide postoperative care (Severn Audit and Research Collaborative in Orthopaedics, 2016). Lack of clear documentation leaves the patient at risk from miscommunication that can compromise the delivery of optimal postoperative care (Douglas-Moore et al, 2014). At the authors' institution, previous work to promote computerised operation notes facilitated improved communication of operative findings and postoperative instructions. These were particularly important in emergency cases where there would most commonly be an absence of previous correspondence, preoperative work up, and higher risks of venous thromboembolism.

Surgeons work as part of the multidisciplinary team where discharge planning is facilitated by nursing and pharmacy staff. Therefore, engaging allied health professionals is a powerful tool that can drive success of interventions, as evident in this project. It also promotes better team-working for safer and effective patient care (McMurray et al, 2007). Educating foundation doctors, who are key members of the surgical team, empowers them to deliver the best clinical care (Sholl et al, 2017) and helps to ensure that such vital information is handed down to peers. Sustaining the effects of the interventions requires effective departmental inductions, regular education of staff members and governance in the form of reaudit.

Standardising discharge planning in patients using a discharge checklist has been proposed (Soong et al, 2013). While there are existing discharge checklists at the authors' institution, they are not specific to patients recovering from colorectal cancer surgery. Given the workload and bed occupancy at any one time as a result of colorectal cancer-related surgery, this area of the discharge process needs further discussion locally. Empowering patients with information that facilitates the transition from hospital to home (Lithner et al, 2015) can also be a useful adjunct in the overall process. While this was not measured or assessed directly, the educational interventions also emphasised the need for patient education. However, for a multitude of reasons, patients do forget and so it remains the responsibility of health professionals to remind them.

Information technology is a powerful tool that can serve multiple checkpoints. As in this project, codes relating to colorectal cancer and colorectal cancer surgery were used to serve as reminders for clinicians completing electronic patient discharges and prescriptions. This was further backed up by changes to prescribing practice for thromboprophylaxis by ensuring the duration was noted on the drug kardex. These interventions collectively

Key points

- The 4-monthly rotation of foundation doctors is a significant factor in the studied institution's variation in prescribing extended venous prophylaxis at discharge.
- Implementing multiple interventions provides a robust strategy for ensuring sustained effectiveness of each individual intervention.
- Education of health professionals propagated the effectiveness of interventions aimed at achieving 100% compliance.
- Patient education is paramount in achieving compliance with postoperative prophylaxis for venous thromboembolism.

contributed to the rigour of the project aims from the day of operation. Unfortunately, the nationally mandated venous thromboembolism risk assessment scoring system has become an automatic tick-box exercise for most clinicians, which is a stark reminder to all health professionals that cognitively engaging with these exercises is paramount to patient safety.

The findings in this project could be replicated at any district general hospital in the UK. Although the author's institution is one of the smallest hospitals in the country, the problems arising with poor adherence to prescribing extended prophylaxis for venous thromboembolism may well be present at other institutions, as junior doctor rotation is commonplace in foundation training. Engagement with allied health professionals and educating them as well as patients is key to maintaining the effective and longevity of interventions.

Conclusions

The findings from the initial audit highlighted the problems with 4-monthly rotation of foundation doctors in general surgery. Failure to adhere to national guidance prompted a multidisciplinary approach to interventions to improve practice and maintain patient safety. Therefore, education of clinical staff involved in caring for patients undergoing surgery for colorectal cancer engages each team member to play their role in delivering the best care. The success of these collective interventions has been demonstrated in the 100% compliance with prescribing extended prophylaxis for venous thromboembolism at discharge in the reaudit period. This quality improvement project is the first to highlight the rotation of foundation doctors in surgery as a contributing factor to variable prescribing of extended prophylaxis for venous thromboembolism at discharge in patients following colorectal cancer-related surgery.

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Conflicts of interest

The authors declare no conflicts of interest.

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