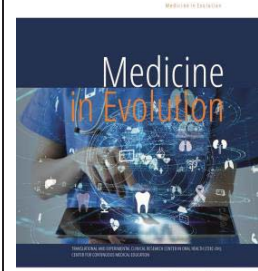


Treatment of special-needs patients under general anesthesia



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Abstract

Dental rehabilitation under general anesthesia is a treatment option for children requiring complex dental treatment, but who exhibit acute situational anxiety and emotional or cognitive immaturity or require dental rehabilitation. The advantages of ambulatory general anesthesia are the efficiency and comfort in performing the intervention. The purpose of this study was to assess the efficacy of dental works under general anesthesia in the case of child patients with neuropsychiatric disorders and of uncooperative ones.

Keywords: psychiatric disorders, general anesthesia, dental treatments

INTRODUCTION

In many countries dental cavities remain one of the most widespread health problems in children. Dental rehabilitation under general anesthesia is a treatment option for children who require complex dental treatment, but who exhibit acute situational anxiety and emotional or cognitive immaturity, or require dental rehabilitation. There are many advantages of ambulatory general anesthesia, such as the efficiency and comfort in performing the intervention.

The use of sedation is a current practice in dentistry and ambulatory oral and maxillofacial surgery. The majority of ambulatory oral and maxillofacial surgery interventions are performed using sedations in association with local anesthesia. Patients with neuropsychiatric disorders pose a real problem in terms of applying dental treatments or oral and maxillofacial surgery. Most of the times, the operating room is a "hostile" environment for the patient, which is why anxiety, fear, agitation, pain are the most unpleasant impressions experienced by them. Therefore, ambulatory general anesthesia is an alternative for most patients with neuropsychiatric disorders. Ambulatory general anesthesia offers a psychological benefit for the patient, in particular for children, because it reduces the period of separation from home and family, avoids the stress induced by hospitalization, reduces the risk of hospital-acquired infections, in particular with immunosuppressed patients and children, and the costs of hospitalization is lower. Often, people with neuropsychiatric disorders can also exhibit other medical conditions (in particular cardiovascular), which is why ambulatory general anesthesia can sometimes pose large problems, and it can also increase the prevalence of postoperative complications, in close connection with medical conditions.

Aim and objectives

The purpose of this study was to assess the efficacy of dental works under general anesthesia in the case of child patients with neuropsychiatric disorders and of uncooperative ones.

The motivation behind this study is the increasingly frequent use of ambulatory anesthesia in patients with psychiatric disorders, and the special importance it has for evaluation and diagnosis, especially since for a majority of patients of this type of the communication between dentist and patient is very difficult. For this reason, we have conducted a prospective study regarding the value of ambulatory anesthesia as method used for the diagnosis and treatment of such patients. The lot of patients studied came from a private clinic in Timisoara. This lot consists of patients being treated over a 3-month period, between March and May 2016. The approval of the ethics commission and the informed consent of the caregivers was obtained before enrollment in this study.

MATERIALS AND METHODS

The patients included in this study were children with psychiatric disorders, who required dental treatment under ambulatory general anesthesia. The total number of admitted patients selected for performing cerebral angiography during the given period is 8, of which 4 were boys and 4 were girls. Of these, 42% had severe impairment of mental capacity, 38% had moderate impairment, 18% had minor impairment, and 2% had deep impairment.

Anesthetic technique

All patients were scheduled for and underwent to short interventions (approximately 1.5-2 h), low hemorrhagic and respiratory risk interventions, which involved no significant postsurgical impairment. All patients were premedicated 30 minutes before induction with Midazolam administered either orally (0.3-0.5 mg/kg), or intrarectally (0.75-1 mg/kg) or Diazepam administered intrarectally (Desistine: 5 mg or 10 mg - depending on the patient's weight). In both groups, before induction all children were given $10 \pm 20 \mu\text{g}/\text{kg}$. Immediately after induction, all the patients were given Paracetamol 20 mg/kg administered either intravenously, or intrarectally for postsurgical anesthesia and Dexamethasone 0.1 mg/kg to prevent postoperative edema. For anesthesia was administered fentanyl 3-5 $\mu\text{g}/\text{kg}$ in induction. Over the course of the intervention, it was readministered in boluses (1-3 $\mu\text{g}/\text{kg}$), depending on the hemodynamic response of each individual patient. The muscle relaxant - tracrrium 0.5 mg/kg was administered in cases where tracheal intubation was not possible by simple administration in induction of propofol in association with fentanyl or sevoflurane. For the entire duration of the surgical procedure, the patients were monitored intra-anesthetic according to the standard established by the American Society of Anesthesiologists (ASA). The dental treatments were performed first, whereupon were performed the tooth extractions. Local anesthetic (xiline 2% with adrenalin 1:100000, < 4 mg/kg) was also administered to all patients for good postoperative analgesia. At the end of the surgical/dental intervention, the continued administration of any oral or intravenous anesthetic was stopped. The tracheal tube was removed only after the reflexes (blinking, swallowing) were present, the state of consciousness resumed (opening the eyes), adequate spontaneous ventilation and cardiovascular function within normal parameters, with proper cleaning of the oral cavity in advance the obstruction of airways with foreign bodies (blood, saliva, compresses, dental debris). The patients were taken out from the operating room only after making sure that they are capable to keep their airway permeable. An anesthesia sheet was prepared for each patient, which record: the age, sex, weight, ASA class, anesthetic technique, hemodynamic and respiratory parameters monitored, the duration of the anesthesia and dental and/or surgical intervention, the treatments.

Immediate post-anesthetic stage

As it is a stage dominated by the remnant effects of anesthesia with the related risks and complications, the patients were supervised in the recovery room. They were standard monitored: clinical monitoring, measuring arterial pressure, electrocardiographic monitoring in the case of patients with associated cardiovascular pathology, pulse oximetry, diuresis, temperature measurement, monitoring the surgical wound until complete recovery (fully awake). The patients' mothers/caregivers were allowed access to the recovery room, given their neuropsychological condition. The patient's evaluation in the recovery room was done by a specially trained nurse with the help of the patients' mothers/caregivers. During the stay in the recovery room, a post-anesthetic sheet was prepared for each patient, which record the patient's condition on admittance, on discharge, postoperative complications occurred (pain, crying-screaming, nausea, vomiting, bleeding, agitation-somnolence), the monitored parameters monitored at established intervals, the treatments administered, when they reached the criteria for discharge. The ranges established were: immediately upon arrival, at 15 minutes and 30 minutes of arrival, respectively, and every half hour until discharge.

Agitation and pain were assessed using a visual analogue scale (VAS), from 0 - no pain to 10 - intense pain. As these were patients with neuropsychiatric disorders who are unable to express their feelings, agitation and pain were distinguished using the following criterion: - severe agitation was suggested by an uncooperative patient, who screams, who cannot be calmed, who tries to leave the bed; - moderate or severe pain was suggested by a crying patient, who is unable to sleep, who emits sounds/vocalizations specific for pain, with

a frowning face, with eyes wide open. In order to assess the optimum time for the patient to leave the recovery room, we used the Aldrete score, on which the maximum score is 10 units and minimum 1 unit. The patients were discharged only after the reaching a score of 9-10. In addition, the patients were discharged from hospital only according to a previously established protocol: vital functions stable for at least 1 h, ability to eat and drink, which also demonstrates the absence of nausea, the absence of vomiting, possible urination, adequate oral hydration, minimum wound drainage, acceptable pain level and capacity to move according to their invalidities. At home, during the first 24 h, the patients' mothers/caregivers were asked to write down the complications that occurred and were interviewed by telephone.

RESULTS

Patient No. 1: 2-year-old

Pathological conditions: Brain disorders, Mental retardation.

Table 1. Patient No. 1

Treatment	Tooth	Element no.
Primary anterior tooth pulpectomy	5.1; 6.1	2
Primary anterior tooth root canal obturation	5.1; 6.1	2
Zirconium pedodontic crown	5.1; 6.1	2
Upper lip frenectomy		1
Retroalveolar radiography pre- and post-surgery	5.1; 6.1	2
Medically-assisted intravenous analgo-sedation - I.C.U	90 min/1 h 30 min	

Patient No. 2: 2-year-old

Pathological conditions: Food allergies

Table 2. Patient No. 2

Treatment	Tooth	Element no.
Preventive primary posterior tooth obturation	5.4; 6.4; 7.4; 8.4	4
Primary anterior tooth pulpectomy	5.2; 6.2; 5.1; 6.1	4
Primary anterior tooth root canal obturation	5.1; 6.1; 5.2; 6.2	4
Zirconium pedodontic crown	5.1; 6.1; 5.2; 6.2	4
Upper lip frenectomy/frenoplasty		1
Medically-assisted intravenous analgo-sedation - I.C.U	180 min/3 h	

Patient No. 3: 2-year-old

Pathological conditions: Brain disorders

Table 3. Patient No. 3

Treatment	Tooth	Element no.
Primary anterior tooth pulpectomy	5.1; 5.2; 6.1; 6.2	4
Primary anterior tooth root canal obturation	5.1; 6.1; 5.2; 6.2	4
Zirconium pedodontic crown	5.1; 6.1; 5.2; 6.2	4
Retroalveolar radiography pre- and post-surgery	2	1
Medically-assisted intravenous analgo-sedation - I.C.U	150 min/2 h 30 min	

Patient No 4: 2- year-old
 Pathological conditions: Brain disorders

Table 4. Patient No. 4

Treatment	Tooth	Element no.
Primary anterior tooth pulpectomy	5.2; 6.2	2
Primary anterior tooth root canal obturation	5.2; 6.2	2
Zirconium pedodontic crown	5.1; 6.1; 5.2; 6.2	4
Retroalveolar radiography pre- and post-surgery	2	1
Upper lip frenectomy		1
Medically-assisted intravenous analgo-sedation - I.C.U	150 min/2 h 30 min	
Professional brushing + Local fluoridation		1

Patient No, 5: 3-year-old
 Pathological conditions: Respiratory conditions, Drug allergies, Anemia

Table 5. Patient No. 5

Treatment	Tooth	Element no.
Primary posterior tooth pulpectomy	8.5	1
Primary posterior tooth root canal obturation	8.5	1
Zirconium pedodontic crown	7.5; 8.5	2
Retroalveolar radiography pre- and post-surgery	2	3
Primary posterior tooth Dycal indirect capping	5.5; 5.4; 6.4; 6.5; 7.4; 8.4	6
Primary posterior tooth Equia Forte obturation	5.5; 5.4; 6.4; 6.5; 7.4; 8.4	6
Primary anterior tooth Equia Forte obturation	5.3; 5.2; 5.1; 6.3	4
Upper lip frenectomy		1
Medically-assisted intravenous analgo-sedation - I.C.U	180 min/3 h	
Professional brushing + Local fluoridation		1

Patient No. 6: 2-year-old
 Pathological conditions: Respiratory conditions, Anemia

Table 6. Patient No. 6

Treatment	Tooth	Element no.
Ultraseal XT hydro widened sealing	5.1; 5.2; 6.1; 6.2	4
Primary anterior tooth root canal obturation	5.1; 6.1; 5.2; 6.2	4
Zirconium pedodontic crown	5.1; 6.1; 5.2; 6.2	4
Medically-assisted intravenous analgo-sedation - I.C.U	150 min/2h 30 min	

Patient No. 7: 12-year-old
 Pathological conditions: Mental retardation

Table 7. Patient No. 7

Treatment	Tooth	Element no.
Primary anterior tooth pulpectomy	5.2; 6.2	2
Primary anterior tooth root canal obturation	5.2; 6.2	2
Zirconium pedodontic crown primary tooth	5.1; 6.1; 5.2; 6.2	4
Retroalveolar radiography pre- and post-surgery	2	1
Upper lip frenectomy		1
Medically-assisted intravenous analgo-sedation - I.C.U	150 min/2 h 30 min	

Professional brushing + Local fluoridation		1
Extraction	4.5; 3.6	2

Patient No. 8: 10-year-old
 Pathological conditions: Mental retardation

Table 8. Patient No. 8

Treatment 1	Tooth	Element no.
Pulpectomy, drug treatment, temporary obturation	1.3; 1.1; 1.2; 2.1; 2.2; 3.6	6
Primary tooth extraction	8.4	1
Permanent tooth extraction	2.6; 4.6	2
Medically-assisted intravenous analgo-sedation – I.C.U	180 min/3 h	

Treatment 2	Tooth	Element no.
Gutta-percha root canal obturation + temporary obturation	1.3; 1.1; 1.2; 2.1; 2.2; 3.6	6
Physiognomic obturation with diacrylic composite resin	1.3	1
Medically-assisted intravenous analgo-sedation – I.C.U	180 min/3h	

Treatment 3	Tooth	Element no.
Crown-root reconstruction with fiberglass	1.2; 1.1; 2.1; 2.2	4
Crown reconstruction with diacrylic composite resin	1.2; 1.1; 2.1; 2.2	4
Preventive obturation	3.5; 3.4; 4.4; 4.5	4
Glass ionomer cement obturation	1.6; 1.4; 2.4	2
Medically-assisted intravenous analgo-sedation – I.C.U	210/3h and 30 min	

CONCLUSIONS

Ambulatory general anesthesia is an essential adjuvant for the performance of dental works in children with disabilities, who are unable to accept routine dental care. With the help of ambulatory general anesthesia, it is possible to perform dental procedures such as dental reconstructions as well as extractions, within a reasonable time period. The performance of such procedures provides the advantages of a non-traumatic emotional experience, a lower risk of infection, and lower cost. The monitoring of such children over time, postoperative complications, as well as the need for repeated treatments, can be achieved with the help of ambulatory general anesthesia. Ambulatory general anesthesia may be performed on a variety of patients with minimum medical comorbidities. The general anesthesia techniques are safe and are an effective path

The majority of the dental procedures under general anesthesia were performed within a time period identical to that normally required for such procedures. The assessment of factors with impact on the duration of general anesthesia can increase efficiency for pediatric dental procedures. The main factors that influence the surgery time duration were: the ASA patient classification; the type of dental treatment; the number of teeth treated. Dental pain post-treatment is one of the most common and lasting of the symptoms. Pain control contributed to a decrease in post-anesthetic complications in dental treatments.

REFERENCES

1. G. L. Borromeo, M. S. Ahmad, S. Buckley, M. Bozanic, A. Cao, M. Al-Dabbagh, A. Athale, Perception of Special Needs Dentistry education and practice amongst Australian dental auxiliary students, *Journal of Dental Education*, 2017, 1-6
2. Lim, M., Liberali, S., Calache, H., Parashos, P., & Borromeo, G. (2021). Perspectives of the public dental workforce on the dental management of people with special needs. *Australian Dental Journal*, 66(3), 304-313.
3. Ana López-Velasco, Miguel Puche-Torres, Francisco J. Carrera-Hueso, Francisco-Javier Silvestre, General anesthesia for oral and dental care in paediatric patients with special needs: A systematic review, *Journal of Clinical and Experimental Dentistry*, 2021 Mar; 13(3): e303-e312
4. Junglim Choi and Re-Mee Doh, Dental treatment under general anesthesia for patients with severe disabilities, *J Dent Anesth Pain Med*. 2021 Apr; 21(2): 87-98