Art of airway management: the concept of ‘Ma’ (Japanese: ма, when ‘less is more’)

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Airway management has progressed in quantum leaps over recent decades, particularly with the introduction of the laryngeal mask and of videolaryngoscopy. In this issue of the BJAn, the Difficult Airway Society Intubation Guidelines Working party provide an update on the original 2004 consensus article. This current document is an important resource for those at all levels of expertise in anaesthesia, emergency medicine, and intensive care. The authors are to be commended on their thoroughness and their informative approach.

The new guidelines are simple, easier to follow and have broached several important points:

- The impact of human factors in decision-making during airway crises and the ‘stop and think’ notion
- The place of videolaryngoscopy
- The use of ‘NO DESAT’ and ‘THRIVE’ techniques
- The concept that no patient should die from low arterial oxygen concentrations without a neuromuscular blocking agent being given
- The role of cricoid pressure during rapid sequence induction
- The evolution of the second-generation laryngeal mask

In my opinion, an understanding of the human factors in difficult airway management crisis is crucial to ensure patient safety.

Human factors

The 4th National Audit Project of the Royal College of Anaesthetists and Difficult Airway Society (NAP4) project has documented several issues in the non-technical aspects of crisis management that have a direct impact on patient safety and outcome. Although many experienced practitioners have at least some degree of awareness of these problems, NAP4 provides clear evidence that non-technical factors are frequently a problem. The complex psychological impact on an anaesthetist when confronted by an unexpected difficult airway has been the subject of several recent studies.

In 1993, the Australian Incident Monitoring Study (AIMS) showed that ‘significant improvements may be achieved by putting more emphasis on eliminating rule-based errors; on developing and disseminating standard protocols and algorithms; on gaining insight into the mechanisms by which slips and lapses occur and on increasing the availability of sophisticated aids to learning.’

The NAP4 project provided more evidence for these conclusions and led to further work. Flin and colleagues developed the anaesthetists’ non-technical skills (ANTS) taxonomy, a behaviour-rating tool, which classified human factors in airway management complications as situation awareness, decision-making, task management, and teamwork. Further research into the causes of airway management complications remains an anaesthetic priority.

Understanding how and why these complications occur requires ongoing research. As a profession, we must continue to look to clinical psychologists for analysis of thought processes during stress.

The original Difficult Airway Society (DAS) guidelines in 2004 stated ‘a limitation of the American guidelines is the use of flow-charts which allow a wide choice of techniques at each stage. This makes them less useful for management of airway emergencies than simple and definitive flow-charts such as those in the European or American Heart Association Advanced Life Support guidelines.’

These latest DAS guidelines continue to pursue a simple algorithm to facilitate decision-making.
“Paradox of Choice”

In 2004, the American psychologist Barry Schwartz wrote a book called *The Paradox of Choice: Why More is Less*, in which he argues that reducing the number of choices available to a consumer will significantly lower anxiety in shoppers.

Complicated algorithms offering a plethora of airway devices create a ‘paradox of choice’ or ‘overchoice’, which prolongs the response time. Overchoice has two prerequisites. First, the practitioner does not have a clear preference for which airway management strategy is the most appropriate for the scenario. Second, the practitioner should not feel they have the required expertise in difficult airway management to make a correct choice.

If another practitioner is asked to enter and make a choice, the problem of overchoice may be reversed. When the practitioner calls for help in a difficult airway crisis, the second operator enters as a proxy decision-maker. The consequences of their choice will not impact directly on them as an individual. This frees them of the implications and allows them to work objectively within the crisis. The ‘call for help’ is an attempt to introduce objectivity and logic to the decision-making process. NAP4, however, shows that the new operator may also rapidly become a part of the over-choice problem and that effective patient management is further delayed or non-existent.

“Analysis paralysis”

Another pathological thought process that may occur during a crisis is ‘analysis paralysis’. The practitioner over-analyses the difficult airway options with the view to finding the ideal management strategy. As a consequence, rather than selecting an option and dealing with subsequent issues arising from it, no action is taken. The practitioner fails to respond in the time frame because of the fear of making a wrong choice, leading to errors of omission rather of commission.

Each of these pathological thought processes can lead to significant delays in urgent patient management. There is a strong tendency to fixate on intermediate objectives (such as intubation), instead of maintaining an objective overview of the situation (‘situation awareness’) with progression through difficult airway algorithms to maintain oxygenation. Intense psychological stress tends to shut down that part of the brain responsible for innovative, creative thought.

A current Australian and New Zealand College of Anaesthetists (ANZCA) working party has formulated a series of documents focusing on airway assessment and the factors leading to a lack of transition from one difficult airway algorithm step to the next (Professional Documents PS61and Background paper PS61-BP). It is hoped that through a better understanding of how and why these breakdowns occur, anaesthetists will manage crises in a more seamless manner.

The new DAS guidelines have taken the important step toward simplifying choices. They have also considered the techniques of Nasal Oxygenation During Efforts Of Securing A Tube (NODESAT) and Transnasal Humidified Rapid-Insuffluation Ventilatory Exchange (THRIVE) to relieve the time pressure of decreasing oxygen saturations during the decision-making process.

Future research into decision-making by individuals on the crisis team should lead to a better understanding of how to improve the transitions between the steps. The simplification of steps in the algorithm and availability of user-friendly devices are both important steps to encourage movement from one part of the algorithm to the next. Understanding difficult airway management is a project that requires life-long training.

Life-long training

The traditional apprenticeship-only style of airway management teaching has now been recognized as outdated. Future developments should focus on structured normal and difficult airway training with clear end points and assessment tools. Junior trainees should understand the principles and value of the true sniffing position in all airway management scenarios, including the morbidly obese. Basic airway skills, including bag-mask ventilation, laryngeal mask insertion, direct laryngoscopy, and infra-glottic airway, should be learnt before trainees are allowed to be on call with remote supervision. Formal assessment of these skills should be part of future anaesthetic training curricula.

Senior anaesthetic trainees should build on this foundation and supplement it with a systematic diagnostic approach to any difficult airway scenario. They should be able to analyse and identify various types of difficult airways, leading to appropriate management. This may include recognition of devices or techniques that will be successful and avoidance of those that are unlikely to be effective. The following skills should be taught: videolaryngoscopy, Ainttre Intubation Catheter (Cook Critical Care, Bloomington, IN, USA) technique, and awake fibreoptic intubation. Airway management fellowship programmes should explore other airway devices and techniques, such as alternative laryngoscope blades, optical stylets, and airway management teaching. The co-ordination of this training programme should be allocated to a senior consultant within the department.

Non-technical aspects of difficult airway management should be an integral part of crisis management. Leadership is an important aspect. Junior consultants need to train and practise in simulators with a view to improving the non-technical aspects of their professional role.

The role of the senior consultant or ‘airway expert’ may be based on the Japanese aesthetic concept called ‘Ma’. This idea embraces simplicity of form and is manifested in their architecture, garden design, music, flower arrangements, and poetry. Ma focuses on the ‘negative space’, which Western culture considers as the background and largely irrelevant. Ma, in contrast, recognizes it as an integral part of the whole and the promotion of simple designs. Contemporary Western business cultures, such as Google Inc., IKEA, and Apple Inc., have successfully adopted this concept with the simplification of business goals and designs. Senior anaesthetic consultants should look to streamline teaching of airway management by providing clear goals and a simple framework within which staff can work confidently. Egos and one-upmanship should be eliminated from the senior ranks. The leader should quietly support the least skilled in the department, with a view to providing a clear path toward mastering this area of our profession.

In a recent editorial, seven axioms for selecting difficult airway devices (see Table 1) were outlined. The first axiom is that oxygenation, not intubation, is the priority. This may be expanded to say that patient safety is the true priority by maintaining oxygenation and airway passage integrity. It is problematic that despite maintaining patient oxygenation, the operator causes airway trauma with repetitive ineffective airway manoeuvres. The priority, therefore, is not only oxygenation, but patient well-being.

The second axiom is that ‘airway equipment should be purchased with the least experienced potential user in mind, and not the most experienced (i.e. ideally, devices should be intuitive and user-friendly, with a short training period).’

Senior consultants have three approaches to purchasing airway equipment: (i) ‘anything goes’ (no restrictions on the difficult
Table 1 The basis of a selection process for difficult airway devices

1. Oxygenation, not intubation, is the priority at all times.
2. Airway equipment should be purchased with the least experienced potential user in mind, and not the most experienced (i.e. ideally, devices should be intuitive and user-friendly, with a short training period).
3. Devices should have sufficient reliable research to support their clinical role.18
4. Ideally, rescue devices should have a close to 100% success rate to ensure the minimal number of steps when securing the airway. A device with a high success rate in routine use may have a lower success rate when used as a rescue manoeuvre—and vice versa—especially when the difficult airway is unexpected. The urgency and the possibility of morbidity or mortality are likely to hinder the success of any device.20
5. Devices should be trialled over an adequate period of time (several weeks or months in most instances) to ensure that the device is used for a variety of airway problems and by an adequate cross-section of staff.
6. Successful intubation should be followed by successful extubation. Similar to the diagnosis and management of a difficult intubation, extubation techniques should be carefully planned. Reintubation planning is an essential part of extubation management, with clearly defined end points for intervention.21 22
7. Provision of devices for oxygenation and technical and non-technical training for staff are mandatory for all areas where anaesthesia is conducted.

airway devices to be used by staff); (ii) ‘limited choice’ (staff are allowed to choose from a restricted range of options); or (iii) ‘no choice’ (there is a fixed set of options, and everyone has to put up with it). Most institutions will benefit by providing a limited choice, while avoiding the potential chaos of ‘anything goes’ and the autocratic ‘no choice’. Inevitably, there are anaesthetists who demand their favourite devices or techniques. However, crisis management remains a ‘team sport’, and therefore, a limited range of devices avoids overchoice. If we are to become masters of airway management, we need a structured approach to diagnosis, which then leads to clear management strategies.

Diagnosis–management paradigm

The cornerstone of medical care is the ‘diagnosis–management paradigm’.17 For example, when treating hypertension, we diagnose the cause of the patient’s high blood pressure and then tailor the treatment. We would never contemplate treating essential hypertension by removing the patient’s adrenal gland, treating renal artery stenosis with medication, or treating a phaeochromocytoma with a renal artery stent. Likewise, teaching the management of normal and difficult airways should begin with an understanding of the airway morphology and then tailoring a specific treatment for each type of abnormal airway. A logical and stepwise airway management–teaching programme can then be constructed for anaesthetic trainees, progressing to lifelong training for consultants. Simple algorithms and user-friendly devices are the key to providing these working conditions.

In conclusion, despite improvements in difficult airway management, NAP4 has highlighted many ongoing problems in an area in which we should be considered ‘masters’. The new guidelines have made significant inroads into contemporary difficult airway management. It remains, however, ‘work in progress’, with a need for further updates in the coming years.

In time, we may look towards a single internationally recognized difficult airway algorithm and encourage a multidisciplinary approach with emergency medicine and intensive care practitioners to develop parallel and clinically relevant algorithms for their clinical situations. A governing body should be established to oversee and administer difficult airway management teaching in all clinical areas and in all parts of the world.

Ultimately, simple algorithms and user-friendly devices will provide the infrastructure for good airway management. It is our professional responsibility to put an end to the unnecessary loss of life by ensuring a clear goal of maintaining patient oxygenation.

A perfection of means, and confusion of aims, seems to be our main problem.
Albert Einstein.

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Difficult Airway Society 2015 guidelines for the management of unanticipated difficult intubation in adults: not just another algorithm

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Since the first iteration of the ASA Difficult Airway Practice Guidelines for the management of the difficult airway was published in 1993 (updated in 2013),1 a number of national societies have generated practice guidelines for difficult airway management, including the Difficult Airway Society (DAS).2

Unlike the ASA guidelines, which address both the anticipated and the unanticipated difficult airway, the DAS guidelines focus on the unanticipated difficult airway, an unpredictable problem. The new 2015 DAS guidelines differ from the original 2004 DAS guidelines in that they are more concise and more pragmatic, with considerable emphasis placed on preparedness and accountability of the practitioner by optimizing conditions and minimizing patient morbidity in a difficult airway situation. Training of physicians with alternative airway devices and techniques, including emergency invasive airway access, is not only considered essential but expected.

Practice guidelines rely on scientific literature to supply evidence in support of clinical recommendations. Evaluation of literature includes identifying whether the topic addressed is relevant and determining whether the methodology used has resulted in the minimization of potential bias in findings. Numerous sources of bias may occur during the development of a guideline, including article selection bias, reviewer bias, reporting bias, bias associated with study design, and subjective weighting or grading of studies.3 Steps to mitigate bias should be a vital part of an evidence-based process.4–6

Difficult airway literature generally focuses on airway management devices and techniques. Airway management techniques