



Anesthetic management of dental procedures in patients with special needs: A retrospective analysis of 519 patients in North of Turkey

Mehmet Ziya Yılmaz^a, Aysun Çağlar Torun^a, Burcu Baş^{b*}, Hatice Duran^b, Hızır İlyas Köse^b, Halit Furuncuoğlu^b

^aDepartment of Pedodontics, Dental Faculty, Ondokuz Mayıs University, Samsun, Turkey

^bDepartment of Oral and Maxillofacial Surgery, Dental Faculty, Ondokuz Mayıs University, Samsun, Turkey

ARTICLE INFO

ABSTRACT

Article History

Received 20 / 02 / 2014

Accepted 05 / 05 / 2014

* Correspondence to:

Burcu Baş

Department of Oral and Maxillofacial Surgery,

Ondokuz Mayıs University,

Dental Faculty,

Samsun, Turkey

e-mail: burcubs@yahoo.com

Keywords:

Anesthetic management

Dental treatment

General anesthesia

Sedation

Patients with special needs

Special need patients have increased risk for oral diseases throughout their life. Sedation and general anesthesia is generally the preferred treatment for special needs patients though it provides optimal conditions for dental treatment. This study was aimed to describe our anesthetic experience in dental treatments of 519 special needs patients at a dental faculty in the north side of Turkey during a three-year period. The data referring to patient's demographic information, anesthetic techniques, agents, dental treatment duration and the type of dental procedure during the period from 2009 to 2012 were retrospectively collected. All of the patients had moderate or severe intellectual disability, and not cooperating fully with dental treatment. There were for different anesthetic techniques in application: face mask, face mask combined with intravenous sedation, total intravenous anesthesia, and nasal intubating general anesthesia. Two intravenous (IV) anesthetic agent, Propofol (Propofol) and Midazolam (Dormicum) were used either alone or combined. Sevoflurane (Sevorane) was used as inhalation anesthesia and Vecuronium bromide (Norcuron) was used in patients that require nasal intubation. The mean age was 19 yr (range 3 to 81), and males predominated females by a ratio of 271\248. Of 519 patients, 204 patients were ASA grade 1, 315 patients were ASA grade 2. Cognitive impairments include; Alzheimer disease (1 patient) and dementia (1 patient). Central nervous system disorders (CNS) include; ataxia (1 patient), autism (38 patients), cerebral palsy (7 patients), hydrocephaly (1 patient), multiple sclerosis (1 patient). Specific syndromes include; Down syndrome (35 patients), Epidermolysisbullosa (1 patient), Reye's syndrome (1 patient). Only minor complications such as nose bleeding, nausea/vomiting, restlessness, dizziness, shivering and desaturation (saturation under 90) were seen during the immediate postoperative period. A multidisciplinary approach between the dentist and anesthesiologist are important to manage successful treatment of these patients.

J. Exp. Clin. Med., 2014; 31:213-216

© 2014 OMU

1. Introduction

Special need is terminology to describe individuals who require assistance for disabilities that may be medical, mental, or psychological. These patients are unable to cooperate because of immaturity or physical or mental disability (Wang et al., 2012). Dental management of patients with mental disability is a challenge to both dentist and anesthesiologist.

During treatment, special care is required because individuals frequently refuse dental treatment and refuse to cooperate. Though patient cooperation is absolutely essential in dental treatment; general anesthesia (GA) was the only choice for most of the patients with physical disabilities who seeks dental treatment.

Although the advantages of GA are considerable, the

disadvantages, and their relevance to each individual patient's physical and mental status, should be carefully considered by the dentist, patient and/or patient guardian prior to making a decision to proceed with treatment under GA.

This study was aimed to describe our anesthetic experience in dental treatments of 519 special needs patients at Ondokuz Mays University, Faculty of Dentistry, during a three-year period.

2. Material and methods

The data referring to patients' demographic information, anesthetic techniques, agents, dental treatment duration and the type of dental procedure during the period from 2009 to 2012 were retrospectively collected. All patients were examined previously, before the operation a routine laboratory examination was done. During operation electrocardiography (ECG) monitorization, pulse oximetric SpO₂ and non-invasive blood pressure monitorization were performed. All of the patients had moderate or severe intellectual disability, and not cooperating fully with dental treatment. There were four different anesthetic techniques in application: face mask, face mask combined with intravenous sedation, total intravenous anesthesia, and nasal intubating general anesthesia. Two intravenous (IV) anesthetic agent, Propofol (Propofol)[®] and Midazolam (Dormicum)[®] were used either alone or combined. Sevoflurane (Sevorane)[®] was used as inhalation anesthesia and Vecuronium bromide (Norcuron)[®] was used in patients that require nasal entubation. Patients were monitorized in recovery room in decubitus position administering O₂ via face mask. All patients were discharged on the day of operation after a recovery period.

3. Results

The anesthetic records of 519 patients with special needs who underwent dental procedures over the three-year period were reviewed. The mean age was 19 years (range 3 to 81), and males predominated females by a ratio of 271/248. Of 519 patients, 204 patients were ASA grade 1, 315 patients were ASA grade 2. The medical conditions that lead to disability were presented in Table 1. Cognitive impairments include; Alzheimer disease (1 patient) and dementia (1 patient). Central nervous system disorders (CNS) include; ataxia (1 patient), autism (38 patients), cerebral palsy (7 patients), hydrocephaly (1 patient), multiple sclerosis (1 patient). Specific syndromes include; Down syndrome (35 patients), Epidermolysisbullosa (1 patient), Reye's syndrome (1 patient).

Anesthesia was accomplished with only face mask technique in 114 patients, face mask combined with intravenous sedation in 209 patients, only intravenous anesthesia in 10 patients and nasal entubation in 186 patients. If dental extractions were required, the dental surgeon administered a local anesthetic with epinephrine 40 mg (Articain) with 0.06 mg epinephrine (Ultracain DS[®]) or 0.012 mg epinephrine (Ultracain DS-forte[®]) for the management of postoperative pain as well as local hemostasis. Dental restorations together with extractions were performed in

136 patients; only dental extractions were performed in 276 patients and only restorative procedures were performed in 107 patients. The mean duration of the dental procedures was 42 minutes (min:5, max:150 minutes). The mean duration of the operations of only dental extraction was 27 minutes (5-90 minutes), only dental restoration was 53 minutes (10-150 minutes) and dental restorations together with extractions was 65 minutes (30-150 minutes).

Majority of the patients tolerated the procedure well. Only minor complications such as nose bleeding, nausea/vomiting, restlessness, dizziness, shivering and desaturation (saturation under 90) were seen during the immediate postoperative period. Intubated patients stay in the post operative patient care unit for 4 hr and non intubated patients stayed for 30 min-2 hr.

4. Discussion

A disability is the restriction or lack of ability to perform normal activities that has resulted from the impairment of a structure or function of the body or mind. One of the major problems in the management of patients with disabilities is the difficulty in making a satisfactory preoperative assessment. Many of the patients are unable to provide adequate information on their own. Thus, there is a need to depend on family members or caregivers for details of the patient's past medical history. Previous anesthetic exposure, allergies, past and present medications, as well as the reasons for any change of therapy should be learned from the accompanied person. It may be necessary to acquire further information from other medical specialists, general practitioners, or long-term care facilities that have had contact with the patient (Haywood and Karalliedde, 1999). Adequate history and physical examination should be followed by appropriate laboratory tests and medical consultation. Preoperative risk assessment should focus on the patient's cardiopulmonary functional status and previous anesthetic experiences (Caloss and Lard, 2004).

There is an increasing need for dental care under general anesthesia for the severely disabled patient. Several anesthetic strategies have been suggested to facilitate induction and maintenance of general anesthesia in patients with special needs (Carrel, 1973; Gullikson, 1973; Johnson and Machen, 1973; Bragg and Miller, 1990). The ideal technique for general anesthesia should allow for a rapid, safe, and smooth induction with easy airway management, followed by a stable uncomplicated maintenance throughout the procedure, and concluding with an uneventful reversal and extubation (Ananthanarayan et al., 1998). Patients with disabilities have some risk factors associated with general anesthesia (Messieha, 2009). Severe scoliosis or vertebral abnormalities might affect functional residual capacity of the lungs and respiratory functions. Patients with cerebral palsy, for example, can present with a history of chronic aspiration, which would lead to recurrent lung infections (Nolan et al., 2000). Syndromic patients present a higher risk of arrhythmias with succinylcholine due to nerve demyelination and increase

Table 1. The distribution of the patient's medical conditions that lead to disability

| | Cognitive impairment | Uncooperative children | CNS disorders | Specific syndromes | Underlying systemic diseases |
|--------------------|----------------------|------------------------|---------------|--------------------|------------------------------|
| Number of patients | 2 | 433 | 48 | 37 | 95 |

in serum potassium levels. Lack of pseudocholinesterase is also a risk factor for this group of patients (Messieha, 2009). Considering our patient population, we preferred to use vecuronium, a safe long acting myorelaxan, instead of succinylcholine. A detailed preoperative examination is essential in this group of patients. One of the major difficulties that we experienced in our patients was difficulty in intubation due to the anatomical abnormalities. For instance, patients with down syndrome have large tonsils and adenoids, a small subglottic area, prolapsed epiglottis, and a large tongue which causes difficulties in airway management (Sedaghat et al., 2012). We managed this problem by various sized endotracheal tubes, blades and stiles. Underlying cardiac and metabolic abnormalities should be also carefully investigated preoperatively, especially for those syndromic patients.

The administration of sedation and general anesthesia is an integral part of dental practice in patients with special needs (Guidelines for the Use of Sedation and General Anesthesia by Dentists, 2007). The choices could be sedation or general anesthesia. Sedation could be categorized as minimal, moderate and deep sedation. In minimal sedation, a minimally depressed level of consciousness occurs, produced by a pharmacological method that retains the patient's ability to independently and continuously maintain an airway and respond normally to tactile stimulation and verbal command. Although cognitive function and coordination may be modestly impaired, ventilatory and cardiovascular functions are unaffected. Moderate sedation is a drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate. Cardiovascular function is usually maintained. Deep sedation is a drug-induced depression of consciousness during which patients can not be easily aroused but respond purposefully following repeated or painful stimulation. The ability to independently maintain ventilatory function may be impaired. Patients may require assistance in

maintaining a patent airway, and spontaneous ventilation may be inadequate. Cardiovascular function is usually maintained (Continuum of Depth of Sedation. Definition of General Anesthesia and Levels of Sedation/Analgesia, 2004). General anesthesia is defined as a drug-induced loss of consciousness during which patients are not arousable, even by painful stimulation. The ability to independently maintain ventilatory function is often impaired. Patients often require assistance in maintaining a patent airway, and positive pressure ventilation may be required because of depressed spontaneous ventilation or drug-induced depression of neuromuscular function. Cardiovascular function may be impaired (Guidelines for the Use of Sedation and General Anesthesia by Dentists, 2007). In our patients, we chose the anesthesia technique considering the duration and the type of the procedure. Sevoflurane with face mask was performed in patients that need simple dental extractions which include few teeth. Sevoflurane with face mask combined with IV sedation was preferred in patients who need several teeth extractions or complicated extractions. General anesthesia via nasal intubation was performed for the procedures that thought to last more than 30 min and that should be done under saline irrigation which can be life threatening when aspirated. The common complications of nasal intubation include lacerations of the nasal mucosa and hemorrhage (Hagberg et al., 2005). We did not experience any serious nose bleeding in our patients.

Dental care of patients with disabilities are challenging for dental healthcare providers and general anesthesia is the preferred treatment modality for these patients. Multidisciplinary approach is essential involving the general anesthetist, maxillofacial surgeon, restorative and periodontal dentist as well as other medical specialists who have had contact with the patient. Patient's family members or companies also play an important role for getting adequate information about the dental and medical history. The appropriate anesthetic technique should be chosen for each patient mainly based on the patient's medical history and the duration and the type of the procedure.

REFERENCES

- Ananthanarayan, C., Sigal, M., Godlewski, W., 1998. General anesthesia for the provision of dental treatment to adults with developmental disability. *Anesth. Prog.* 45, 12-17.
- Bragg, C., Miller, B., 1990. Oral ketamine facilitates induction in a combative mentally retarded patient. *J. Clin. Anesth.* 3, 121. doi:10.1016/0952-8180(90)90065-B.
- Caloss, R., Lard, M.D., 2004. Anesthesia for office-based facial cosmetic surgery. *Atlas Oral Maxillofac. Surg. Clin. North Am.* 12, 163-177. doi:10.1016/j.cxom.2003.10.001.
- Carrel, R., 1973. Ketamine: A general anesthetic for manageable ambulatory patients. *J. Dent. Child.* 28, 446.
- Continuum of depth of sedation. Definition of general anesthesia and levels of sedation/analgesia, 2004, of the American Society of Anesthesiologists (ASA). Guidelines for the use of sedation and general anesthesia by dentists. As adopted by the October 2007 ADA House of Delegates.
- Guidelines for the use of sedation and general anesthesia by dentists. As adopted by the October 2007 ADA House of Delegates. http://www.ada.org/~media/ADA/About%20the%20ADA/Files/anesthesia_use_guidelines.ashx.
- Gullikson, J., 1973. Oral findings in children with Down's syndrome. *J. Dent. Child.* 40, 293.
- Hagberg, C., Georgi, R., Krier, C., 2005. Complications of managing the airway. *Best Pract. Res. Clin. Anaesthesiol.* 19, 641-659. doi:10.1016/j.bpa.2005.08.002.
- Haywood, P.T., Karalliedde, L.D., 1999. General anesthesia for disabled patient in dental practice. *Anesth. Prog.* 45, 134-138.
- Johnson, R., Machen, J.B., 1973. Behavior modification techniques and maternal anxiety. *J. Dent. Child.* 40, 272.
- Messieha, Z., 2009. Risks of general anesthesia for the special needs dental patient. *Spec. Care Dentist.* 29, 21-25. doi:10.1111/j.1754-4505.2008.00058.x.
- Nolan, J., Chalkiadis, G.A., Low, J., Olesch, C.A., Brown, T.C., 2000. Anaesthesia and pain management in cerebral palsy. *Anesthesia.* 55, 32-41. doi:10.1046/j.1365-2044.2000.01065.x.

- Sedaghat, A.R., Flax-Goldenberg, R.B., Gayler, B.W., Capone, G.T., Ishman, S.L., 2012. A case control comparison of lingual tonsillar size in children with and without Down syndrome. *Laryngoscope*. 112, 1165-1169. doi: 10.1002/lary.22346.
- Wang, Y.C., Lin, I.H., Huang, C.H., Fan, S.Z., 2012. Dental anesthesia for patients with special needs. *Acta Anaesthesiol. Taiwan*. 50, 122-125. doi:10.1016/j.aat.2012.08.009.