Nurse-Administered Propofol Sedation Safety Further Confirmed – but Can We Really Allow Our Patients to Drive Afterwards?

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Many of us are familiar with the situation in which a patient is somewhat combative during an endoscopic procedure, but sleeps like a baby for what seems an age afterwards. Despite undoubted advances in this area, it is glaringly obvious that we have significant room for improvement in how we sedate patients.

So, what about propofol? Propofol is an intravenous anesthetic agent often used with other agents for delivery of general anesthesia, but increasingly used in lower doses to induce conscious sedation. Hardly a month goes by without some study supporting the use of propofol by non-anesthesiologists for conscious sedation. Propofol has some undoubted advantages over benzodiazepines and opiates [1]. A particular advantage that is much cited by advocates of using propofol for conscious sedation is that it has a very short half-life, between 2 and 4 min, so there is a much shorter time to recovery from the drug than with midazolam, which has a 30-minute half-life. Rapid induction of sedation and subsequent patient recovery would accelerate patient turnover, allowing more procedures to be done per session. Would this be achieved at the expense of safety? It would appear not.

In this issue of *Digestion*, Horiuchi et al. [2] from Japan prospectively look at the safety of nurse-administered low-dose propofol (30–80 mg total) for diagnostic esophagogastroduodenoscopy (EGD). An impressive 12,031 patients were studied. Only 1.1% of subjects developed transient oxygen desaturation, and full recovery was

present in 97.5% 30 min after the procedure. Patient satisfaction was also very good with 99.8% willing to repeat the same procedure. These findings serve to further confirm the strong impression that propofol is safe for use as a conscious sedation agent for endoscopy in the hands of appropriately trained endoscopists and endoscopy nurses. There are several studies over the last few years (involving over 200,000 patients) examining propofol administration for endoscopy by gastroenterologists and specially trained endoscopy nurses [3–9]. A recent meta-analysis found no increase in the risk of cardio-pulmonary complications with the use of propofol sedation for endoscopy, as compared to the use of traditional sedative agents. There was not a single patient in these studies who required intubation or died. Nonetheless, despite the plethora of safety data relating to the use of propofol by endoscopists and endoscopy nurses, there are still concerns within the community. A key factor is appropriate patient selection as there is a more recent study which reported a very small number of deaths in patients who received propofol for conscious sedation, most of whom were undergoing more prolonged procedures and/or were higher risk ASA (American Society of Anesthesiologists) class [10]. Of note, none of the patients in this recent series underwent colonoscopy or standard routine gastroscopy. The current study by Horiuchi et al. [2] focuses on low-dose propofol in diagnostic EGD, and irrefutably confirms the safety of such a practice.

A more novel aspect of the study by Horiuchi et al. [2] was the use of a driving simulator to compare the residual effects of propofol with those of midazolam on psychomotor function. Driving ability recovered to the basal level within 60 min of propofol (40 mg) administration, but for patients who received midazolam (4 mg) there was still a significant tracking (the ability to steer an image of a car bonnet down the center of a winding road as accurately as possible) error rate and slower reaction times, even at 120 min. In the regional conscious sedation guidelines for Vancouver, where I work, it is stated that: 'Patients should be advised prior to the administration of sedatives that a prolonged period of impaired cognition may occur. They should be instructed to make plans not to drive (for 24 h), operate heavy or potentially harmful machinery, or make legally binding decisions. When sedatives are administered, a competent companion for discharge must accompany patients from the recovery area.' This is a common practice in many units.

So, can we really change our current practice and allow patients to drive home 1 h after propofol sedation? The recovery at 1 h after low-dose (40 mg) propofol is impressive, but clearly the findings of this study need to be further confirmed in larger studies. However, earlier studies have suggested a similar theme. For example, in a study by Vargo et al. [5, see also 11], all patients who received propofol were fit for discharge within 30 min of the procedure, compared to less than 20% of patients in the standard sedation group. This is reflected at a slightly later period as well; 24 h after the procedure, the patient has much less difficulty with neurological function, and social functioning is at a higher level than with traditional agents. There is no specific dosing schedule with propofol. Generally, a loading dose of 40–50 mg is given with further smaller bolus loads (10–20 mg) to maintain sedation, with a typical total dose anywhere from 100–300 mg. This is where we need to be careful with advocating a change in the current advice not to drive for 24 h after sedation, as it is currently unclear what total dose is safe to suggest such a change in advice. What total dose is 'safe' for driving 1 h later? Is it 40, 80, 100 mg or even higher? Clearly, even the suggested safety after 40 mg needs to be confirmed. Interestingly, Horiuchi et al. [2] measured blood propofol levels at 1 h after administering 40 and 80 mg, and found a very similar blood level in the area of 100 ng/ml for both doses. It is very probable that higher doses of propofol than 40 mg are needed for patient comfort for colonoscopy, so if we assume that we could safely allow our patients to drive home 1 h after 40 mg propofol, can we do so if they receive 80 mg for colo-

noscopy? Or 100 mg? Or 150 mg? Without doubt, this area needs significantly more study. Even at the lower 40 mg dose, can we truly allow our patients to drive home given the increasing move to a zero tolerance for driving with any level of alcohol or recreational drugs? I think we are only just getting to grips with the idea of non-anesthesiology administered propofol without potentially muddying the persistently stormy waters by suggesting that our patients can safely jump into their cars and drive home shortly after propofol sedation, even if low dose.

Even more controversial is the subject of the combination of propofol and lower dose benzodiazepines/opiates for which there is a growing body of evidence. It is suggested that with combination therapy, patients can be targeted to moderate rather than deep sedation easier than with propofol alone [6, 12]. A small dose of opioid/benzodiazepine dramatically reduces the total dose of propofol needed. There is at least some reversible component on board, and patients recover just as quickly. How would this practice, if more widely adopted, impact the issue of driving after a procedure?

However, even if we ignore the issue of driving, the biggest benefit for increasing throughput in the endoscopy department will be from standard (usually lower dose propofol) gastroscopy and colonoscopy, as these procedures account for the vast majority of procedures performed. Hence, faster recovery times from propofol use will have the largest impact, reducing prolonged recovery room stays. With increasing demand for endoscopy, particularly for colonoscopy for colon cancer screening, the faster turnaround time will help meet this demand. I think it is pretty self-evident that using propofol appropriately will allow more patients to move through the unit in a given day and for them to leave more quickly. We truly could be toasting this 'milk of amnesia' in our units in years to come, or at least something very similar, as new safe ultra-short-acting anesthetic agents are being developed that are likely to supercede propofol in the near future.

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