



## REDUCED SEDATIVES & ANALGESICS

### Sedative & pain medication - putting patient health at risk

Sedative premedication is commonly used to calm patients prior to surgery and other stressful medical treatments. Although sedation is meant to improve patient health by relieving stress and anxiety, that medication can have a variety of adverse side effects. Sedative premedication can negatively affect the cardiovascular and respiratory system, impair cognitive functioning and may even provoke paradox reactions. Deep sedation also poses the risk of developing emergence delirium after surgery, leading to prolonged convalescence and hospital stays. Audiovisual interventions are an effective, non-pharmacological and low cost method to prevent premedication with sedatives and overconsumption of analgesics.

#### 1. PREMEDICATION

Premedication with sedatives has been established as **the standard procedure to deal with patient anxiety in the perioperative period**. The mode of action of sedative medication is to block several functions of the nervous system, numbing respiratory activity and therefore decreasing blood pressure and heart rate. Depending on the administered dose, the patient gets slightly numbed or knocked out and consequently falls asleep.

Although it might be relieving for patients not to be fully awake during the anxiety-evoking medical treatment, they are also at risk for suffering from various side effects in the postoperative period. Clinical studies identified **cognitive impairments**, such as memory loss, as a frequent adverse effect after surgery. Patients who had been *premedicated with midazolam and had then undergone 1–2 hours of general anesthesia with propofol and remifentanyl* were found to suffer from *measurable memory impairment one day after their surgery*.<sup>1</sup>

Anxiolytic premedication has further been linked to poorer short-term postsurgical outcome. These include **longer hospital stay, higher risk for follow-on operations, cardiovascular complication and a higher mortality rate**.<sup>2</sup> For patients with a diagnosis of obstructive sleep apnoea (OSA), sedation bears a heightened risk of airway obstruction. Furthermore, sedative premedication is assumed to contribute to the development of OSA postoperatively.<sup>3</sup>

Essentially, **health practitioners tend to overly sedate patients** in order to make them feel more comfortable. However, data shows that the depth of sedation does not affect patients' subjective feelings of distress.<sup>4</sup>

**Reducing or even going without preoperative sedation can significantly prevent elderly patients from developing new onset of postoperative cognitive dysfunction (POCD) or emergence delirium**. These include memory impairment, diminished ability to combine tasks, psychomotor



dexterity and other cognitive impairments, and can, if persisting, enter into the differential diagnosis of dementia. POCD symptoms are present in 41% of patients aged 60 and up on hospital leave, but also appear in 36% of younger patients between 18 and 39 years old. To prevent POCD and other complications, new guidelines recommend using sedative premedication with extreme caution.<sup>5</sup>

**The official organ of the German Medical Association and the National Association of Statutory Health Insurance Physicians advises critically reconsidering the habitual practice of premedicating patients with sedatives such as midazolam.<sup>5</sup>**

## 2. PROCEDURAL SEDATION

**Procedural sedation can lead to prolonged recovery and delayed side effects** in children undergoing MRI and CT diagnostic procedures. Their research found that 52% of children did not return to baseline levels of consciousness and vital signs until 8 hours after being sedated for the procedure. *Fifty-three per cent of children were asleep during the trip home and 31% continued to sleep for at least 6 hours after discharge.* Five per cent of children were still impaired in those activities on the second day after their procedure. Side effects reported by parents included breathing difficulties, agitation and aggressive behavior, nausea and vomiting, diarrhea and motor imbalance, which bears the risk of falls and injuries.<sup>6</sup> *Reduction of the need to sedate children undergoing CT scanning is therefore desirable.<sup>7</sup>*

**Additionally for endoscopic procedures, sedation has been identified as a major risk factor for complications.** In fact, short narcosis in terms of propofol has been found to account for 50% of complications that occur directly during the investigation. These include especially cardiopulmonary complications, which are the most frequent cause of mortality in the context of colonoscopies. In 2014, the German Association for Gastroenterology, Digestive and Metabolic Diseases published S3-Guidelines on sedation use in gastrointestinal endoscopy: Although sedation is often essential for patients to better bear the investigation, it is **recommended to go without sedation whenever possible to promote patient safety and health.<sup>8</sup>**

## 3. INTENSIVE CARE

**Sedatives** are also commonly used to handle delirium at the intensive care unit. Ironically, for delirious patients those medications **can have serious side effects and may even contribute to the development or manifestation of delirium:**

It is widely known that sedatives disrupt the melatonin circadian rhythm, therefore impairing patients' sleep patterns. As a consequence, patients experience less phases of deep sleep, hindering the brain from recovering as well as impairing sleep quality. The additional administration of sedation can further lead to a higher chance of mortality and a lengthier hospital stay.<sup>9</sup>



Investigating quality of life in intensive care patients, Nelson and colleagues (2000) found that the administration of sedatives was positively associated with long lasting depression and posttraumatic stress disorder (PTSD) symptoms, which were measurable until 3.4 years after ICU treatment for acute lung injury.<sup>10</sup> The incidence of PTSD in ICU patients was found to lie between 25 and 34%, and thus seen as a frequent complication. Both depression and symptoms of PTSD were correlated with days of sedation.<sup>11</sup>

According to the evidence and consensus-based German “S3-Guideline for the management of analgesia, sedation and delirium in intensive care”, **sedative medication is critically involved in the development of emergence delirium and shall not be given to patients, if not absolutely necessary.** Importantly, patients shall be awake, understand their procedure and be free of pain and anxiety. They shall be actively involved in their treatment and recovery.<sup>12</sup>

## Audiovisual distraction - a non-risk alternative to sedatives

During the last few decades, the anxiety relieving effect of music has been intensively studied in the medical context. In 1998, Koch and colleagues conducted a first randomized controlled trial and found that patients who listened to music during their procedures required significantly less propofol and alfentanil to acquire the same level of sedation than their controls.<sup>13</sup> This finding was reproduced and supported by a variety of following studies:

Relaxing music was found to decrease the level of patient anxiety in the preoperative setting to a greater extent than orally administered midazolam. The authors stressed that the higher effectiveness and absence of apparent side effects makes **music interventions a useful alternative to sedative premedication.**<sup>14</sup>

Years later, a comprehensive Cochrane review concluded that *given the fact that preoperative sedatives and anti-anxiety drugs often have negative side effects and may prolong patient recovery and discharge, music interventions are a valuable alternative to these drugs and should be offered to patients more frequently.*<sup>15</sup>

**Simultaneously, researchers across the world started to investigate the new concept of audiovisual distraction in the operating room.** To audiovisually distract patients before and during procedures, researchers displayed films via monitors, tablets or video glasses to their patients. In 2004, Lee and colleagues conducted a randomized controlled trial using patient controlled sedation during colonoscopies. They compared 53 patients receiving standard care with 52 patients receiving audiovisual distraction through video glasses while undergoing their endoscopic procedures. Results showed that patients who received audiovisual distraction **required significantly less propofol.**<sup>16</sup>

Four years later, Etzel-Hardman and Jones (2009) tested an audiovisual distraction technique during a computer tomography scan. Instead of procedurally sedating kids, which is a standard procedure in many institutions, they distracted them before and during their procedures by



showing them child-appropriate films and music. By doing so, the **need for procedural sedation in kids was decreased by 91%**.<sup>17</sup>

In 2014, Seiden and colleagues confirmed that audiovisual distraction techniques prior to surgery are **superior to preoperative sedation** in children. Their research claims that distracting children prior to surgery does not only reduce anxiety and the need for additional sedation, but also minimizes the associated risk of emergence delirium. Children that did not receive midazolam as premedication but audiovisual distraction had a **5% lower incidence of postoperative delirious states**. Moreover, children who received distraction prior to induction could leave the postoperative recovery room on average 24 minutes earlier. The researchers concluded that using audiovisual distraction as an alternative to sedative premedication improves recovery and thus leads to **earlier discharge from the postanesthesia care unit**.<sup>18</sup>

Researchers from the Oxford University Hospitals NHS Foundation Trust recently conducted a survey with 50 patients undergoing elective limb surgery under regional anesthesia and offered them an audiovisual distraction device instead of standard sedation. Patients aged 18 to 80 years could then select from a variety of films and music to occupy themselves during their surgery. Analysis showed that **45% of patients could go without minimal sedation** when using the distraction device.<sup>19</sup>

Also for ICU patients, distraction in the form of music and videos has been found to reduce delirious symptoms. A randomized controlled trial with 66 patients found a **significant decrease in the number of episodes of postoperative confusion and delirium in elderly patients** (65 and older) after elective hip and knee surgery. Those patients could choose from a selection of nature sounds, classical and meditation music and listened to it in the postoperative period.<sup>20</sup> Music and distraction therapy are generally recommended to be used for non pharmacological prevention of emergence delirium.<sup>21</sup>

## Audiovisual distraction - an effective pain management tool

Distraction has been proven to positively impact patients' pain perception during and after various medical treatments and subsequently results in decreased needs for pain medication. Patients who undergo urologic procedures with spinal anesthesia consume significantly less opioid medication when they listen to music during their procedures. In total, the **reduction of overall alfentanil requirements amounted to 44%**.<sup>13</sup>

During lithotripsy for kidney and ureter stones, distraction by means of videos and music has been found to reduce the subjective pain perception and lower the need for analgesic medication. 118 patients were included in a clinical trial and randomized into an intervention and a control group. The patient-reported pain score was significantly lower in the intervention group and reduced from a mean of 6.1 to 2.4 ( $P < 0.0001$ ). Similarly, the distress score was reduced from a mean of 4.4 to 1.0 ( $P = 0.0001$ ) for patients receiving audiovisual distraction during their treatment. Subsequently, **pain perception and distress were reduced by 61% and 77% respectively**.<sup>22</sup>



Distraction therapy with nature sights and sounds was found to significantly reduce pain in patients undergoing flexible bronchoscopy (Diette, Lechtzin, Haponik, Devrotes, & Rubin, 2003). Another randomized controlled trial found that audiovisual distraction with video glasses significantly reduces subjective pain perception during colonoscopies (mean pain score 5.1 for AVD intervention, versus 7.0 for no intervention on a scale ranging from 0-10).<sup>16</sup>

For children, **audiovisual distraction in form of animated short films has been proven to alleviate pain during puncture procedures.** A novel cross-over design enabled all 40 school-aged children (6-11 years) to undergo periods with and without distraction, therefore serving as their own controls. During treatment phases of film distraction, children experienced significantly less pain compared to phases without distraction.<sup>23</sup>

Previous research found that the audiovisual distraction technique is even more effective in alleviating children's pain during puncture procedures than active play interventions and comparable to psychological interventions.<sup>24,25</sup> When comparing passive distraction through television versus parent play with interactive toys, children experienced a greater pain relief when watching films. On average, **children's self pain ratings were 49% lower when watching films** during their blood draw (17,4 versus 8,9). Passive compared to active distraction seems to be more effective in reducing pain, as children's distress hinders them from actively interacting with the distractor.<sup>24</sup>

**In 2017, The Journal of Pain and Symptom Management published a systematic review which concluded that distraction is a promising intervention for procedural pain.**<sup>26</sup>

The authors point out that research studies and clinical guidelines have recommended using nonpharmacologic interventions, such as distraction, for procedural pain management in children. *Pharmacologic interventions do not improve the overall pain experience of children as they still complain of pain and remain distressed.*<sup>26</sup>

Additionally, the World Health Organisation (WHO) indicates in their report "Promoting safety of medicines for children" that *there is a lack of research on the effect of pain medication in children.* Existing clinical trials include small sample sizes and are therefore not capable of detecting potential side effects. **Avoiding pain medication and making use of nonpharmacological interventions is strongly advised.**<sup>27</sup>

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