Medical audit

28-Day emergency surgical re-admission rates as a clinical indicator of performance

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With the introduction of clinical governance, the NHS Executive has identified 28-day emergency re-admission rates as a clinical indicator to be used to assess and compare performance between NHS trusts. We undertook a 3-month retrospective audit of patients identified from the trust computer as having been re-admitted as an emergency within 28 days of discharge from the general surgical division. We wanted to examine reasons for re-admission, possible errors in coding and any preventable factors in these patients subsequently re-admitted acutely.

Key words: Clinical competence – Postoperative complications

As a method of assessing and comparing performance within different NHS trusts, various clinical indicators have been identified which are thought to reflect adverse events and complications of treatment. One of these indicators is 28-day emergency re-admission rates, high rates being said to raise questions about the quality of care and clinical competence.¹

We wanted to see whether 28-day emergency re-admission rates are a reasonable surrogate marker of performance or whether, in fact, it is too complex a marker to be used either locally or nationally. The aim of our study was to examine the reason for re-admission and possible errors in the coding for emergency re-admission rates within 28 days of a discharge within the general surgical division.

Patients and Methods

A 3-month retrospective case-note review was performed on general surgical re-admissions to Hull Royal Infirmary

between April and June 2000 (inclusive). Patients were identified using the hospital's 'Clinicom' patient administration system using the in-built 28-day re-admission search tool. The case-notes were then obtained for each patient and a form completed with the details of each admission. In those re-admissions correctly identified as such, an attempt was made to decide whether the re-admission was preventable or not.

Results

The total number of admissions to the general surgical division between April to June 2000 (inclusive) was 1914 of which 77 (4.0%) were emergency re-admissions (Table 1). Of the 77 patients identified as emergency re-admissions, 72 case-notes were obtained and reviewed (93.5%). Of those reviewed, 52 (72.2%) were correctly coded as surgical re-admissions, of which 2 (3.8%) were felt to be unrelated. Three patients (5.8%) died after subsequent re-admission.

The initial diagnosis of those patients correctly identified as having been re-admitted is shown in Table 2. The mean age of patients was 54.2 years and the mean duration of the first admission was 7.7 days (range, 1–87 days). We also noted the last recorded white cell count (WCC) and temperature to see if this would be an indicator

Table 1 Number of admissions (elective, emergency and day-case) to the general surgical unit (April–June 2000)

	<i>n</i>	% of total
Emergency	1032	53.9
Emergency re-admission	77	4.0
Elective	805	42.1
Total	1914	

Table 2 Diagnosis at initial admission

Diagnosis	Patients (<i>n</i>)
Appendicitis	6
Cholecystitis	6
Constipation	5
Diverticular disease	5
Non-specific abdominal pain	3
Elective colectomy	3
Elective vasectomy	2
Bleeding <i>per rectum</i>	2
Peri-anal abscess/fistula	2
Adhesive small bowel obstruction	2
Elective Nissen's fundoplication	2
Elective mastectomy for carcinoma	1
Pancreatitis	1
Miscellaneous*	9

*Parastomal infection, ileostomy reversal, anterior sphincter repair, axillary abscess, gastro-enteritis, blocked biliary stent, incarcerated inguinal hernia, infected hernial mesh, in-patient colonoscopy.

Table 3 Diagnosis of problem leading to re-admission

Diagnosis	Patients (<i>n</i>)
Wound infection	8
Non-specific abdominal pain	8
Constipation	5
Bleeding <i>per rectum</i>	5
Perforated viscus	3
Colonic obstruction	3
Pancreatitis post ERCP	2
Dysphagia post Nissen's fundoplication	2
Diverticulitis	2
Adhesive small bowel obstruction	1
Wound haematoma	1
Miscellaneous*	12

*Renal cell carcinoma, parastomal abscess, high stoma output – dehydration, epididymitis post vasectomy, blocked biliary stent, biliary colic, renal colic, empyema of gallbladder, myocardial infarction, Crohn's disease, abdominal collection postoperatively, peri-anal abscess.

of re-admission. The median WCC was 8.9 and median temperature was 37.0°C, both within normal limits. Of the patients, 30% were discharged initially by the consultant, 62% by the registrar and 8% by the senior house officer.

The median re-admission interval was 6 days. The problem necessitating re-admission is shown in Table 3. The mean duration of the second admission was found to be 6 days (range, 1–36 days). Of the patients, 23 (46%) underwent an operation on the first admission (Table 4) of whom 5 (10%) were re-operated on when subsequently re-admitted (Table 5). Eight patients (16%), not operated on initially, underwent surgery when re-admitted and are shown in Table 6.

Of the 50 correctly coded related admissions, 11 were thought to have been preventable on review of the notes. Of these, 6 had been discharged before all the relevant investigations had been performed which, on balance, would have prevented a subsequent admission. Two patients had unrecognised colonic obstruction and both underwent laparotomy on subsequent re-admission. Both

Table 4 Patients correctly coded as re-admissions and operated on initially

Diagnosis	Patients (<i>n</i>)
Appendicectomy	6
Colectomy	5
Laparoscopic Nissen's fundoplication	2
Ileostomy reversal	2
Fistulotomy	2
Laparoscopic cholecystectomy	2
Mastectomy	1
Anterior sphincter repair	1
Right inguinal hernia repair	1
Removal of infected mesh	1

Table 5 Patients correctly coded as re-admissions and re-operated upon on subsequent admission

Operation	Patients (<i>n</i>)
Perforation – laparotomy and repair	2
EUA	1
Laparoscopic removal of crural suture post Nissen's fundoplication	1
I&D peri-anal abscess post fistulotomy	1

Table 6 Patients correctly coded and operated upon on subsequent admission

Operation	Patients (<i>n</i>)
Laparoscopic cholecystectomy	3
Extended right/right hemicolectomy	2
I&D axillary abscess	1
Choledochojejunostomy (failed re-stent)	1
Hartmann's procedure	1

Table 7 Reason for patients being incorrectly coded as re-admissions

Reason	Patients (n)
Elective re-admission	5
Previous out-patient OGD	3
Previous out-patient ERCP	3
Previous out-patient chemotherapy	3
Ward attender	2
Transfer back from other hospital	2
Previous out-patient sigmoidoscopy	1
Previous out-patient colonoscopy	1

patients died and their deaths were deemed potentially preventable had they been more fully investigated on the first admission. Three patients had been discharged too early postoperatively and had developed postoperative complications necessitating re-admission. One patient was re-admitted unnecessarily by a GP who had not reviewed the patient prior to requesting admission. The other was a large peri-anal abscess treated initially by antibiotics rather than by formal drainage.

Twenty patients (27.8%) had incorrectly been coded as having had an emergency surgical re-admission. Most patients were incorrectly coded as having been in-patients prior to their emergency admission, when in fact they had attended for an out-patient procedure. The others had been either re-admitted electively or transferred back from another hospital. A breakdown of these patients is shown in Table 7.

Discussion

Emergency re-admissions accounted for 4.0% of the total number of admissions in the study period. This figure is similar to those found in other studies such as in North East Thames² (4.1%), Leicestershire³ (4.5%), and Oxford⁴ (5.3%). It has been suggested, however, that re-admission rates can only usefully be used to compare outcome between hospitals when both the proportion of re-admissions that are avoidable and the proportion of patients with adverse outcomes who are re-admitted are known.⁵ This information can only be obtained from local studies and not inferred from crude re-admission rates.⁵

Of the 50 correctly coded re-admissions, we identified 11 (22%) which were deemed potentially avoidable. A study of 28-day re-admission rates in the North Thames Region found surgical re-admissions to be more avoidable than medical re-admissions, and surgical re-admissions at 0–6 days after discharge were more avoidable than those at 21–27 days.⁶ On further analysis of our figures, 8 of the 11 re-admissions (72.7%) were re-admitted 0–6 days after discharge. Our study would, therefore, seem to support this observation. Such observations have led to the suggestion that more research should be undertaken to see if the

indicator should be limited to emergency re-admissions within the first 7 days after discharge.⁷ Of the 2 potentially avoidable deaths in our study, one patient was re-admitted 1-day after discharge, the other at 14 days. Reducing the indicator to re-admissions within 7 days in our study would have missed one of these deaths and, therefore, underestimated the degree of adverse outcome. In fact, re-admission mortality has been proposed as a more useful 'screening tool' as an indicator of outcome of hospital care.⁸

In Scotland, 28-day emergency re-admission rates for specific operations are used as clinical indicators between trusts, as directed by the Clinical Outcomes Working Group.⁹ Operations cited include emergency appendicectomy, elective prostatectomy, elective hysterectomy and elective total hip replacement. Large studies, such as the Oxford record linkage study,⁴ have shown these procedures to have the highest re-admission rates within 28 days, with appendicectomy and colectomy having the highest re-admission rates of those general surgical operations studied. Interestingly, in our study of the 23 patients operated on initially (Table 4), 11 (47.8%) had undergone appendicectomy or colectomy. However, the number of patients in our study is too small to be significant, with a longer period of study necessary to identify more accurately those procedures associated with a higher risk of re-admission.

Acquiring accurate and relevant information has been identified as necessary to monitor clinical practice and implement clinical governance.¹⁰ For 28-day emergency re-admission rates to be accurate and meaningful, all patients must be correctly coded and have surgical complications necessitating re-admission. Ideally this would exclude medical problems and complaints such as non-specific abdominal pain, which together in our study accounted for 9 of the 52 re-admissions (17%). The main error identified in our study was incorrect coding of patients. Twenty patients (27.8%) were incorrectly identified by the patient administration system as emergency re-admissions within 28 days, resulting in an overestimation of the actual re-admission rate for the period studied. Using rates of re-admission as an outcome indicator will partly reflect differences in accuracy of data collection between hospitals.⁶ This emphasises the need for accurate coding in order to compare re-admission rates between different trusts.

Conclusions

Accurate emergency 28-day re-admission rates, when combined with local studies such as this, can highlight where care has been sub-optimal, and re-admissions and even deaths prevented. However, just comparing rates between trusts does not allow for inaccuracies in coding and makes no attempt to quantify the number of

avoidable re-admissions which, with better quality of care, could be avoided. It is these avoidable admissions from which lessons could be learnt and clinical practice modified accordingly. Emergency re-admission rates could, therefore, be more usefully employed to identify those trusts with high re-admission rates where more detailed local studies would be of benefit. Quantifying the number of patients in such trusts with avoidable adverse outcomes would then more accurately identify where the general level of care has been sub-optimal and improvements are necessary.

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