Electronic Double Checking of Anaesthetic Drugs

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Drug error in anaesthesia is a leading cause of patient harm. Prospective studies suggest that the error rate admitted to by anaesthetists is between 1 in 130-150 anaesthetics. The rate of drug error has not improved in spite of sanctions which might be thought to be effective. Drug error is not usually caused by 'bad' practitioners but is the almost inevitable result of systematic failures coupled with failure of cognitive strategies employed by anaesthetists to reduce this risk. These failures are not unique to anaesthesia and may be found in other branches of medicine e.g. blood transfusion, radiotherapy and oncology as well as in other industries, in particular commercial aviation, with analogous errors.

'Double checking' has been suggested as a strategy to reduce risk of drug error. There is some evidence that the error rate is reduced when this is employed. Krause et al. found an error rate of 2.98/1000 drug administrations amongst nurses and this rate fell to 2.12/1000 when a two-person 'double check' was introduced. Jensen et al. performed a post hoc analysis of a series of medication errors and ranked those pre-error interventions that were most likely to have prevented the error from occurring. They suggested that 58% of these errors would have been prevented by the use of 'double checking' of drugs prior to administration. Toft, in his recommendations following a review of a series of medication errors in Bristol, suggested that 'double checking' would be an effective strategy but only if was performed properly.

There is widespread doubt over both the effectiveness and practicality of 'double checking' in anaesthetic practice. This has also been debated in the area of blood transfusion medicine where the lack of evidence has been highlighted and has resulted in calls for robust research to help clarify the issue as to whether single- or two-person checking is superior. Common criticisms against 'double checking' in anaesthetic practice include denial for the need of any check and difficulty in performing the check because of lack of staff and the time taken (wasted) in performing the check. However, it would seem prudent in an increasingly litigious and quality focused healthcare environment to embrace the concept of improved checking processes in anaesthetic drug administration. All areas in a surgical patient's pathway through their hospital stay, but with particular emphasis on the perioperative period, have been targeted for improved safety (e.g. preoperative checklists and briefing) and it would be naive to expect anaesthesia to be exempt from this. Each prosecution and inquiry that recommends improved checking standards makes it more likely that future errors will be more harshly treated unless it can be shown that adequate checking processes are in place. The argument has therefore moved from 'should we do it at all' to which methods of 'double checking' might be most suitable.

In order to attempt to partly answer this question an Expert Consultative Group from the AAGBI, RCOA and the National Patient Safety Agency commissioned a multicentre qualitative pilot study, which has recently been completed, examining the feasibility in the NHS of two different methods of 'double checking'. The first was a two-person check rigorously adhering to checks from drug preparation in the anaesthetic room through to patient administration. The second method involved the use of bar coding technology at the point of administration of drugs to the patient. Assessment of the feasibility of both methods was made by participants at each trial site and also by multidisciplinary expert observers.

Bar coding is used in many industries and in commerce as an easy way to identify products, trace movement in shipping and provide embedded details about products, e.g. expiry dates. In

medicine they are extensively used for patient identification and on products that must have 100% reliability, e.g. blood products. This technology has been incorporated into a computer-based system, developed in New Zealand that allows for recognition of drugs prior to administration. Drugs are labelled with standard colour-coded labels that have a drug-specific barcode incorporated into the label which is scanned just prior to administration of the drug. Custom software interprets scanned barcodes, redisplays the drug name on the computer screen in large type along with its colour code, and announces the name of the drug using a pre-recorded voice. In this way scanning forces checking and provides two cognitive processes of identification (auditory and visual) and multiple opportunities to detect error.

A further layer of safety is added because of decreased anaesthetist workload due to the system's record-keeping function. The system automatically collects output data from the patient monitor so that haemodynamic, respiratory data, along with any other chosen output (e.g. BIS, syringe drivers, etc.) are recorded onto an electronic chart. Events such as anaesthetic technique used, cannulation type and site, and timing information (surgery start/end time etc.) can be entered from barcoded sheets. This results in the creation of a robust integrated anaesthetic record that can be printed at the end of the procedure and also permanently stored in an electronic database. User observations suggest that, because of the decreased time and attention required to create an adequate anaesthetic record, using the anaesthetic record-keeping function has resulted in increased time for direct patient care and vigilance. It is therefore possible to argue that using safety systems like this offers a reward to the anaesthetist for good behaviour!

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