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International Journal of Medical Informatics 47 (1997) 87–90

International Journal of Medical Informatics

The anaesthesia critical incident reporting system: an experience based database

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Abstract

To date there have been fewer than a dozen studies on the nature of, and contributory factors in, critical incidents (CI) in anaesthesia. The first of these, by Cooper and colleagues, showed that the vast majority of their CI involved human error [1]. Most recently, the on-going Australian Incident Monitoring Study (AIMS), with now more than 2000 reports, has shows that aspects of 'system failure' may constitute the bulk of the contributory factors, even though some human error may be detected in about 80% of the analysed cases [2]. We set up a Critical Incident Reporting System (CIRS) to collect anonymous CI in anaesthesia using a reporting form on the Internet. CIRS analysis of the first 60 cases corroborates the findings of previous CI studies. In addition, our preliminary results have shown certain important trends, especially those concerning the contributory factor of communication in the Operating Theatre. Although to date we are unable to assess the educational importance of these CI reports, we believe that there is great potential for this aspect of CIRS. © 1997 Elsevier Science B.V.

Keywords: Critical incident; Anaesthesia; Death

1. Introduction

Assessment of the structure, process and outcome of care is very important in todays high-tech medicine. In anaesthesia, the quality of the structure and process of care has been addressed, for example, by determining the numbers of anaesthetic-related deaths in the perioperative period. However, death due to anaesthesia alone is too rare to be useful as the sole index of systematically assessing the quality of routine anaesthetic practice. For example, the Confidential Enquiry into Perioperative Deaths (CEPOD) showed that anaesthesia was considered to have been wholly responsible for a fatal outcome in three out of half a million procedures [3]. Therefore, measuring the quality of anaesthe-

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PII S1386-5056(97)00087-7

sia should be included (but is not limited to) critical incident monitoring, morbidity and mortality, systematic assessment of individual and team performance, patient satisfaction, and cost-benefit analysis. Of these, critical incident monitoring is attractive because of the greater frequency of CI than of that of complications or accidents.

There is an increasing number of studies on the nature of and contributory factors in CI. The earliest of these, by Cooper and colleagues, showed that the vast majority of CI involve human error [1]. Most recently, the ongoing Australian Incident Monitoring Study (AIMS) with now more than 2000 reports, has shown that aspects of 'system failure' may constitute the bulk of the contributory factors, even though some human error may be detected in about 80% of the analysed cases [2]. (These results are in line with the current thinking about the evolution of anaesthetic complications [4].)

Critical incident reporting in anaesthesia can thus serve as a tool to monitor the quality of anaesthetic care (both its structure and process) and give insight into the nature of critical incidents. In addition, CI reports can form the basis of a collection of important cases, which may be used for teaching at all levels of learner.

2. Methods

Inspired by the experiences in aviation (Aviation Safety Reporting System; ASRS) we set up a system to collect anonymous critical incidents in anaesthesia using a reporting form on the Internet. With this form we wanted to gain insight into the nature of critical events and collect cases, that might have a teaching potential for other anaesthetists.

A critical incident was defined as any deviation from the expected course, with the strong potentia for an adverse outcome. A HTML reporting form (CIRS, reporting form) was created and added to the CIRS mainpage (CIRS) which again is linked to the homepage on the Swiss Anaesthesia Server Basel (Department of Anaesthesia at the University of Basel). This form includes checkboxes, list-boxes, radio-buttons and free-text fields. (Theoretically, anyone browsing through the Net could fill out this form. However, because the form contains so many different technical questions, we can easily determine if the user is an anaesthetic professional or not.)

With the help of a template, an automatic re-mailer creates anecdotel text out of the entered information, as soon as the report is submitted. This text is added to the section of already entered cases, forming the teaching-database (CIRS, reported cases). Furthermore, the details of each submitted incident are stored on our server to allow compilation of the data.

3. Results

Sixty cases have been entered since the start of the project in April, 1996. Of these, 74% were elective cases and 26% were emergency procedures. The average American Society of Anesthesiology (ASA) Classification of Physical Status (a simple numerical description of how well the patient was at the time of presentation to the Operating Theatre) was 2.3 for the elective and 3.5 for the emergency cases (where 1 = perfectly well and 5 = will not live more than 24 h with or without the operation). General anaesthesia was provided in 74%, regional anaesthesia in 19%, combined general-regional anaesthesia in 4% and resuscitation in 2%. The primary

provider of anaesthetic care had an average experience of 7.4 years of practice (minimum 0.5, maximum 30, median 5). Most of the incidents occurred during either induction (30%) or maintenance (47%), with 9% during emergence and 13% postoperatively. The majority of events were wrong drug/wrong drug-dose/wrong drug-labeling (23%), and airway incidents (23%), followed by events concerning the heart/circulation (19%).

Most of the incidents (72%) did not affect the outcome of the case. Morbidity ranging from minor to major, including unexpected admission to ICU or prolongation of hospitalisation, was reported in 21%. One death was reported.

Problems with communication were chosen as a contributory factor in 34% of the reported cases, followed by lack of situational awareness in 30%, lack of experience in 30%, not performing a check in 28% and wrong judgment in 23%. (More than one item per case was allowed). Human error was acknowledged in 42% (with 55% of these as slip/blunder and 45% as a knowledge-based error). Management error was noted in 32% and technical error in 6%.

4. Discussion and conclusions

We have demonstrated that the CIRS form works as a tool to report CI in anaesthesia and may be used by anaesthetists of varying experience. Analysis of the first 60 cases corroborates the findings of other critical incident studies using more traditional modalities of data collection (interviews, and paper questionnaires). In addition, CIRS permitted the detection of certain important trends, particularly the factor of communication in the Operating Theatre.

A central problem with all critical incident studies lies with the voluntary nature of the reports. Thus, it is impossible to determine how complete or representative a database is of the population under study. However, most investigators have concluded that such voluntary reporting systems underestimate the frequency of incidents, but not necessarily the nature of problems, even when the reporter is protected from punishment and identification. Critical incident reports have also been criticised for being no better than anecdotal case reports—the one off. On the other hand, a series of critical incident reports, which are classified as to contributory factors and outcomes, is much more valuable than simple anecdotal cases. It is this aspect of education, which comes from the sharing of pooled and classified information, which we are as yet unable to quantify. We believe that these cases have strong potential as a teaching tool, for both knowledge (what to do) and procedures (how to do it). In addition, in keeping with the finding of system failures, the reported cases may be used to construct scenarios which may be used in high-fidelity Operating Theatre simulators (TOMS, Team oriented medical simulation in the operating theater), to enhance performance of the entire Operating Theatre team [5].

Finally, although critical incident studies have proven useful in medicine, as well as in other fields, e.g. aviation (where the technique originated), they should not be regarded as the only method of evaluation. Critical incident studies should be seen to be part of a spectrum of evaluation where various types of complementary data are used for ongoing review and analysis of the system in question. Such complementary data can be derived from: systematic audit of structure and process (classic quality assurance), the use of trained observers in the assessment of various process events, participant and observant reporting of critical incidents/accidents,

and systematic quality assurance review of various modalities of outcome, including mortality, morbidity and consumer satisfaction. Only with the complete spectrum of data can the safety and quality of a system be truly assured.

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