

# Conscious sedation for endoscopic procedures

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## ABSTRACT

**Despite the fact that gastrointestinal endoscopy is a safe procedure, significant complications can occur. According to the literature most complications are related to sedation and compared with perioperative mortality under general anaesthesia, the mortality for this procedure appears high. Strict implementation of existing guidelines is warranted.**

In this issue, Bosch *et al.* report on a stepwise sedation procedure with midazolam and fentanyl for the insertion of central venous catheters. They conclude that such an approach is safe and effective. Apart from the insertion of catheters, conscious sedation is frequently applied during invasive procedures in internal medicine, such as biopsies, punctures and endoscopy procedures. Within this field the administration from sedatives and narcotics by non-anaesthesiologists has been a matter of debate for many years. In 1986 a report of the Dutch Health Council for the use of sedation in dentistry was published.<sup>1</sup> The Committee concluded that initial treatment should begin with reassurance and support to bring the patient to a state where the medical treatment offered is accepted. In most cases this should be enough. If this does not work, it may be necessary to obtain sedation by means of pharmacological agents. The report gives useful definitions about general anaesthesia and 'conscious sedation'. General anaesthesia is described as a method that induces a reversible and controllable depression of certain functions of the central nervous system causing unconsciousness. Fear and pain are absent and vital reflexes are depressed or absent. 'Conscious sedation' is described as a method that induces a reversible and controllable depression of certain

functions of the central nervous system, during which the patient remains conscious. The maintenance of verbal and non-verbal communication and intact vital reflexes during conscious sedation is crucial. Both ventilatory and cardiovascular function has to be maintained. Despite these definitions the line between sedation and general anaesthesia is not always clear in practice.<sup>2</sup> Although the use of conscious sedation in endoscopies is widespread, there are large regional differences. In one survey conducted in the United States only 2.2% of endoscopies were performed without routine use of conscious sedation, whereas in some European countries the majority of endoscopic procedures are performed without sedation.<sup>3,4</sup> Recently Bonta *et al.* found that echo-endoscopic investigation of the oesophagus and stomach without sedation was feasible and acceptable for both endoscopists and patients.<sup>5</sup> However, the overall tolerance of patients was significantly better during sedation with midazolam. Despite the fact that gastrointestinal endoscopy is a safe procedure, significant complications can occur as a result of instrumentation with a frequency of 0.1% for upper endoscopies and 0.2% for colonoscopy.<sup>6</sup> According to a rather old study by Silvis *et al.* cardiopulmonary complications are more common than bleeding or perforation and may account for over 50% of all reported complications.<sup>7</sup> In a more recent study the rate of cardiopulmonary events was 2 per 1000 cases.<sup>8</sup> The 30-day mortality was 1 per 2000 cases and included aspiration pneumonia, pulmonary embolism and myocardial infarction. Arrowsmith *et al.* used data from the American Society for Gastrointestinal Endoscopy's computer-based management system to compare the rates of serious cardiorespiratory complications

and death associated with the use of midazolam and diazepam.<sup>9</sup> Data were analysed from 21,011 procedures. Serious cardiorespiratory complications and death occurred in 5.4 and 0.3 per 1000 procedures, respectively. The authors concluded that concomitant use of narcotics and urgent and emergency procedures increased the risk of serious cardiorespiratory events.

When we compare these results with postoperative mortality these numbers seem quite high. In a Dutch survey of 62,969 procedures in a University Hospital, including neurotrauma and emergency surgery, 314 patients (0.5%) died within seven days of the operation.<sup>10</sup> Death was related to both anaesthesiological and surgical factors in 14 patients (2.2 per 10,000 operations). Other studies estimate anaesthetic mortality rates to be as low as 0.05 per 10,000 anaesthetics for in-hospital surgical procedures depending on the ASA classification of the patient.<sup>11-13</sup> For outpatient anaesthesia D'Eramo *et al.* found an overall mortality rate of 1 in 835,000 patients.<sup>14</sup>

Although mortality seems a clear endpoint, results may be biased by study methods (voluntary reporting) and differences in definitions or the postoperative observation period. Furthermore, it remains difficult to compare surgery during general anaesthesia with endoscopic procedures. To my knowledge there are no figures available from the Dutch situation about complications during endoscopic procedures. However, it must be concluded that compared with postoperative mortality after general surgery the mortality for a merely diagnostic procedure such as endoscopy appears high.

Recently, studies have been published about the use of ultra-short-acting hypnotic agents such as propofol for endoscopic procedures. Propofol is a useful intravenous anaesthetic agent. It causes a reduction in blood pressure predominantly resulting from vasodilation. After the injection of propofol apnoea commonly occurs and for varying duration. One of the greatest problems with the administration of sedative agents is the interindividual variability of the sensitivity for these agents. The dose that causes no effect in one patient may cause deep sedation in another patient. Also agitation may be interpreted as not enough sedation, but may actually be caused by hypoxia. Although in a recent publication the authors stated that they did not experience major complications with the use of propofol, the need for short-lasting mask ventilation was significantly increased.<sup>15</sup> Maintenance of the airway is one of the most important tasks of the anaesthesiologist or emergency physician. It cannot be overemphasised that this life-saving technique seems much easier than it often is in clinical practice and that this technique needs extensive education and training. There is, in my opinion, an important fundamental difference in responsibility in applying mask ventilation in an emergency situation compared with the elective administration of a sedative

agent in an elective case.

Given the information that the majority of cardiopulmonary complications as a result of endoscopies relate to 'conscious sedation', strict monitoring of the patient and a good understanding of the pharmacology and side effects of the agents that are administered as well as the role of pharmacological antagonists is important. Personnel should be trained in life support skills and advanced life support should be available within five minutes. Guidelines by the American Association of Anesthesiologists and the American Society for Gastrointestinal Endoscopy should be implemented.<sup>16,17</sup> Despite the fact that it is not specifically mentioned in the guidelines of the American Society for Gastrointestinal Endoscopy monitoring patients by a specially trained person other than the endoscopist can probably prevent many cardiorespiratory complications.<sup>18</sup> The routine assistance of an anaesthesiologist for low risk patients undergoing standard upper or lower endoscopic procedures is not warranted and is certainly cost-prohibitive. In the future, 'conscious sedation' during diagnostic procedures might be an interesting role for anaesthetic physician assistants. In my view, the person who assists the gastroenterologist with conscious sedation should be part of the local anaesthesia department and should have continuous experience in administering anaesthesia and maintaining the airway. After sedation patients should recover in an area equipped with appropriate monitoring and resuscitation equipment. The procedure will become even safer if the patients are under close attendance by skilled personnel during the recovery period until discharge criteria are fulfilled.

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