

# The red dot initiative: An analysis of postoperative visits to the emergency department

Findings from a recent study suggest a formal notification system is needed to inform the operating surgeon when a patient who has undergone surgery presents to the emergency department with a surgery-related complaint.

## ABSTRACT

**Background:** A shift from surgeries followed by protracted postoperative hospital stays to more ambulatory surgeries has increased the likelihood of patients experiencing complications and concerns after they have been discharged. Despite this, we were unable to find a hospital or health region in British Columbia with a formal notification system to ensure continuity of care by informing surgeons when patients present to the emergency department postoperatively or are readmitted to hospital. A study was proposed to determine the magnitude of this problem and consider possible solutions.

**Methods:** The study was conducted at a mid-sized community hospital. Charts of patients presenting to the emergency department at Chilliwack General Hospital within 6 weeks of surgery were marked with a red dot sticker by the registration clerk to prompt nursing staff to ask questions and record information about the surgery. The charts marked and

annotated during this red dot initiative from 7 July to 30 September 2015 were copied after the patient was discharged, with the originals going to health records and a copy being placed, if appropriate, in the operating surgeon's hospital mailbox. Data collected on all red dot cases were analyzed and descriptive statistics were obtained.

**Results:** A total of 248 patients who presented to the Chilliwack General Hospital emergency department during the study period met inclusion criteria. Of these patients, 138 (56%) were found to have had their surgeries performed at the study site and 110 (44%) had their surgeries performed elsewhere. A total of 915 patients had surgery at Chilliwack General Hospital during the study period, allowing us to estimate that 15.1% (138/915) of patients made postoperative emergency department visits. Presenting complaints included pain (23.0%), infection (17.7%), and bleeding (12.5%). In terms of the disposition of patients upon discharge from the emergency department, less than half (40.3%)

were advised to arrange follow-up with their surgeon, more than a quarter (28.6%) required no follow-up, and a small number (11.7%) were instructed to contact their GP for follow-up. Only 2 patients (0.8%) were admitted to hospital.

**Conclusions:** Postoperative visits to the emergency department were common among surgical patients, suggesting a reliable notification system is needed to alert surgeons when this occurs. Furthermore, the majority of these emergency department visits were for minor complications or concerns, suggesting that an improvement in perioperative education could reduce unnecessary emergency department visits. In an extension of the study described here, more detailed information about presenting complaints and disposition of patients has been gathered for analysis and a survey was recently completed to assess the type of perioperative education patients received, their satisfaction with the information provided, and what delivery methods they would find most useful.

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Improvements in both surgical and anesthetic practices have shifted care away from surgeries followed by protracted postoperative hospital stays to a significant proportion of day and short-stay procedures. In 1986 approximately 40% of all surgical procedures in North America involved day surgery compared with approximately 65% in 2001.<sup>1,2</sup> Previously, when patients had longer hospital stays, surgeons were intimately involved in the identification and treatment of postoperative complications and continuity of care was maintained. A change in practice to more ambulatory surgery has increased the likelihood of patients experiencing complications and concerns after they have been discharged and has led to more patients presenting postoperatively to physicians' offices or the emergency department.

Currently, a formal notification system does not exist to inform sur-

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geons when their patients present to the emergency department with postoperative concerns, meaning surgeons may not be aware of or involved in the identification and care of surgical complications. They may even be unaware when patients are readmitted to hospital. The magnitude of this problem has not been determined and we have been unable to find a hospital or health region in British Columbia with a formal notification system. Previous attempts were made to address this problem at our site, Chilliwack General Hospital (CGH), by encouraging emergency department physicians to contact surgeons directly. When this did not result in reliable notification of surgeons, we proposed a study to consider this problem in more detail and determine if implementing an interdepartmental communication system might improve postoperative patient care.

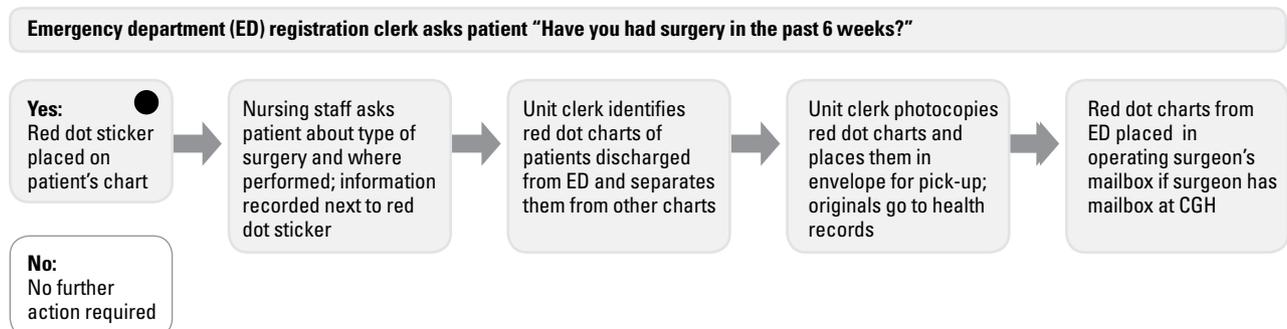
Our site is a mid-sized community hospital that provides services in general surgery, urology, obstetrics, gynecology, otolaryngology, orthopaedics, ophthalmology, and oral surgery, and sees approximately 60 000 emergency department visits annually. During 2017, 8772 surgeries were performed at CGH, including 4647 ophthalmology cases and 4125 cases from all other surgical subspecialties combined.

## Methods

A study was conducted using data collected at Chilliwack General Hospital in 2015. The study was approved for commencement by the local departments of Emergency Medicine and General Surgery as well as the executive director of health services in the Chilliwack area. Patients were included in the study if they presented to the emergency department within 6 weeks of surgery, regardless of their chief complaint and whether the surgery was conducted at the study site. Patients were excluded from the study if they had undergone dental or ophthalmologic surgeries. Dental cases were excluded because the majority of these procedures are performed in private office settings rather than in hospital, and ophthalmologic cases were excluded because ophthalmology is a regionalized service and is not specific to Chilliwack General Hospital.

A preliminary round of data collection took place from 15 May to 6 July 2015 to obtain a tally of postoperative emergency department visits, identify the hospitals where patients underwent their surgeries, and to develop a patient tracking process called the red dot initiative (**Figure 1**).

A second round of more detailed data collection using this process took



**Figure 1.** Red dot initiative: Process used to track patients visiting the Chilliwack General Hospital (CGH) emergency department for postoperative complaints.

place from 7 July to 30 September 2015. Only the data that was collected between 7 July and 30 September was used for analysis. The charts of patients presenting to the emergency department during this period were marked with a red dot sticker by the registration clerk to prompt nursing staff to ask questions about the surgery and record the answers. Information obtained included the surgeon who performed the original surgery, the presenting complaint, and the patient's disposition at discharge. Charts marked and annotated during this red dot initiative were copied after the patient was discharged, with the original going to health records and a copy being placed, if appropriate, in the operating surgeon's hospital mailbox.

The study protocol included a discretionary pathway for direct communication between the emergency room physician and the surgeon to address serious postoperative complications such as myocardial infarction, pulmonary embolism, and sepsis. Past experience with a high rate of false-positives for wound infection led to placing particular emphasis on

accurate diagnosis, appropriate treatment, and continued follow-up.

Data collected on all red dot cases were analyzed and descriptive statistics were obtained.

### Results

During the study period, 248 patients who presented to the Chilliwack General Hospital emergency department met study inclusion criteria. Of these patients, 138 (56%) had their surgeries performed at the study site, and 110 (44%) had their surgeries performed at other hospitals. A total of 915 patients underwent surgery at CGH during the study period, allowing us to estimate that 15.1% (138/915) of patients receiving surgery at the site made postoperative emergency department visits.

Presenting complaints (Figure 2) for all 248 patients presenting to the CGH emergency department varied: 57 (23.0%) presented with pain, 44 (17.7%) presented with postoperative infection, 31 (12.5%) presented with postoperative bleeding, 27 (10.9%) presented for concerns about wound appearance, and 13 (5.2%) presented

with symptoms of deep vein thrombosis or pulmonary embolism. In addition, 53 patients (21.4%) presented with other surgery-related complaints categorized as "Various." Only 23 patients (9.3%) presented with complaints unrelated to their surgery.

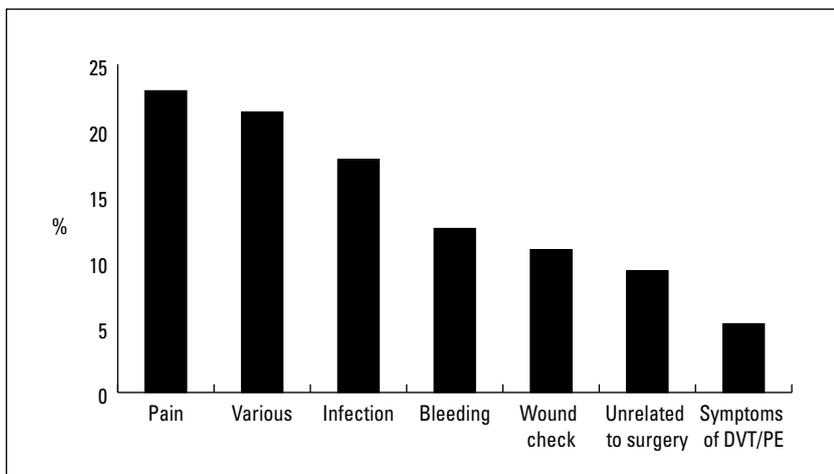
The disposition (Figure 3) of the 248 patients discharged from the CGH emergency department also varied: 100 (40.3%) were advised to arrange follow-up with their surgeon, 71 (28.6%) required no follow-up, and 29 (11.7%) were instructed to contact their GP for follow-up. Of the remainder, 23 (9.3%) had presented with complaints unrelated to surgery and their follow-up arrangements were not considered pertinent, and another 23 (9.3%) were categorized as "Other" because they had alternative follow-up arrangements. Only 2 patients (0.8%) required admission to hospital.

### Conclusions

The goal of this study was to identify patients presenting to the emergency department with postoperative complaints within 6 weeks of their surgery. The number of patients identified (15.1%) falls within a range found in other studies of postoperative complications presenting to the emergency department,<sup>3-5</sup> and in our study the vast majority of these (90.7%) presented with concerns directly related to the surgery performed.

### Continuity of care

Only 40.3% of patients were discharged with advice to contact their surgeon, leaving almost 60% of patients unlikely to communicate with their surgeon regarding the postoperative concern that resulted in the emergency department visit. This lack of communication can result in fragmentation of postoperative care and is an issue for several reasons.



**Figure 2. Presenting complaints of 248 patients visiting emergency department within 6 weeks of surgery.**

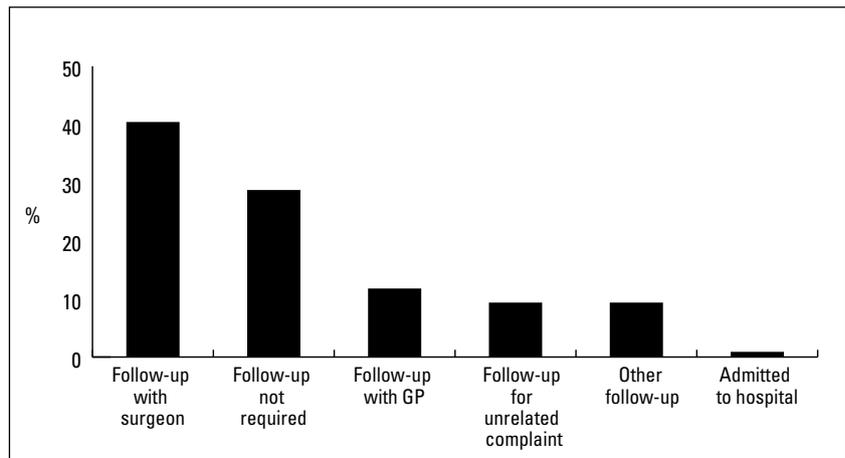
DVT/PE = deep vein thrombosis/pulmonary embolism

First, patients who require readmission postoperatively have been found to have higher survival rates at 1 year when cared for by the operating surgeon while in hospital,<sup>6</sup> suggesting that not having the surgeon involved can lead to less than optimal management of some postoperative complications. The study by Justiniano and colleagues also suggests that continuity of patient care at the hospital level is not in itself adequate and that continuity of care at the level of the surgeon improves patient outcomes.<sup>6</sup> Second, patients generally assume that their surgeon has been informed of their emergency department visits, new prescriptions, and changes in care. When they realize this is not the case, they may lose faith in both the surgeon and the health care system in general. Third, the lack of communication with the operating surgeon when a patient has a postoperative complication prevents surgeons from accurately tracking their postoperative complication rates and facilitating positive improvements in their practice and perioperative education of patients.

Our study findings suggest that a reliable, automatic, electronic notification system is needed to facilitate communication between the emergency department and surgeons. There is currently no formal notification system used in the Fraser Health Authority, where 71 442 surgeries (excluding ophthalmological procedures) were performed in 2017. Extrapolating from our findings that 15.1% of patients made postoperative emergency department visits, we suggest that over 10 000 patients a year could benefit from improved communication between the emergency department and surgeons.

### Perioperative education

The most common presenting com-



**Figure 3. Disposition of 248 patients discharged from emergency department.**

plaints in this study were pain (23.0%), infection (17.7%), and bleeding (12.5%). A significant proportion of patients presented for wound checks (10.9%), but very few patients presenting to the emergency department required admission (0.8%). These findings are similar to those of other studies.

When Mahnert and colleagues retrospectively assessed for return visits to the emergency department after hysterectomy for benign disease they found a low admission rate (1.0%) and that pain was by far the most common complaint (29.5%).<sup>3</sup>

A 2010 study by Aiello and colleagues looking at appendectomy patients reported a slightly higher postoperative admission rate (2.2%) and also found pain to be the most common complaint (48.0%), followed by wound concerns (13.0%) and fever (13.0%).<sup>4</sup>

A 2001 study by Imasogie and Chung found a 1.0% rate of readmission within 30 days of ambulatory surgery.<sup>7</sup> Similarly, a 1992 study by Biswas and Leary described a 1.2% rate of readmission after day surgery,<sup>1</sup> and a 1998 study by Mezei and Chung described a 1.1% rate of readmission

rate after ambulatory surgery across numerous specialties.<sup>2</sup> In addition to finding a very low admission rate in line with the studies described above, our study found that 28.6% of patients discharged from the emergency department required no follow-up whatsoever. These results indicate that significant postoperative complications are rare and suggest that initiatives to reduce excessive hospital visits would be beneficial.

A 2009 systematic review performed by Fredricks and colleagues found that intensive and individualized perioperative education is associated with a decline in postoperative symptoms experienced by the patient.<sup>8</sup> Improved counseling about what to expect during the postoperative period, delivered during preoperative patient preparation via the Preoperative Assessment Clinic, hospital-based teaching sessions, online resources, or other modalities, could reduce visits to the emergency department for minor complaints that are more appropriate for outpatient assessment. The expansion of perioperative education to reduce unnecessary emergency department visits is well supported in the literature.<sup>3,4,9,10</sup>

A reduction in unnecessary emergency department visits would benefit not only the individual patient by reducing the stress and anxiety associated with testing and intervention, but would eliminate expenditures incurred by the health system for such visits.

### Further data analysis

In an extension of the study described here, we have gathered more information from a larger population to identify patient needs and deficiencies in current care. These data on presenting complaints and disposition of patients are currently being analyzed. As well, a postoperative survey was recently completed to assess the perioperative information patients received, their satisfaction with the information provided, and what delivery methods they would find most useful (e.g., preoperative teaching sessions at the hospital, online videos, preadmission clinic appointments). The data are also currently being reviewed and analyzed. Findings from this survey will be used to assist the working group that has been established to review preadmission processes and modify perioperative patient education.

### Study limitations

The main limitation to this study is a data collection process that relied on patients remembering they had undergone a surgical procedure and registration clerks remembering to ask an initial question about surgery. Significant numbers of patients could have been missed because of this reliance on memory. Other limitations include a small sample size consisting of patients at a single community hospital and a study design focused on a limited amount of data, specifically the number of postoperative visits made by patients to the emergency department and where their surgery took

place. These limitations mean the findings may not apply to other sites. Furthermore, we acknowledge that organizational culture varies from site to site and can affect communication between emergency physicians and surgeons. For example, surgeons at the study site agreed to be contacted directly by phone during working hours and additional evening hours regarding their patients presenting to the emergency department with postoperative complications regardless of whether they were on call, something that may not be acceptable to surgeons at other sites. Similarly, we acknowledge that perioperative education varies from site to site and across surgical specialties.

### Summary

An analysis of data collected during the red dot initiative at Chilliwack General Hospital found postoperative visits to the emergency department were common among surgical patients but that the majority of visits were for minor complications or concerns. This and other findings support development of a notification system that improves communication between the emergency department and surgeons. Further study is underway to improve perioperative education, with preliminary data suggesting that teaching patients what to expect during the postoperative period could reduce unnecessary emergency department visits. [BCMJ](#)

### Competing interests

None declared.

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