Special care dentistry: Midazolam conscious sedation for patients with neurological diseases

ABSTRACT

Aim Midazolam is used very often to control the anxiety of patients for dental treatment, especially in patients with special needs. The objective of this study was to evaluate the efficiency of Midazolam in patients with neurological diseases referred for dental treatment.

Study design Descriptive study

Methods Forty consecutive patients with neurological disorders (encephalopathy, autism, and epilepsy) were referred to dental treatment, and 45 sedations were performed; all were sedated with Midazolam (intramuscular 0.2-0.3 mg/kg or intravenous 0.1mg/kg) and all were anesthetised with lidocaine 2% (0.5-2 mL). During the dental procedure, their behavior was analysed and classified into 3 categories: A (indifferent), B (reacted but allowed treatment), and C (did not allow treatment). Data were tabbed and statistically analysed.

Results The final patients’ classification was: A 22 (49%), B 18 (40%) and C 5 (11%); the patients with encephalopathy had the best results of sedation according to the proposed classification (p<0.05).

Conclusion Midazolam demonstrated to be effective in 89% of this sample for dental procedures in patients with neurological and behavioral disturbances, but it was less effective for patients with autism (p<0.05).

Keywords: Conscious sedation; Dental treatment; Midazolam; Special care; Special need.

Introduction

Acute pain due to oral surgery or dental treatment involves anxiety and fear, which can be controlled with pre- or intraoperative techniques like analgesia and sedation [Prado et al., 1999; Leitch and MacPherson, 2007]. Patients with severe mental deficiency or systemic diseases are usually more anxious because of the high frequency of visits at the hospital; in these cases, dental procedures under analgesia with ketamine or other general anaesthetic are helpful. An alternative method of treatment consists in sedation with benzodiazepines with short half-life, like Midazolam [Leitch and Macpherson, 2007; Schmidt, 2005].

Midazolam is a safe benzodiazepine with few side effects and able to cause anterograde amnesia [Matsuki et al., 1997]. It has rapid effect and short duration because of its quick metabolic inactivation. This medication does not produce sleepiness in children even in high doses; therefore, it works as a sedative agent with the benefit of anterograde amnesia when compared to similar drugs [Downs et al., 1997; Alcaino, 2000].

The restrictions in the use of this drug by the parenteral pathway are elderly debilitated patients with cardiovascular, respiratory or renal failures. In these situations, the doses must be monitored and reduced, and the vital functions monitored. Patients with congestive cardiac and chronic renal failure can have slow clearance of Midazolam [Leitch and Macpherson, 2007]. Special care is needed with patients having myasthenia gravis because of the preexistent muscle relaxation. Like other drugs, Midazolam cannot be used in the first trimester of pregnancy, and should be used carefully in breastfeeding women. It is also contraindicated in patients with hypersensitivity to benzodiazepines [Downs et al., 1997; Alcaino, 2000].

Thus, the objective of this study was to evaluate the efficiency of Midazolam in patients with neurological diseases referred for dental treatment.

Materials and methods

Between June 1997 and December 1998, 40 consecutive patients had their dental treatments under conscious sedation with Midazolam at a large teaching hospital (Hospital das Clínicas, Medical School, University of São Paulo). This study was approved by the Ethics Committee and the informed consent was signed for each patient. All patients had neurological diseases and were referred from the Neurology Department; therefore, all had problems at the first appointment at the Dentistry Division, and thus were referred for dental treatment with sedation.

These patients were classified according to the criteria of the American Society of Anesthesiology: ASA I (with no organic, psychological, biochemical or psychiatric disturbance) and ASA II (mild disturbance). We excluded patients with a body weight higher than 95 kg or those free from clinical conditions at the day of sedation. The treatment protocol consisted in the routine clinical evaluation for patients that undergo general anesthesia,
with conventional laboratory exams (complete blood panel, coagulogram and blood sugar assessment). All patients fasted for at least 8 hours before sedation. The treatment was performed by one dentist and one anaesthetist; another external observer was responsible for the analysis of the behaviour and sedation of the patients.

The sedative used was Midazolam in the intramuscular dosage of 0.2 mg/kg or 0.3 mg/kg, or intravenous dosage of 0.1mg/kg, not exceeding the dosage of 15 mg; all patients were monitored with pulse oxymeter for oxygen saturation (kept above 95%).

After sedation and until the end of the treatment, general stimuli like noises, light or pain were avoided. The dental chair was kept perpendicular to the floor to prevent aspiration of fragments, and to contribute to the ventilation of the patient. After 2 minutes of sedation, local anesthesia was used in all patients (0.5-2 mL of lidocaine 2%).

The sedation followed the sequence below:
- Local anaesthetic infiltration.
- Non bloody procedures: wet phase (cavity preparation), dry phase (restoration).
- Bloody procedures.

The patients were classified into three types according to the behavior during the sedation and dental procedures performed:
- the patient was indifferent to the environment during the procedure; he/she received bloody and/or non bloody procedures.
- the patient reacted to the environmental stimuli; he/she received bloody and/or non bloody procedures.
- the patient did not allow the treatment and needed physical containment to the execution of the dental procedures.

All data were collected into files, tabbed and analysed for frequency, variation, means and standard deviations. The level of significance was 5%, and the statistical analysis performed was the chi-square test.

Results
Forty consecutive patients aged between 2 and 54 years were treated, and 45 sedations were performed. The classification of the patients, according to their behavior, were: "A" 22 (49%) patients; "B" - 18 (40%) patients and "C" 5 (11%) patients (Fig. 1). The most common systemic diagnoses were neurological disorders (encephalopathy, autism, and epilepsy); the patients with encephalopathy had the best results of sedation according to the proposed classification (p<0.05) (Fig. 2).

The total number of dental procedures was 125: 42 amalgam restorations, 40 dental extractions of permanent teeth, 13 temporary restorations, 13 dental extractions of deciduous teeth, 4 composite restorations, 1 surgery to remove a traumatic bone cyst, 1 aspiration biopsy and 1 suture of a traumatic lesion (Table 1).

Discussion
In this study, we observed that the conscious sedation with Midazolam was very helpful during dental treatment of patients with emotional disturbances directly or indirectly associated with their neurological diagnoses. The treatment conditions in this sample were perfect (with no or few reaction of the patient during the treatment) in 89% of the sedations, which were classified as A or B (49% of "A" and 40% of "B"). Although some patients reacted during the assessment ("B") they still could be...
CAPP PL. ET AL.

treated, therefore for 11% of the patients (“C”) the sedation did not succeed. It is known that patients with motor disturbances facilitate the dental procedures when they are sedated, as it was observed in this sample [Yagiela, 1991], but the reasons for the non responsiveness in some of them are unknown, especially the autistic patients [Pisalchaiyong et al., 2005]. Some studies suggest that the association of Midazolam and Nitrous Oxide [Schmidt, 2005; Fukuta, 1994] could be used in these cases; it proved successful in anxious, ASA I and II [Runer and Strom, 1997], spastic, neurological [Van Der Bijl and Roelofse, 1994] and pediatric patients [Alcaino, 2000].

It is known that sedation needs to be monitored with pulse oxymeter, precordial stethoscope, thermometer, manometer and the clinical parameters like skin color [Aka et al., 1995], however it is especially important during the dental treatment because of the mechanical obstruction of the airways that can occur due to aspiration of fragments or increase of secretions [Kohjitani et al., 2008]. The oxygen saturation must not fall under 95%, except during anesthetic infiltration [Runes and Strom, 1997]. Another cause of reduction in oxygen saturation is the pain stimuli during the procedures. This sample did not present any important reduction in the oxygen saturation during the interventions, and the patients were maintained in the sedation room until they reached stable levels, higher than 96%.

In this study, we did not need any drug to revert the effect of Midazolam, although this had been suggested by some authors. The use of the antagonist of benzodiazepines, flumazenil, is required in case of breathing depression [Smith, 1998].

Although the patients were kept in the perpendicular position (90°) aiming to reduce the risks of aspiration and mechanical obstruction of the superior airways, this position can be revised because the sedated patient maintain his/her reflexes [Letch and Macpherson, 2007], and the inclination of the dental chair to 45° would permit better access to the oral cavity and a reduced work time.

The procedures on autistic and epileptic patients sedated with Midazolam were less successful than for patients with encephalopathy, even with the use of local anaesthetics in all of them. Prospective studies should be done in order to evaluate the underlying factors, including environmental, intraoral, anaesthetic or other causes.

Conclusions

Midazolam demonstrated to be adequate in 89% of this sample for dental procedures in patients with neurological and behavioral disturbances, but it was less effective for patients with autism (p<0.05); this benzodiazepine is an excellent option for improving the treatment of patients with neurological abnormalities that refuse dental treatment. Sedation with Midazolam can be an option to other forms of general anesthesia, with short half-life and lower costs. Therefore, it is fundamental that the team is prepared and has an anaesthetist for possible complications.

References


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