



Protective Ventilation in the OR

A distracting thought on difficulties deploying protective ventilation

It is undisputed that general anaesthesia is quite a safe medical intervention as process control is quite advanced. But on the other hand the complexity of procedures is steadily increasing. Here's a different thought of what could hamper implementation of protective ventilation in the operating room.

The current, lively discussion on lung protective ventilation in the OR stresses the importance of this topic and the question may be raised on how implementation into daily clinical routine can be achieved. Looking at other procedures, such as active warming of patients in the OR, evidence is clear and even guidelines demand respective measures. But deployment into daily clinical routine appears to be hampered for various reasons. We eagerly await the results of an international, prospective, observational, multicenter cohort study intending to research the current mechanical ventilation practices during general anaesthesia to get solid insights into the degree of protective ventilation deployment in the OR⁸. However, clinicians may need to consider a growing number of guidelines and standardised procedures in their daily clinical routine to fulfil the so-called standard of care in the future, that specifically apply to the fairly complex topic of 'Ventilation in the OR'.

Complexity

The workplace of anaesthetists in the OR is very complex and overloaded with information and multitasking necessities. The number of tasks, anaesthetists have to perform daily has increased substantially over the past decades, also demanding to continuously multitask under difficult conditions. In an article by Thomas M. Hemmerling he referred to the anaesthetist as the pilot in the physiological biosphere of modern acute care medicine⁷.

When combining the above with the concepts of distraction and mental workload that anaesthetists are exposed to, there is a potentially negative impact on patient care.

Distraction

Distractions are cited as contributory to healthcare-associated errors in a large portion of incidents including or involving the anaesthetist¹. The safe administration of anaesthesia requires vigilance, time-sharing among multiple tasks and the ability to rapidly make decisions and take actions⁶. It is well recognised in other industries, such as aviation, that distraction increases the risk of error. Within anaesthesia, distraction has been implicated in the development of critical incidences². Another aspect has the potential to make the entire mixture quite delicate.

Looking into literature, distraction of the anaesthetist has already been researched. One observational study has found that on average 34 distracting events were observed in cases with a mean duration of 103 minutes. Sources of distraction included other anaesthetists, the circulating nurse, visitors and the surgeon. But events with the highest level of distraction requiring immediate attention originated from OR equipment (alarms, noises) and other anaesthetists. The spread of distractions across the phases of anaesthesia was equal. Another study found that one distracting event happened every 4 minutes and 23 seconds, most frequently during emergence with one event every 2 minutes². In the first study mentioned above, approximately 8 distracting events per case were judged to be detrimental to current patient care¹. The second study judged 22% of all observed distracting events to have a negative effect².

Distracting events during key anaesthetic interventions were observed relatively frequently, with about 2 events per case. The role of general background noise in the OR is controversial. General background theatre noise has been associated with deterioration in mental efficiency and short-term memory. But looking into the nature of different tasks, noise does not always have a negative effect. Low demand tasks may be performed better with increasing levels of external stimulation (conversations, noise and music) up to a certain point, but higher demand tasks may suffer with the same degree of external stimulation¹.

Tip: For further technical background information, see our "technology insights" [e-book](#).

Our perspective and more

From our perspective, the administration of a general anaesthesia, including protective ventilation needs to be considered as a high demand task that requires vigilance and close monitoring of all parameters that can be compromised by distractions as described above. Reported incidences may underline this thought. In one case in Germany, an anaesthetist forgot to switch on the anaesthesia device while the patient was intubated. The reported reasons were distraction and ambient noise level in the OR³. In another case, the anaesthetist forgot to re-start the ventilation after deliberately suspending ventilation during cardiac surgery. Among the reasons reported: many distractions⁴.

The abovementioned events can surely not only be attributed to inattention of the anaesthetist or other inadequate behaviour. But they may be a result of the abovementioned contributing factors: complex work environment meets information overload meets constant multitasking meets frequent distraction. Another factor that has been studied but apparently not yet clearly proven to be a factor contributing to human error in anaesthesiology is the mental workload⁵. Methods to measure mental workload have been researched and further research is desirable⁵. However, all this calls

for the medical device industry to come up with devices that reduce information overload, are being used intuitively and assist with tasks that can be carried out following evidence based rule sets. Maybe assistance systems that take over those tasks but leave the anaesthetist in the drivers seat, easing the compliance with the standard of care, freeing up cognitive resources of the anaesthetist and reduce the potential negative effects of distractions in the OR may help reduce errors and gain importance.

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