Differences in prescription of sedative and analgesics in ICU practice in Sudan

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Abstract
Relatively little information is available on common sedative and analgesic practice in Sudanese ICUs. Exposing the situation will help to reach a consensus towards establishment of protocols regarding the use of sedatives and analgesics in ICU.

Objectives
The aims of this observational exploratory study is to know whether sedatives and analgesics are administered regularly to critically ill patient in ICU, to determine the commonly used sedative and analgesics, to identify strategies for sedatives and analgesics administration and to identify whether sedation scoring systems are used.

Methods
In this observational exploratory study we sought to assess the differences in the prescription of sedative and analgesic drugs in Khartoum state’s ICUs, as an example of ICU practice in Sudan, by means of a short, self-administered questionnaire. All intensive care physicians in Khartoum state (40 physicians) were targeted by the questionnaire.

Results
The study approached 40 ICU physicians using short questionnaire. Among the respondents of this study, only 27% use

References

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Sedation in 100% of their mechanically ventilated patient, with a large percentage of patients at risk of developing adverse events from lack of sedation. The most commonly used sedative is midazolam; propofol used by most of physician, and ketamine and thiopentone used in small percentage of patients. Large percent of ICU physicians never use sedation score (40%), with the risk of over or under sedation. Concerning ICU analgesia, pethedine is the most commonly used analgesic drug (37.5% used it always).

**Conclusion**

The study demonstrated substantial differences in sedative and analgesic practices in Sudanese ICUs. The study concluded that our practice regarding sedation and analgesia is in need of further evaluation and it should be guided by protocols and strategies that control drug administration.

**Keywords:** anaesthesia, analgesia, pain

**Introduction**

Sedation is a universal requirement for all patients in intensive care units (ICU). Sedation is required to relieve discomfort and anxiety caused by procedures such as tracheal intubation, mechanical ventilation, suction and physiotherapy. Analgesia is also required for ICU patients.

The use of sedative medications can have substantial impact on the duration of ICU length of stay and complications, a fact that raised the awareness of the value of structured sedation evaluation. Reliable sedation tools can improve consistency in drug administration, be used in sedation protocols and improve precision of medication titration as patient needs change over time. The routine use of a sedation scale, with frequent adjustment of the sedation target as needed, is strongly endorsed in recent guideline. Unfortunately, sedation scales are underused in ICUs.

Pain is a common experience for most ICU patients. Failure to recognize that frequently leads to agitation and may result in excessive administration of sedatives. Accordingly, an aggressive approach to managing pain has been strongly recommended by published consensus opinions. Surgical incisions, indwelling vascular catheters, endotracheal suctioning, and mechanical ventilation are all potential sources of pain for patients in ICU. Pain may result in many adverse events including increased endogenous catecholamine activity, myocardial ischemia, hyper metabolic states and anxiety. Oxygen consumption can be reduced from baseline by an average of 15% after administration of sedatives and opioids in mechanically ventilated patients.

Variations in sedative and analgesic drugs prescription, the most commonly used types and the use of sedation scales were assessed in this study, so that guidelines can be adopted and the existing strategies of drug administration evaluated.

**Methodology**

This is an observational exploratory study conducted among Sudanese ICU physicians to identify differences in prescribing sedatives and analgesics.

The approval for the study was obtained from the ethical committee.

The study was conducted in Khartoum state, the capital of Sudan, as most ICUs in Sudan are in Khartoum state where the ICU practice is considered as a representative to the ICU practice in Sudan. The study was conducted in the period from November 2009 to June 2010. A short questionnaire was handed directly or sent by e-mail to all ICU physicians in Khartoum state. The short questionnaire asked seven questions regarding the clinical use of sedative and analgesic drugs. The answers were then collected on a computer database. Data were then tested for descriptive statistics (using frequencies and percentages).

**Results**

The use of sedation for mechanically ventilated patients varied considerably between ICU practitioner in Sudan. Those who think less than 50% of ventilated patients need continuous sedation being 30%, those
who think 50%-75% need sedation were 22.5%, those who think 75-90% need sedation were 20%, and those who think 100% of mechanically ventilated patients need sedation were only 27% (Fig 1).

Regarding the selection of drugs used in patients requiring a continuous infusion of sedation, midazolam is always used by 30% of respondents, 20% use it often, 27.5% use it regularly, 20% seldom and 2.5% never use midazolam (Fig 2). Propofol is always used in 27.5% of patients requiring a continuous infusion of sedative agents, often used in 30%, regularly used in 20% and seldom in 22.5% (Fig 2).

Other sedative used were diazepam, by 5% of the respondents, and thiopentone by 2.5% (Fig 3).

The percentage of the respondents who used to use ketamine regularly in patients needing sedation is 2.5%, 45% using it seldom and 52.5% never used it (Fig 2).

Concerning the use of sedation score, 40% of the respondents do not use sedation scoring system, 52.5% of those using sedation scoring system use Ramsay score sedation system and 7.5% use local score (Fig 4).

Regarding the use of analgesics in ICU, 35% of the respondents never use morphine, 55% use it seldom, 5% regularly and 5% often (cardiac and coronary units) (Fig 5).
Fentanyl is always used for intravenous analgesia in ICU by 7.5% of the respondents, often by 27.5%, regularly by 22.5%, seldom by 37.5% and 5% never use fentanyl (Fig 5). The percentage of the respondents who always use pethidine for intravenous analgesia in ICU is 37.5%, 35% use it often, 10% regularly, 10% seldom and 7.5% never use pethidine (Fig 5).

Concerning the use other form of analgesia, non-steroidal anti-inflammatory drugs (NSAIDs) is always used as ICU analgesia by 37.5% of the respondents, 35% use it often, 7.5% regularly, 10% seldom and 10% never used NSAIDs (Fig 5).

Ninety five percent of the respondents have never used epidural as ICU analgesia and only 5% use it seldom (Fig 6).

Concerning other forms of analgesia, local infiltration is used by 10% of the respondents, interpleural block by 10%, paracetamol by 10%, tramadol by 60% and nopain by 10% (Table 1).

### Table 1: Other forms of analgesia

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpleural block</td>
<td>1</td>
</tr>
<tr>
<td>Local infiltration</td>
<td>1</td>
</tr>
<tr>
<td>Paracetamol</td>
<td>1</td>
</tr>
<tr>
<td>Tramadol</td>
<td>6</td>
</tr>
<tr>
<td>Nopain</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
</tr>
</tbody>
</table>

**Discussion**

Virtually every patient admitted to the intensive care unit should be administered sedation therapy\(^1\); this is applicable, with variable levels, to all patients in ICU, whether mechanically ventilated or not. A minority of ICU physicians in this study (only 27%) believe that all (100%) mechanically ventilated patients should receive a continuous intravenous sedation, while the majority (30%) think that only less than 50% of mechanically ventilated patients need sedation, disregarding the fact that the desired result of a sedation regimen is to allow the patient to tolerate the physical environment, and the unpleasant procedures and therapies that are necessary in the ICU, to facilitate nursing care and management, and reduce both anxiety and stress, so that post-traumatic stress disorder does not occur after discharge from the unit\(^2\). The blunting of autonomic responses, reduced oxygen consumption and ventilator synchrony are other important goals of sedation therapy\(^3\)\(^-\)\(^7\).

An agitated patient on mechanical ventilation is really a major challenge for ICU physician; this may result from many specific correctable causes that should be addressed first, but still patient agitation requires sedation to control. The increased morbidity and mortality and poor outcome among our ICU patients is directly related to this practice. Highlighting the importance of sedation for ICU patients and evaluation of existing strategies is extremely recommended. In this study, the most commonly used sedatives for mechanically ventilated patients (in those who believe in that) are midazolam and propofol, being always used by 30% and 27% of respondents respectively. Although the use of midazolam is more common than propofol, a combination of drugs strategy is accepted and practiced by all ICU physicians who believe in the use of sedatives for mechanically ventilated patients. No single drug can achieve all the indications for sedation and analgesia in the ICU, a combination of drugs, each titrated to specific end points, is typically a more effective strategy\(^8\).
Benzodiazepines are particularly useful because they are anxiolytic, anticonvulsant, amnesic and provide some muscle relaxation in addition to their hypnotic effect \(^{(9-11)}\). The common drugs used in this class are diazepam, midazolam and lorazepam. Midazolam is the most commonly used drug in this group as it is less irritation at the injection site and as it has got a short elimination half life of 2 hours. Diazepam use has decreased because of concern about its active metabolites (especially desmethyl diazepam) which has a long half life. 2.5% of the respondents of this study stated that they never use midazolam for ICU sedation. Diazepam is used by a low percentage (2%) of the respondents of this study. Lorazepam is not used for sedation in ICU in Sudan. Although propofol has a rapid onset and offset of action because it is metabolized rapidly, both hepatically and extrahepatically, and is ideal for continuous infusion, only 27% of participants involved in this study use it always and 22.5% seldom use propofol as an ICU sedative.

In subanaesthetic doses ketamine is sedative and also analgesic. However, it is generally not used because of the rise in blood pressure, ICP and pulse rate that may result. It is a cheap form of analgesia that can be used in poor countries if not contraindicated; it is particularly useful in asthmatics and cardiovascular stable patients. Although ketamine is a useful sedative and analgesic, but with side effects, only 2.5% of the respondents of this study use ketamine regularly.

Thiopentone was used as an ICU sedative by only one physician (2.5%) for cases with raised intracranial pressure and in intractable seizure activity. Its use as a sedative is not popular among ICU physicians as it causes significant cardiovascular depression and accumulates during infusions leading to prolonged recovery times. Drugs like butyrophenones and phenothiazines, clonidine, clormethiazole and chloral hydrate are not used for ICU sedation in Sudan.

In order to prevent the adverse complications of poorly controlled sedation, sedation therapy should be administered in a careful and precise manner; and to be able to reach this goal the routine use of sedation scales is essential. The scoring system selected for use must be easily understood, used routinely and be part of the regular assessment of the ICU patient\(^{(12)}\). Regarding the use of sedation scoring system for sedated patients in ICU, 52.5% of the respondents use Ramsay sedation score, 40% do not use any scoring system to assess sedation while 7.5% use a local score which is non specific, depending on clinical and haemodynamic variables that can be altered by many common pathologies in the critically ill patients. It is obvious that a high percentage of ICU patient in Sudan (47.5%) are either receiving uncontrolled sedation or no sedation, with its known attendant risks.

Regarding use of intravenous analgesics in ICU, 5% of the respondents regularly use morphine as an ICU analgesic, 5% use it often (especially in cardiac and coronary care units), 55% use it seldom and 35% never use morphine for ICU analgesia. Although some newer agents, having specific advantages, have been introduced, morphine, which is the most commonly used analgesic in the literature and the drug against which all other opioids are being measured, is under used by ICU physicians in Sudan. Of the new analgesics, fentanyl is used often as continuous intravenous analgesia by 27.5% of the respondents, 22.5% use it regularly, 37.5% use it seldom, 7.5% use it always and 5% never use fentanyl. Although used more than morphine for ICU analgesia, there is always a shortage of supply, depending on hospitals and central medical supplies policies; a reason why fentanyl being underused or even not used by most of ICU physicians in Sudan.
Pethidine is the most commonly prescribed opioid in Sudanese ICU practice, as it is the cheapest and always available, despite its low potency, short duration of action, and unique toxicity (i.e., seizures, delirium, other neuropsychological effects) relative to other available opioid analgesics. Nevertheless, some physicians continue to use it as the first line opioid. The percentage of the respondents who use pethidine always as intravenous analgesia in ICU is 37.5%; 35% use it often, 10% use it regularly, another 10% use it seldom and 7.5% of the respondents never use pethidine as an ICU analgesia.

Being available, cheap and simple to use, NSAIDs are always used by 37.5% of the respondents while 35% use it often. Only 5% of the respondents are familiar with epidural and used it as one form of ICU analgesia in specific cases (postoperative analgesia), probably as a result of the skills needed, availability of epidural kits and lack of training.

Other forms of analgesia are used in different low percentages (local infiltration 10%, interpleural block 10%, paracetamol 10%, tramadol 60% and no pain 10%). This study revealed substantial differences in the clinical use of drugs prescribed for sedation and analgesia in ICU. Controlled Sedation and analgesia is an important aspect of management of mechanically ventilated patient in ICU, so it should be the standard in our practice for all ICU patients. The use of midazolam, propofol, morphine and fentanyl is recommended as substitute for non steroidal anti-inflammatory drugs and pethidine, since the later two drugs fall out of favor in recent years because of their side effects and toxicity. The use of sedation scales to monitor levels of sedation is highly recommended, especially the Ramsay sedation score. Highlighting the importance of sedation to the ICU physician and establishment of strategies and protocols for sedation and analgesic are highly recommended.

References