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Editorial

The Role of Incident Reporting in Continuous Quality Improvement in the Intensive Care Setting

Quality in clinical care and overall management have become major issues in health care provision. Quality must be differentiated from efficiency: making medical care more efficient does not necessarily improve its quality. Also, achieving the highest possible standards from the perspective of all groups who could be construed as "customers" of an intensive care unit (e.g. relatives and friends of patients, trainees, referring doctors) is unlikely to reflect the best use of resources. With limited resources, gaining the greatest increase in quality and quantity of life ("health") for each available dollar and having a humane approach in a sympathetic environment (likely to lead to "satisfaction") must be the prime aims[1]. Thus, improvements in the quality of clinical care should ultimately be verified by direct measurements of the improved health, functional status and satisfaction of the individuals in the population served[2].

In intensive care, however, key outcomes may be late and affected by factors not influenced by medical care. For example, the nature and severity of the disease may be more important in determining outcome than individual treatment options. The challenge is to develop outcomes that are measurable and relevant to intensive care. Final outcome measures that have been used include: mortality rates in intensive care, in hospital and six months after discharge; comparison of predicted versus actual mortality rates; length of stay in intensive care and in hospital; neurological outcome and measurements of functional status[3,4].

Intermediate outcome variables have included measurements such as the frequency of incidents, intensive care readmissions or nosocomial infections, adequacy of analgesia or sedation, duration of ventilation/intubation, and indicators of patient or relative satisfaction.

Although initiatives are underway to improve outcome measures, it is still important to pay close attention to "structure" and "process" in intensive care, both of which must underpin any improvements in outcome. The "structure" of intensive care in Australia and New Zealand (e.g. buildings, equipment, staffing levels) is generally of a very high standard, and is likely to be safeguarded by the requirements of both bodies which accredit hospitals and intensive care units for training.

Attention to "process" requires continuous assessments of and improvements in quality of care. One of two basic approaches can be adopted[1,5]. The first approach is concerned with the isolation of "low-quality" outliers and often results in taking punitive action, whereas the second approach focuses on improving the general, average level of care. Here the focus is on problems with the system rather than with people and on learning, not defensiveness. Excellence as well as deficiency of care are considered. This approach assumes that even when people make a mistake, underlying problems with the system such as poor job design, failure of leadership, or unclear purposes can often be identified. People are seen as having good intentions and team participation to improve quality of care is encouraged. This approach is based on the theory of continuous improvement[1,6]. It involves an iterative loop of monitoring activities, assessment and analysis of variations in practice, instituting interventions and follow-up. It consists of a series of internal, organization-based, professionally led efforts to improve many small processes of care in a ceaseless cycle of examination and change[5].

In seeking to improve the system it is first necessary to determine what is going wrong. This can be monitored prospectively, with appropriate information systems, by measuring variances from predetermined clinical pathways, i.e. applying statistical process control to each clinical problem, but this is expensive and lies somewhere in the future for most of the condi-

tions treated in intensive care. A simpler approach is to analyse the circumstances surrounding anything which goes wrong (adverse events).

Adverse events can be caused by human error, by problems inherent in complex systems and, most commonly, by combinations of these. Error researchers typically find that at least 80% of serious incidents in complex systems where humans and machines interact involve human error[7,8]. Two broad categories of errors exist — active and latent errors. Active errors are usually immediate precursors to an incident or accident, whereas latent errors may occur well before the time of an accident, and are embedded in the milieu in which an unintended action or active error may lead to an incident or accident. Although human errors must be seen as a normal part of everyday life, their effects and frequency may be reduced with a clearer understanding of the processes underlying them.

Thus, an initial first step in the desire to improve the safety of patients is to identify adverse or potentially adverse events to try to elucidate the underlying causes and contributing factors. Useful processes are in place to monitor major adverse events[9,10] and these include mortality reports, morbidity reports, medical defence reports, "closed claims" studies, hazard alerts, medical record analysis and anecdotes or experience. Although the major events detected by these methods are easy to identify and define, they are insensitive indicators of overall patient safety. Techniques utilizing the reporting of all incidents do not require death or injury to occur to identify errors, suffer less from "outcome bias" and may elicit rich detail about contributing factors[11,12]. Anonymous incident reporting has the advantage that it is relatively cheap, potentially universally applicable, medico-legally safe and may elicit a large volume of relevant, specific information[13,14]. This approach, however, does not provide a numerator or denominator, so that the absolute incidence of a particular type of problem cannot be assessed. Nevertheless, a great deal of detailed information about the qualitative nature of what is happening can be gained from incident monitoring, and this is perfectly adequate for designing both prospective studies and preventive strategies[15]. All the methods listed above have their own advantages and disadvantages, and should be regarded as complementary rather than mutually exclusive.

The purpose of a systematic method of investigating incidents is to determine causal factors and to prevent future incidents. The chain of responsibility to prevent the occurrence of any incident may be long and complex, and the entire system needs to be addressed: the person reporting the incident is only one link. Incident investigation should aim to determine what happened, how it happened and to make recommendations to prevent it happening again. Incident monitoring is a means of identifying deficits in quality of care, and an important first step in the quest for Quality Management in Intensive Care. A number of steps are involved in the prevention and management of errors, incidents and accidents. They include: finding out what is going on, collating this information, categorizing problems, developing strategies, putting them into place, and then assessing if these are working[8].

The Australian Incident Monitoring Study in Intensive Care (AIMS-ICU) was established to identify and report incidents which are potentially harmful to patients being cared for in the intensive care environment. This project systematically examines incidents, as well as the causes and preventive measures associated with these incidents, at a national level. A voluntary anonymous incident reporting system is used, which is medico-legally safe and provides prospectively collected qualitative information. Qualitative research methodology is particularly useful where problems are complex, contextual and influenced by the interaction of physical, psychological and social factors, and thus seems well suited to probing the factors behind human error and system failure in the complex environment of the intensive care unit. It may be regarded as hypothesis generating research: quantitative research methods may then be better directed at problem areas identified by qualitative methods[15]. The details of the methodology used to develop, introduce and evaluate an anonymous voluntary incident reporting system in intensive care are given on pages 314-319 and the findings of the first year of incident reporting are described on pages 320-329 of this issue of the Journal[16,17].

The next step is to gather sufficient information to allow a detailed analysis of the specific areas in which our care most frequently fails, compromises patient safety and generally increases cost. Initial analysis of incidents reported so far suggests that this will provide sufficient rewards to justify the effort involved.

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REFERENCES

1. Berwick DM. Continous improvement as an ideal in health care. N Engl J Med 1989; 320:53-56.
2. Rutstein DD, Berenberg W, Chalmers TC, Child CG 3rd, Fishman AP, Perrin EB. Measuring the quality of medical care. N Engl J Med 1976; 294:582-588.
3. Knaus WA, Draper EA, Wagner DP, Zimmerman JE. An evaluation of outcome from intensive care in major medical centers. Ann Int Med 1986; 104:410-418.
4. Jackson T, Macarounas-Kirchmann K. Changing patterns in ICU admission and length of stay in five Victorian hospitals. Presentation: Australian Health Economics Society Meeting, Canberra, Australia, Sept. 18, 1992.
5. Lohr KN, Schroeder SA. A strategy for quality assurance in medicare. N Engl J Med 1990; 322:707-712.
6. Roper WL, Winkenwerder W, Hackbarth GM, Krakauer H. Effectiveness in health care. N Engl J Med 1988; 319:1197-1202.
7. Cooper JB, Newbower RS, Long CD, McPeek B. Preventable anesthesia mishaps: A study of human factors. Anesthesiology 1978; 49:399-406.
8. Runciman WB, Sellen A, Webb RK et al. Errors, Incidents and Accidents in Anaesthetic Practice. Anaesth Intens Care 1993; 21:506-509.
9. Warden JC, Borton CL, Horan BF. Mortality associated with anaesthesia in New South Wales, 1984-1990. Med J Aust 1994; 161:585-593.
10. Paull JD, Holland RB. Monitoring morbidity. Anaesth Intens Care 1988; 16:90-92.
11. Williamson J. Critical incident reporting in anaesthesia. Anaesth Intens Care 1988; 16:101-103.
12. Symposium Report: Critical incidents in anaesthesia: medico-legal and other aspects. Can J Anaesth 1991; 38(8):1028-1036.
13. Williamson JA, Webb RK, Pryor GL. Anaesthesia safety and the "critical incident" technique. Aust J Clin Review 1985; 5:57-61.
14. Webb RK, Currie M, Morgan CA, et al. The Australian Incident Monitoring Study: An analysis of 2000 incident reports. Anaesth Intens Care 1993; 21:520-528.
15. Runciman WB. Qualitative versus quantitative research—Balancing cost, yield and feasibility. Editorial. Anaesth Intens Care 1993; 21:502-505.
16. Beckmann U, West LF, Groombridge GJ, et al. Australian Incident Monitoring Study: AIMS-ICU. The development and evaluation of a voluntary anonymous incident reporting system in intensive care. Anaesth Intens Care 1996; 24:315-326.
17. Beckmann U, Baldwin I, Hart GK, Runciman WB. Australian Incident Monitoring Study in Intensive Care. AIMS-ICU. Analysis of the first year of incident reporting. Anaesth Intens Care 1996; 24:321-330.