Hospital readmissions: a re-evaluation of criteria

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■ A prospective study surveyed patients discharged from the Cardiology, Cardiovascular Surgery, and Gastroenterology services of the Cleveland Clinic Hospital during April and September 1987. The total number of hospital discharges during the study period was 5,349; the study population discharged during this period included 1,640 patients (30.7% of all hospital discharges). In the study population, 149 patients were readmitted (9.1%). The percentage of readmissions was similar for both months and similar to that reported in the literature. However, when readmissions were categorized into four subsets, significant differences were found. The four categories were: 1) complication of a previous admission (16.8% of readmissions), 2) recurrence of the disease process (11.4% of readmissions), 3) planned treatment (53% of readmissions), and 4) unrelated new diagnosis (16.1% of readmissions). The authors conclude that reviewing readmission rates without using these subdivisions can be misleading, and the results are inappropriate for evaluating the quality of medical care given in an acute care hospital. They recommend that these four subdivisions be included in future studies of readmission rates in acute care hospitals.

□INDEX TERM: PATIENT DISCHARGE □CLEVE CLIN J MED 1989; 56:704–708

QUALITY of medical care is an issue that has come to the forefront in medicine because of the profession's desire to prove quality and the demand to insure quality by those who pay for the care. Various criteria are being evaluated as potential quality indicators.[1] Recent discussions concerning quality of care have used structure, process, and outcome as parameters.[1] The ability to quantify outcomes of care more accurately has also received attention,[2] both generally and in medicine. One of the most important criteria is readmission to the hospital.

■ *See also the editorial by Anderson (pp 674–675)*

Readmission to an acute care hospital within a 15- to 30-day period following discharge has been suggested as an indicator of quality of care.[3] Although not always stated, readmissions have had negative implications for both quality assurance and, increasingly, for reimbursement. As an example, mechanisms established by the Health Care Financing Administration[4] have been to review admissions within 15 days of discharge from the acute care hospital to insure quality of care for Medicare recipients. Specifically, peer review organizations (PROs) are instructed to:

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1. Identify all admissions occurring within 15 calendar days of discharge.
2. Compare diagnostic codes for the two stays to determine whether the two stays are related.
3. Attempt to define readmissions in which "the second stay appears to be the result of inadequate care provided in the first stay."
4. Deny all claims where readmission results from premature discharge or the readmission is for care that "pursuant to professional recognized standards of health care, should have been provided during the first admission."

Hospital readmission has been a significant concern for Medicare as well as other patients, in part because of the cost of hospital readmission. In 1984 Anderson and Steinberg[5] reported that from 1974 to 1977, 24% of Medicare inpatient expenditures resulted from readmissions and that within 60 days of discharge the readmission rate was 22%. This phenomenon has also been studied in the National Health Service in the United Kingdom, and readmissions have been called "the price of early discharge." In a study of the National Health Service of 1977 compared with 1983, it was noted[6] that the length of stay had decreased, but the readmission rates had increased. Despite the economic and quality of care concerns, few studies of readmission address criteria other than the patient's age,[7] postoperative readmissions,[8] or follow-up of patients with a specific disease.[9] A study from the medical service of a referral hospital,[10] which included 1,646 consecutively admitted patients, demonstrated a 16.9% readmission rate within 90 days.

Although readmission clearly has a major economic impact and may be a quality indicator, it is necessary to classify readmissions in order to understand their significance. In an effort to classify readmissions and to determine whether readmission to the hospital is an indicator of poor care, we studied a cohort of patients admitted and readmitted to the Cleveland Clinic Hospital.

MATERIALS AND METHODS

The Cleveland Clinic Hospital is a 1,008-bed institution where tertiary care referrals and complex medical problems are the norm. As part of a quality assurance program, quality indicators and clinical practices were reviewed, including readmissions. We reviewed all readmissions within 30 days of a previous discharge in a group of patients admitted during April and September 1987. All hospital discharges from the services of Cardiovascular Surgery, Cardiology, and Gastroenterology were reviewed; these services represent departments with both medical and surgical patients and include approximately 30% of all hospital discharges.

The reviews were carried out prospectively; the services were chosen to obtain a representative sample of activity in the hospital and because they are active clinical services. Prospective criteria for readmission were established that were appropriate both for the surgical and medical care of these patinets. All admissions and readmissions from these services to the hospital were compiled by members of the Medical Records Department. Readmission criteria were determined and established by the physician members of the committee. All cases were reviewed and were validated by physician members of the Cleveland Clinic Hospital's Medical Records and Statistics Committee or the Quality Assurance Office.

CRITERIA

In assessing the reasons for readmission within 30 days of a discharge from the Cleveland Clinic Hospital, four general criteria were established. These included:

1. Readmission as a result of a complication related to the original admitting diagnosis or treatment. The complication occurred after discharge but was directly related to the previous admission.
2. Readmission for recurrence of the illness that necessitated the original hospital admission. This included patients whose medical condition was stable at the time of discharge and for whom readmission constituted a new episode of the illness.
3. Readmission for planned treatment. This included patients readmitted for planned additional therapy that for medical reasons could not be accomplished during the original hospital stay.
4. Readmission unrelated to the previous admission. The new illness, which occurred within the 30 days after discharge, was unrelated and involved a different organ system.

RESULTS

The total number of hospital discharges during the study period (April and September 1987) was 5,349; the study group included 1,640 patients who were discharged from three services during this time, and 149 patients (9.1%) who were readmitted to the Cleveland Clinic Hospital (*Table 1*). Fifty-three percent of readmissions within 30 days of discharge were for planned treatment (criterion 3). As *Table 1* demonstrates, most of the patients in this category required a cardiovascular procedure that could not be performed during the first stay be-

TABLE 1
READMISSIONS AFTER 1,640 TOTAL DISCHARGES FROM CARDIOLOGY, CARDIOVASCULAR SURGERY, AND GASTROENTEROLOGY SERVICES APRIL (864 DISCHARGES) AND SEPTEMBER (776 DISCHARGES) 1987

Reasons for readmission	April (*n* = 67) Number (%)	September (*n* = 82) Number (%)	Total (%) (*n* = 149)
Complication of previous illness or treatment	14 (20.9)	11 (13.4)	25 (16.8)
Postoperative infection	5 (7.4)	–	
Wound infection	–	3 (3.6)	
Congestive heart failure	2 (3.0)	2 (2.4)	
Supraventricular tachycardia	2 (3.0)	–	
Unstable angina	–	2 (2.4)	
Postoperative pulmonary effusion	1 (1.5)	–	
Pacemaker malfunction	–	1 (1.2)	
Acute bacterial endocarditis	1 (1.5)	–	
Bacterial endocarditis	–	1 (1.2)	
Stricture esophageal anastomosis	1 (1.5)	–	
Pericardiotomy syndrome	1 (1.5)	–	
Postcardiotomy syndrome	–	1 (1.2)	
Persistent vomiting	1 (1.5)	–	
Malnutrition associated with cancer	–	1 (1.2)	
Recurrence of primary illness	8 (11.9)	9 (11.0)	17 (11.4)
Coronary artery disease	4 (6.0)	1 (1.2)	
Supraventricular tachycardia	1 (1.5)	–	
Ventricular tachycardia	–	1 (1.2)	
Congestive heart failure	1 (1.5)	3 (3.6)	
Atrial fibrillation	–	1 (1.2)	
Hypertrophic nonobstructive cardiopathy	–	1 (1.2)	
Cholecystitis	–	1 (1.2)	
Esophageal stricture secondary to cancer	–	1 (1.2)	
Melena	1 (1.5)	–	
Intrahepatic calculi	1 (1.5)	–	
Planned treatment	31 (46.3)	48 (58.5)	79 (53.0)
CABG following catheterization	16 (23.9)	20 (24.4)	
Percutaneous transluminal angioplasty	4 (6.0)	4 (4.9)	
Aortic valve replacement	2 (3.0)	5 (6.1)	
Mitral valve replacement	2 (3.0)	5 (6.1)	
Heart transplant	1 (1.5)	–	
Aneurysectomy following cardiac catheterization	–	1 (1.2)	
Cardiac catheterization	–	2 (2.4)	
Post MI (6 weeks) catheterization	1 (1.5)	–	
Laser treatment of esophageal cancer	–	4 (4.9)	
Pulmonary surgery	2 (3.0)	–	
Colonoscopy for GI bleeding	–	1 (1.2)	
Ileocolic resection	1 (1.5)	–	
Lung lobectomy	1 (1.5)	–	
Lung cancer treatment	–	1 (1.2)	
Ostium primum defect	–	1 (1.2)	
Sclerotherapy	1 (1.5)	–	
Excision tumor thrombus	–	1 (1.2)	
Other planned surgery	–	3 (3.6)	
Unrelated to previous admission	11 (16.4)	13 (15.9)	24 (16.1)
Inadequate data	3 (4.5)	1 (1.2)	4 (2.7)

cause of the patient's clinical status and not because of any logistic aspect such as scheduling. Sixteen percent of patients were admitted to the hospital for reasons unrelated to the original diagnosis (criterion 4).

Readmissions directly related to the previous hospital admission (criterion 1) or recurrence of the illness that was the primary reason for the first admission (criterion 2) constituted 28% of the readmissions in this study. Three percent of the readmissions could not be analyzed because of inadequate data.

DISCUSSION

Readmission as a result of a complication of the previous admission is undesirable, but it is not necessarily due to poor care. Readmissions for either planned therapy or for unrelated illnesses should not have a negative connotation and may, in fact, be evidence of good and efficient care. It has been observed that rates of readmission to hospitals have increased. However, the rate of increase was lower in the first four years of the prospective payment system than in the preceding four years.[11] In our study, 53% of the readmissions to our hospital were for planned treatment. Sixteen percent of the readmissions were because of a condition unrelated to the original diagnosis, reflecting the numbers of multiple illnesses and complex cases, which are more common in this tertiary care institution.

Obviously, accurate definition and monitoring of hospital readmissions are essential. We believe our proposed classifications help in understanding readmissions. Many criteria have been used, and others implied, in attempts to develop criteria for assessing quality of care and outcome; using readmission alone, however, may not be justified because the readmission may be unrelated to a previous diagnosis. The reasons for unrelated readmissions, which should be treated separately in these kinds of assessments, should be relatively simple to establish, and planned treatment should be documented and can be reviewed. Differentiating between a complication and recurrence may be difficult, but can usually be done.

Readmission is of special concern in the Medicare population, both because older patients are more likely to have multiple and serious diseases, and because of the economic and social implications of health care in this age group.[5]

In a study by Fethke et al,[7] 47% of the patients had at least one unplanned readmission. This was related to the severity of illness, the patient's age, and the patient's social circumstances. In addition, it has been observed that the longer the hospitalization the greater the chance of readmission; in the study by Berkman and Abrams,[9] 67% of patients whose initial hospital stay was longer than 14 days required readmission, whereas only 18% of those whose stays were fewer than 14 days required readmission. Furthermore, regional differences in readmission rates for Medicare patients have been noted[12] for operations such as prostatectomy, cholecystectomy, and total hip replacement.

Other studies focus not on the older patient but on specific hospital circumstances, including a review of rehospitalization following coronary artery bypass graft (CABG) operations[13] and of patients discharged from a medical intensive care unit.[14] In the study of coronary bypass patients,[13] 24% of patients were readmitted within six months, and 26% of those were readmitted for noncardiac reasons. Among patients discharged from the intensive care unit,[14] 30% were readmitted for a reason unrelated to the original admission to the intensive care unit.

Ellwood[15] recently called for accelerating "the use of outcome management by adding a uniform set of life measures as a new data element." Accurate definition of readmissions can be one of these measures. We believe that the studies cited here support our concept of separating or subdividing reasons for readmission to an acute care hospital. It is clear, based on this study and others[7,9,10,13,14] that readmissions must be classified to develop meaningful data for quality assurance. When categorized this way, the information can be used for internal (hospital) quality assurance programs as well as for external comparison and payment purposes.

We believe our study demonstrates that the relatively simple criteria for evaluating readmissions could be broadly applied and data could be obtained to compare hospital experiences, if desired. The criteria of 1) complication, 2) recurrence, 3) planned treatment, and 4) unrelated illness can be applied to a wide spectrum of hospitalized patients and could form the basis of further studies.

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REFERENCES

1. Donabedian A. Quality assessment and assurance: unity of purpose, diversity of means. Inquiry 1988; **25**:173–192.
2. Lohr KN. Outcome measurement: concepts and questions. Inquiry 1988; **25**:37–50.
3. Brook, RH, Lohr KN. Monitoring Quality of Care in the Medicare Program. JAMA 1987; **258**:3138–3141.
4. Omnibus Budget Reconciliation Act, October 21, 1986; Section 9352(b):535,536,536A.
5. Anderson GF, Steinberg EP. Hospital readmissions in the Medicare population. N Engl J Med 1984; **311**:1349–1353.
6. Jones J. Readmission rates: the price of early discharge. Health Serv J 1986; **96**:825.
7. Fethke CC, Smith IM, Johnson N. "Risk" factors affecting readmission of the elderly into the health care system. Med-Care 1986; **24**:429–437.

8. Roos LL, Cageorge SM, Roos NP, Danzinger R. Centralization, certification, and monitoring: readmissions and complications after surgery. Med Care 1986; **24:**1044–1066.
9. Berkman B, Abrams RD. Factors related to hospital readmission of the elderly cardiac patients. Soc Work 1986; **31:**99–103.
10. Smith DM, Norton Ja, McDonald CJ. Nonelective readmissions of medical patients. J Chronic Dis 1985; **38:**213–224.
11. Schramm CJ, Gabel J. Prospective Payment. Some Retrospective Observations N Engl J Med 1988; **318:**1681–1683.
12. Riley G, Lubitz J. Outcomes of surgery in the Medicare aged population: rehospitalization after surgery. Health Care Finance Rev 1986; **8(1):**23–34.
13. Stanton BA, Jenkins CD, Goldstein RL, Vander Salm TJ, Klein MD, Aucoin RA. Hospital readmissions among survivors six months after myocardial revascularization. JAMA 1985; **253:**3568–3575.
14. Franklin C, Jackson D. Discharge decisionmaking in a medical ICU: characteristics of unexpected readmissions. Crit Care Med 1985; **11:**61–66.
15. Ellwood, PM. Shattuck Lecture—Outcomes management: a technology of patient experience. N Engl J Med 1988; **318:**1549–1556.