# Goldilocks and endotracheal tube cuff pressure management: Not too high, not too low. Just right …

Great strides have been made in airway management and respiratory support since the first documented case of endotracheal intubation by Hippocrates (460 - 379 BCE). Today, endotracheal intubation is almost a routine component of the management of the majority of patients being cared for in our intensive care units.

The development of endotracheal tubes over the years has aimed at enhancing their function and minimising the complications of their use. The addition of cuffs, for example, was key in creating a seal to allow for more effective ventilation and to minimise aspiration. Unsurprisingly, though, the cuffs came with their own series of problems, warranting refinements to ensure high volume and low pressure.[1,2] However, the problems have remained. At too high a cuff pressure, the tracheal mucosa is damaged, resulting in a spectrum of problems: from sore throat to tracheal stenosis to tracheo-oesophageal fistula.[3] At too low a cuff pressure, leaking makes ventilation difficult, and aspiration and ventilator-associated pneumonia (VAP) become more likely.[4,5] So, we need the cuff pressure not too high, not too low. Just right …

The absence of clear international guidelines complicates recommendations for optimal cuff pressure range and frequency of intermittent monitoring. Despite this, an approximate range of 20 - 30 $cmH_2O$ has generally been recommended for cuff pressure. A South African guideline recommends pressures of 25 - 30 $cmH_2O$ and a 12-hourly monitoring frequency.[6] Memela and Gopalan[7] previously suggested that the frequency be increased to every 6 hours. In this issue of *SAJCC*, Khan *et al.*[8] report on tracheal tube cuff pressure and confirm the already prevalent view that cuff pressure management is poorly performed,[9] with 87% of the charts reviewed in their study not having a documented cuff pressure measurement. They extend their study by attempting to relate nursing knowledge and behaviour to cuff pressure measurement and demonstrate that knowledge of cuff pressure measurement, awareness of the complications and the availability of national guidelines did not translate to appropriate practice by nurses. This behaviour is likely far more widespread than just the unit in which the study was conducted.

Why should it be thus? Why are we so bad at cuff pressure management, despite knowledge of the potential problems?

Human behaviour, despite being extensively studied, remains somewhat of an enigma in many respects. Our behaviour is driven, in part, by our thoughts and feelings and provides a window into our psyche revealing inter alia our values and attitudes. What then does our general inaction with respect to cuff pressure management say about our attitude to it? Perhaps, we simply do not regard it as being important! Plato suggested that 'human behaviour flows from three main sources: desire, emotion, and knowledge.' If, as is suggested by Khan *et al.*,[8] we have the knowledge, then our behaviour towards cuff pressure measurement must be for the lack of desire and emotion in this regard. The desire to do or react to something is a function of its immediacy, its seriousness and the degree to which we connect with it.

Our challenge is to effect a behaviour change in this regard. Practitioners across the globe have become increasingly defensive in their practice of medicine. Despite its own set of problems, such an approach forces a re-evaluation and adjustment of practice. In many places, iatrogenic complications such as VAP are deemed preventable and have implications for how such patients are funded. Although this remains controversial, we do need to take ownership of the complications, however delayed, that arise from over- or underinflation of endotracheal tube cuffs. This will likely make us defensive in our practice and in so doing, we will be forced to improve our cuff pressure management.

Using continuous readings, Memela and Gopalan[7] have previously reported that patients spent a considerable time above or below the acceptable range, and that the cuff pressure varied extensively during mechanical ventilation between and within individual critically ill patients. Continuous monitoring was therefore recommended for all patients undergoing mechanical ventilation. Continuous monitoring has also been shown to decrease VAP.[10]

However, monitoring is just one part of cuff pressure management. It serves no purpose if practitioners do not respond appropriately to pressures that are too low or too high. Continuous monitoring, while setting us on the right path, cannot give us the assurance of optimal cuff pressure management.

Ideally, closing the loop with automated self-regulating pressure devices would be the solution.[11] Such devices are not freely available and come at a cost that remains a challenge in poorly resourced settings. In these situations, intermittent cuff pressure monitoring will need to continue. Each unit should have a clear cuff pressure management protocol of which all staff need to be aware. Each patient bed should have a dedicated simple cuff pressure gauge. All monitoring charts should have a clear, prominent space for documentation of cuff pressures. Regular audits need to performed. The target for cuff pressures should be 25 $cmH_2O$, with its maintenance in the range of 20 - 30 $cmH_2O$ and its documentation at least every 4 hours.

Let's get it just right.

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