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EDITORIAL

Sleep disordered breathing and the anaesthetist

It ain't what you don't know that gets you into trouble.
It's what you know for sure that just ain't so.

Mark Twain

It is 25 years since Kehlet and Rosenberg described a pattern of unexplained nocturnal death in the first few days following major abdominal surgery [1]. Since then the concept of opioids and residual anaesthesia leading to post-operative respiratory arrest, associated with the presence of obstructive sleep apnoea and other forms of sleep disordered breathing, has become widely recognised. But all too often, it is not until a critical event or death occurs in our own hospitals (the "sentinel event") that we take notice at an institutional level.

Morbid obesity is the major factor contributing towards the increasing incidence of the condition. Therefore within the anaesthesia world it is those working in bariatric surgical centres who most frequently see patients with severe and significant sleep-disordered breathing, and tend to have the greatest familiarity with these conditions. But as sleep physicians and anaesthesiologists have collaborated to further improve our understanding of the mechanisms involved, and because of the changing population demographics in all our patients, sleep disordered breathing and its implications for perioperative care can, and should, now be understood by all.

It is not uncommon that in obese patients, what starts as simple obstructive sleep apnoea (OSA) will progress to a hypoventilatory condition, with chronically elevated CO_2 levels persisting throughout the day as well as night. It appears that recurrent obstruction with associated significant hypoxaemic episodes may gradually alter the brainstem responses to recurrent hypoxia and hypercapnia and leads to a re-setting of the CO_2 respiratory drive. Persistently elevated CO_2 can often be identified by an elevated venous bicarbonate level, and the usefulness of checking this simple blood test to help identify the higher-risk group of patients cannot be overstated [2].

This condition of hypercapnia and chronic hypoxaemia is the Obesity Hypoventilation Syndrome (OHS), and it is at this end of the spectrum of sleep disordered breathing, that extreme sensitivity to residual anaesthetic and parenteral opioids becomes so dangerous. These are patients heading towards type 2 acute on chronic respiratory failure, with blunted responses to hypoxia and hypercapnia. It is these patients, who if not identified and appropriately managed, could on the first post-operative night become what our US colleagues sometimes refer to as a "dead in bed".

However there are physical signs which should alert the anaesthetists to the likelihood of sleep disordered breathing, and these form the basis of many screening tools. Large neck circumference, a receding jaw, a small mouth with a high Mallampati score, and a short neck are all warning signs. Every anaesthetist should understand the fundamental pathophysiology of sleep disordered breathing and look for the signs and symptoms which should alert us to an increased likelihood of OSA.

In this issue of the journal two papers are published which focus on screening for OSA and add to our knowledge of sleep apnoea in the perioperative period. In the first of these, Ambrosii et al. [3] further underline the association between sleep apnoea and perioperative complications. In their study, a cohort of 400 patients were screened using the Berlin Questionnaire, and those with risk factors for OSA, were clearly demonstrated to have a higher incidence of perioperative adverse events.

However, whilst this type of cohort study demonstrates association, we cannot say it is the presence of OSA itself that causes the complications; 82% of the

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patients scoring positive in the Berlin Questionnaire had co-morbidities, compared with only 34% of those who did not, and it may be the presence of these other co-morbidities that lead to complications. This highlights the need to screen for confounders in future studies.

Additionally, as the authors recognise, the Berlin Questionnaire is an over sensitive tool and only 23% of their patients were considered not to be at risk for OSA. If one uses a tool, which identifies three-quarters of the surgical population as at risk, this is not clinically that helpful. Despite this, their study clearly demonstrates that a high score using the Berlin Questionnaire is a marker of risk in the perioperative period, and the authors are to be commended for sharing their results.

In the second paper, Godoroja and Cioc [4] explore the role of dual x-ray absorptiometry (DEXA) to quantify fat mass in the neck and trunk, and use this in addition to baseline oxygen saturation, expiratory reserve volume, Body Mass Index (BMI) and STOP-Bang scores to assess likelihood of significant OSA (as defined by an Apnoea Hypopnoea Index (AHI) of $\geq$ 20). They analysed their results and found that by using a series of cut-off points from each of the parameters, and summating the number of "positives", that the consolidated score was a better predictor than any of the single measures. They suggest that this score may remove the need for formal polysomnography in many patients and allow earlier application of CPAP, thereby potentially reducing delays in the preoperative work up. The availability and feasibility of DEXA scanning may limit the widespread applicability of this method. None-the-less, further study of this novel approach appears warranted.

There are a wide variety of screening tools available for use in the pre-operative period, but all of them have limitations. There is a balance needed between ease of application and providing reliable results. Screening tools only predict the likelihood of having OSA, whereas what we really want to know is the presence of clinically significant sleep disordered breathing.

In many ways sleep-disordered breathing is analogous to ischaemic heart disease. It is present in a large proportion of our patients, but we use our clinical acumen and relatively simple tests to identify those in whom it is significant, and it is only a very small proportion who are sent for a definitive treatment prior to surgery.

As awareness and a good understanding of sleep disordered breathing becomes standard amongst the anaesthesia community, simpler tests, which may include the use of anthropometric measurements described above, should allow us to safely manage these patients and avoid significant perioperative morbidity and mortality.

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Conflict of interest

Nothing to declare

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