of high-quality illustrations as part of review articles, the *British Journal of Anaesthesia* will be encouraging authors of all future review articles to include figures suitable for colour reproduction wherever appropriate.

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# Editorial II

## Advances in patient comfort: awake, delirious, or restrained

In this editorial, three aspects of comfort of intensive care patients will be explored: avoiding unnecessary coma; delirium; and physical *vs* pharmacological restraint.

## Avoiding unnecessary coma

Most intensive care units (ICUs) in the UK have a significant input from anaesthetists. Anaesthetists are used to rendering patients unconscious, primarily so that they do not suffer during surgery. Critically ill patients are also often kept unconscious and nothing is seen as unusual or wrong with this. There is increasing evidence that unnecessary sedation may increase patient morbidity and costs.[1 2]

The quantity and quality of staff available influence the amount of sedation given. Natural light and a clock orientate patients while reducing noise from alarms, etc., encourages sleep. Communication problems can cause frustration and agitation, which will be exacerbated by poor hearing, eyesight, or both. The adverse effects of sedatives are widely known,[3] yet they are often given in an uncontrolled and unmonitored way.

One of the best ways to avoid many of the problems patients experience with sedation is to think about the needs of the patient. Almost all patients need analgesia, be it because of a surgical wound, traumatic injury, pleuritic pain, or immobility. If they are receiving mechanical ventilation, then tracheal tube tolerance along with reversible and titratable respiratory depression may also be needed. These are best provided by opioids. Notably, hypnosis is not a necessary component of what most patients need or want. It should be reserved for patients who cannot be managed with opioids (about one-third of patients only)[4] and not used universally.

This approach reduces length of stay in the ICU and the period of mechanical ventilation. It also saves money when compared with conventional (hypnosis-based) sedation and analgesia.[2] Remifentanil, for example, has been shown to reduce the need for hypnotics by two-thirds and is increasingly used for the critically ill, usually without hypnotic drugs.[4] There is substantial evidence that remifentanil reduces duration of mechanical ventilation and length of stay in the ICU.[4–6] Although its acquisition cost is high, the savings mean that it can reduce costs by €1000 per patient compared with other regimens.[2] Not only is there a cost saving, but there are other benefits, such as better interaction with family and carers, ability to move (reducing the nursing workload), and cooperating with the physiotherapist. Finally, it allows patients who are having troublesome dreams, hallucinations, and

delusions to be recognized. This is especially important when these occur as patients are going off to sleep (hypnogogic), since they may try to avoid sleeping so as not to suffer from these sometimes terrifying experiences. This may help reduce psychological sequelae after ICU. Dreams occurring on waking (hypnopompic) are usually less frightening.

## Delirium

This is an acute disorder of attention and global cognitive function, characterized by acute onset and fluctuating symptoms, which is associated with increased morbidity. It is not a disease but a syndrome and has multiple causes. In the event of failure to respond to preventative and supportive measures, pharmacological treatment may be needed. Early identification and prompt treatment may reduce the severity and duration of delirium.

### *Identification*

The classical form of hyperactive delirium, characterized by agitation and restlessness, is quite rare in critically ill patients (incidence 1.6%). The common forms are hypoactive delirium, characterized by withdrawal and apathy (incidence 43.5%) and mixed (incidence 54.9%).[7] Until recently, a lack of recognition of these hypoactive states and the fluctuating course of delirium led to significant under-recognition.

The severity of illness and a lack of verbal communication in these patients have led to the development of validated ICU-specific delirium screening tools. The most commonly used are CAM-ICU[8] and Intensive Care Delirium Screening Checklist (ICDSC).[9] CAM-ICU is quick and simple to perform and has been shown to have excellent sensitivity and specificity. As under-recognition of delirium is associated with a poorer outcome, routine assessment by one of these methods at least once in every 24 h period has been recommended.

### *Prevention*

Benzodiazepines may increase the duration and incidence of delirium in ICU patients, whereas using alpha-2 adrenergic agonists such as dexmedetomidine may reduce it. Dexmedetomidine is currently not licensed for use in the UK, but has sedative, analgesic, anxiolytic, and sympatholytic actions without depressing respiratory function. Its side-effects include bradycardia and hypotension. Using dexmedetomidine rather than lorazepam for sedation is associated with more delirium- and coma-free days, more ventilator-free days, and a reduced risk of death at 28 days.[10] When compared with midazolam, there was a shorter time to tracheal extubation and a shorter ICU stay with dexmedetomidine. These studies suggest that the future of delirium therapy may lie in its prevention.

### *Treatment*

Antipsychotics have been the traditional mainstay in the acutely confused patient, in response to the theory that delirium may be caused by a dopaminergic/muscarinic imbalance in the brain, although evidence for this approach is limited. Haloperidol is the most widely used drug in the treatment of delirium and is recommended in most guidelines,[11 12] despite the lack of any randomized controlled trials. It has been studied in the prevention of delirium in postoperative patients and reduced the severity and duration of delirium episodes but did not reduce their incidence.[13]

Haloperidol inhibits symptoms such as hallucinations, delusions, and unstructured thought patterns but also diminishes the patient's interest in their environment leading to a flattened affect. High doses may be associated with clinically significant prolongation of the QT interval of the ECG and neuroleptic malignant syndrome.

Droperidol is more potent than haloperidol but is associated with frightening dreams and increased hypotension. Chlorpromazine is also effective at treating delirium but is associated with anticholinergic side-effects that have been implicated in the development of delirium.

Recently, there has been increasing interest in the use of the atypical antipsychotics, including olanzipine, risperidone, and quetiapine. A recent meta-analysis comparing olanzipine and risperidone with low-dose haloperidol has shown that the three drugs have similar efficacy, but that high-dose haloperidol was associated with increased extrapyramidal side-effects.

Benzodiazepines are only recommended in the treatment of delirium associated with alcohol withdrawal syndromes. In patients with AIDS, lorazepam was ineffective at treating delirium and led to a high incidence of side-effects compared with haloperidol.[14] A short-acting benzodiazepine, such as midazolam, may be given in conjunction with haloperidol to control an acutely agitated patient who is at risk to themselves or others.

## Restraint

When patients become agitated or confused, they risk harm to themselves and others. In this situation, there is a place for restraint, either physical, chemical, or both to maintain a safe environment for patients and their carers. Recent American guidelines[15] advocate the greater use of physical over chemical restraint. At the same time, UK guidelines[16] proposing the opposite emphasis have been produced.

### *Chemical vs physical restraint*

In the UK, agitation is usually controlled with drugs (chemical restraint). While this is generally regarded as kind, these drugs carry their own risks. In other countries,

**Table 1** The risks and benefits of physical *vs* chemical restraint

| Chemical restraint | | Physical restraint | |
|---|---|---|---|
| **Advantages** | **Disadvantages** | **Advantages** | **Disadvantages** |
| Carers feel good | May worsen delirium | No chemical effects on patient | Injury to skin or limbs |
| Stops immediate physical harm to patients | Drug accumulation may cause unrecognized coma | Inexpensive equipment | Infections |
| | Toxic side-effects of drugs, especially cardiovascular and CNS | | Contractures |
| | Accidental self-extubation | | Accidental self-extubation |

drugs are used less and physical restraint as a way of restricting a patient's freedom of movement is common. The relative risks of both are poorly understood and are summarized in Table 1.

Family objection is often quoted as a reason for not using physical restraints, but there is no evidence for this.

### *Ethical and legal issues*

There are two main legal issues with both physical and chemical restraint in the UK. The first involves the law of assault, the threat of violence, and battery, the actual and direct use of unlawful physical force on another person, even if they are not actually harmed. The second legal issue is the risk of negligence. For example, if a patient is sedated because of agitation and as a result, their ICU admission is prolonged, is this negligent?

The ethical issues surrounding restraint in the confused patient centre around the risk–benefit balance, beneficence, and non-maleficience and around patient autonomy. The use of restraint must respect a patient's autonomy and autonomous patients must not be restrained without consent. Using the CAMICU score,[8 17] as part of establishing a need for restraint, helps to clarify this issue.

Chemical and physical restraints are legally and ethically the same but are regarded very differently. Chemical rather than physical restraint is preferred in the UK because sedation is thought more caring, a perception which may be inaccurate. Sedative agents are administered without specific training in their use while training is required to use physical restraints appropriately. Perhaps training in techniques of restraint for all ICU staff would encourage a safer approach.

## Declaration of interest

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# Editorial III

## Neurokinin-1 antagonists: a step change in prevention of postoperative nausea and vomiting?

The ability to reliably treat and prevent postoperative nausea and vomiting (PONV) still remains elusive, despite significant advances in our understanding of the physiology of emesis and availability of several new antiemetics. This is unfortunate as patients are really concerned about, and often fear, nausea and vomiting in the perioperative period. However, although of concern, it is not considered by many anaesthetists as one of the most important things to avoid during anaesthesia. For example, a group from San Diego asked a panel of expert anaesthetists what clinical anaesthesia outcomes are both common and important to avoid.[1] The list in order of importance was reported as: death, recall with pain, nerve injury, recall without pain, damage to teeth, corneal abrasion, vomiting, post-dural puncture headache, pain, and nausea. Patients' perception of problems to avoid during anaesthesia is very different. They expect to survive, most regard being asleep and unaware as par for the course, and most would not expect to awake with damaged nerves, eyes, or teeth. Indeed, the same team in San Diego asked patients what outcomes they thought were important to avoid during anaesthesia.[2] Their response in order of importance was: vomiting, gagging on the endotracheal tube, nausea, recall without pain, residual weakness, shivering, sore throat, and somnolence. Another measure of how much PONV is an issue for patients is to ask them how much they would pay to be free from emesis after surgery. In 2001, a survey of patients in the USA revealed that they were willing to pay $55–100.[3] Quite a sum when you allow for 8 years of inflation.

The incidence of PONV is still generally regarded as ~30%,[4 5] but clearly depends on patient and surgical factors. Four of the most important risk factors are: female gender, non-smoking, previous history or motion sickness, and the use of perioperative opioids.[6] It has been estimated that the risks of PONV after inhalation anaesthesia is 10%, 20%, 40%, 60%, or 80% in the presence of none, one, two, three, or four of these factors, respectively.[6] The incidence may be less with total i.v. anaesthesia, but there is no doubt that PONV is still a common and troublesome complication.

A recent Cochrane review gave an enlightening summary of the relative efficacy of antiemetics used for PONV[7] (Table 1). These data show relatively disappointing efficacy compared with placebo (especially with respect to nausea) and the need for better therapy. The 1990s saw the introduction of the 5-$HT_3$ antagonists with claims by some that they heralded the end of PONV. Sadly, this was not the case; data in Table 1 show how they compare with others. These disappointing results gave impetus to the developing concept at that time of multiple therapy for PONV which was proving to be more effective than monotherapy.[8] This approach has now become standard practice in many clinical situations and has been adopted in national and local guidelines for the prevention of PONV, especially in high-risk cases.[9]

Mortality from anaesthesia in developed health-care services, although devastating, is very rare; service improvements are focused on quality and PONV is a major issue in this regard. In addition, the complications associated with PONV are well known, for example, aspiration of stomach contents, disruption of surgical sutures, dehydration, and electrolyte disturbance. Clearly, this problem