SCENARIO TRAINING AS AN ADJUNCT TO THE DAS GUIDELINES

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"It is incident to physicians, I am afraid, beyond all other men, to mistake subsequence for consequence"
Samuel Johnson (1709-1784)

A critical incident has previously been described as an unintended event that reduced or could have reduced the safety margin for a patient [1]. Every practising anaesthetist has experienced an airway related critical incident and most have felt the acute discomfort of reliving that experience during a morbidity / mortality meeting when as a group we try to learn from the event. However the aetiology and prevention of unexpected emergencies remains in the large part poorly understood. Our accounts are often coloured by a tendency to record "what must have happened" rather than "what actually happened". Interestingly, in general terms, more critical incidents occur during the maintenance phase of an anaesthetic rather than the generally perceived high-risk periods of induction or emergence [2]:

PHASE	CRITICAL INCIDENTS
Pre-induction	10%
Induction	25%
Maintenance	48%
Emergence	8%
Recovery	6%
Post-recovery	3%

The clinical nature of incidents varies enormously. Some are related more to 'patient factors', others to 'problems within the system'. The clinical outcome for the patient may affect whether an incident is labelled simply as a chance event complicating normal practice, or an error, accident, or act of negligence. An analysis of 2000 critical incidents reported anonymously in the Australian Incident Monitoring Study (AIMS) in 1993 found that some form of human error had factored in 83% of incidents [3]. This conveniently appears to allow any inquiry to find against the individual and satisfies our desire to create a scapegoat and close the case. However, deeper enquiry will reveal that a number of latent factors usually conspire to precipitate the final active error or critical incident. For instance, performing a rapid sequence induction with just propofol and fentanyl without the use of muscle relaxation would be widely condemned as sub-standard anaesthetic practice, especially if it resulted in a failed intubation. In isolation, a knowledge-based error of this nature would not be deemed acceptable practice of a competent on-call anaesthetist. However, an unintended slip when two identically sized syringes containing 2mls of clear fluid are confused because they were laying next to one another on the drug tray becomes entirely understandable.

Norman, Reason and Rasmussen have classified errors and mistakes into a number of domains [4, 5, 6]:

1. **Knowledge-based errors** account for one quarter of critical incidents. They occur because the anaesthetist lacked insight and failed to anticipate or take account of a known factor that affected outcome. In the above example, failure to identify the need for a rapid sequence induction in an obstructed abdominal case would qualify as a knowledge-based error. Typically novices are more prone to this type of mistake and prior experience tends to protect against their occurrence. However, it should be remembered that it is difficult to gain individual first-hand experience in the management of rare events such that consultants dealing with life-threatening conditions for the first time may perform like novices.

2. **Rule-based mistakes** are the scourge of 'advanced beginners'. Before full competence is achieved there is a tendency to stick to anaesthetic recipes. Typically the individual will be working with limited understanding between the tramlines of normality and is unable to adapt to the abnormal situation. In the above example, rigid adherence to a propofol dose of 2mg/kg without regard to patient age and frailty may precipitate a critical incident on

induction of anaesthesia. It has been said that correction of rule-based errors would have helped in the management of approximately half of all critical incidents.

3. **Skill-based slips and lapses** are present in a quarter of reported critical incidents but are probably under-reported because they simply go unnoticed unless the result is harm to the patient. Many would regard these execution errors as simple acts of absent-mindedness or forgetfulness. They tend to affect the more proficient and experienced practitioner who has learnt to perform automated tasks at a sub-conscious level with minimal conscious supervision. Slips occur when cues are misinterpreted. Everyone knows that anaesthetists should read the syringe label, but in the above example a slip occurred because the anaesthetist sub-consciously selected a syringe on the basis of expectation that it would be suxamethonium and failed to make a conscious secondary check. Lapses or omissions may occur when there are interruptions to the normal routine that interfere with the expected prompts or cues for the next action in a sequence. For example, one may forget to complete the anaesthetic machine check if asked to sign the controlled drug book mid-check. Situational awareness may then be lessened by omission of these routine preoperative precautions.

4. **Technical errors** occur when the anaesthetist fails perform an intended task either because of a lack of expertise or equipment failure. Returning to the above example, a critical incident has already occurred as a result of knowledge-based or skill-based errors but failure of the laryngoscope bulb or dexterity of the anaesthetist may produce the final technical factors that result in failure to intubate. Technical errors are present in one in eight critical incident reports.

Preventative strategies to deal with critical incidents

Prevention relies upon an awareness of where risks lie. The most effective reporting systems for critical incidents in both anaesthesia (AIMS, NCEPOD) and the airline industry protect the anonymity of reporters, but attempt to apply the lessons learned by individuals to the wider community. A flexible, blame-free culture facilitates the changes that are needed to reduce risk. Although risk analysis helps to reduce future mistakes it is not possible to completely eliminate error from the workplace. Other lines of defence are required. No single measure is likely to be able to catch and prevent all mistakes. Usually an element of duplication is required in our defensive systems to prevent errors from slipping through the net. Those high-risk industries such as the nuclear power or defence organisations that are potentially susceptible to catastrophic accidents build several levels of protection and redundancy into their safeguards on the assumption that the one in a million event may occur tomorrow. Unfortunately the current emphasis on improved economy and perceived efficiency tends to run counter to this ideal.

Reactive strategies to deal with unanticipated critical incidents

Assuming that prevention has failed, how should we train anaesthetists to help them to react appropriately when faced with a critical incident? Diagnosis is a skill that underpins all areas of medical practice. By tradition we are taught that one should approach a medical problem by first taking a careful history from the patient. The results of detailed inquiry should suggest a differential diagnosis that may then be further refined by physical examination of the patient for confirmatory signs of disease. Finally one should undertake specific investigations suggested by the preceding findings that will confirm a provisional diagnosis. This systematic approach works well in most situations. However, perioperative anaesthetic emergencies differ from those encountered in most other medical specialties because they tend to develop rapidly into life-threatening conditions. Although critical incidents frequently occur in the presence of a theatre team, the single-handed anaesthetist is likely to be the only person present with the specialist knowledge and practical skills required to deal with the problem. This can give rise to intense pressure. Critical incident protocols and drills have been designed to aid in the management of the more complex or common emergencies. However, it is wise to bear in mind that a protocol driven approach is heavily reliant upon recognition, in the first instance, that a serious problem exists and secondly implementation of the *correct* protocol to deal with that problem. The need to initiate immediate supportive measures interferes significantly with the traditional diagnostic approach and inevitably leads to corners being cut. Anaesthetists are likely to best guess the nature of the problem on the basis of probability and their own previous personal experiences. Whilst this process of pattern recognition can give a good head start it does depend on a level of experience that is difficult to teach to novices. It also gives

rise to the possibility of diagnostic error if only a selection of the available signs are taken into account. Confirmation bias is likely. The clinician may opt for a possible diagnosis and then search only for confirmatory evidence to support that provisional diagnosis, ignoring any signs that do not fit the desired pattern.

Generic simulation-based critical incident training is designed to help avoid these pitfalls and to foster an approach to crisis management that can be applied to virtually any emergency situation. The basic aims are to:

1. Quickly achieve a position of safety and stability
2. Confirm the diagnosis by review

The principles of an ABC approach are to minimise risk to the patient whilst buying time for more definitive treatment to be instituted. Simplification is often the key. Frequently it is difficult to make an accurate diagnosis of the true nature of a critical incident in the early stages but this should not delay attempts to minimise or eliminate the problem by simple measures. Through a process of self-appraisal and review, simulated rehearsals of critical incidents may help an individual to:

- Recognise situations that cannot be contained and dealt with alone.
- Improve the ability to communicate in a crisis.
- Establish an impromptu team approach to deal with complex problems.
- Recognise the qualities of a good team leader.
- Perform effectively as a team member.
- Make effective use of available resources and protocols.
- Conduct a constructive team debrief to improve future team performance.
- Identify, minimise and accommodate errors.

Effective communication is a skill that is frequently adversely affected as a result of the stress imposed on the anaesthetist during a critical incident. Whereas surgeons frequently work together in pairs, anaesthetists tend to work as independent practitioners within the operating theatre. In a crisis, team integration may be impaired by an inability to assimilate information and to convey information clearly and accurately to others.

Strategies that have been shown to improve communication

- Declare problems early to the rest of the theatre team before losing control of the situation. Remember that they can be getting on with basic generic resuscitation measures whilst you figure out the diagnosis.
- No matter whatever or whoever 'caused' the crisis, be sure that you use objective and non-judgmental comments. Insults tend to provoke an aggressive or withdrawal response from the recipient and inhibit team function.
- To communicate effectively, your messages or commands should be:
  ADDRESSED - Ask specifically named individuals, not "someone", to perform tasks.
  HEARD - Reduce background noise and distractions by turning off the radio, the CD player etc.
  UNDERSTOOD - If you make a complex request, ask the recipient to repeat it back to you.
- If you haven't got a clue what the cause of the problem is, be honest. Say what you don't know as well as what you do know. Encourage others, including juniors, to chip in with observations or suggestions.
- Reappraise the situation regularly. Update the rest of the team with new information. If you are still unsure about what to do, send for help - a second person with a fresh approach may pick up on missed clues.

Invoke a team approach…

- A team should have one clearly identified leader, who should make effective use of the mixture of skills and resources available within the rest of the team.
- A good team leader is able to step back from the situation to consider the whole picture. This can only be achieved by delegation of responsibility for tasks to other members of the team. It should then be possible to evolve and communicate a plan of action.
- A repeated and systematic ABC approach helps render the patient 'safe', buys thinking time, and increases the likelihood of detecting signs that may lead to a definitive diagnosis.

- Most members of an impromptu emergency team will need to adopt the role of 'team players'. A good team player is adaptable, assumes complete responsibility for delegated problems, and feels comfortable enough to advocate an opinion or feed back information to the rest of the team.

The use of scenario training facilitates insight into individual weaknesses and the uncertainties that frequently lead to a delay in recognition of a problem, revealing the strengths of a team-based approach to management of critical incidents. An over-reliance on complex management plans and algorithms can then be avoided, which, whilst these may appear to make excellent aids and adjuncts when formulated in theory, may be prone to misinterpretation or simply prove to be impossible to implement effectively in the confusion of a real life unanticipated emergency.

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