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Dental Treatment Under General Anesthesia in a Day Care Surgery Setting

Stomatološko liječenje u općoj anesteziji u sustavu jednodnevne kirurgije

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Abstract
Objective: To analyze data on full-mouth rehabilitation under general anesthesia (GA) performed at the University Clinical Hospital Zagreb with emphasis on patient characteristics, type of procedure and postoperative complications. **Materials and methods:** Retrospective chart review of 100 patients treated under GA at the Dental clinic's day care surgery. Patient's demographic (sex, age) and clinical data (diagnosis, GA technique, intubation type, procedure duration, number of carious teeth, presence of visible calculus, number of sealed teeth, fillings, extractions and endodontic treatments, discharge time, postoperative complications) were registered. **Results:** Eighty patients were treated under GA because of noncompliance due to different reasons and twenty patients because of either their poor physical condition or extensive dental procedure. Median DMFT per patient was 9(0-21). Eighty nine patients underwent full-mouth dental restoration and 11 patients underwent other types of procedures. Ninety seven patients were safely discharged the same day. Four patients experienced postoperative complications and three of them were hospitalized for another 24-48 hours for postoperative follow-up. **Conclusion:** Patients with physical and/or intellectual disabilities have higher caries activity and increased dental treatment needs compared to the general population. Dental treatment under GA in day care service is a safe and effective way of providing dental care for noncompliant patients.

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Key words
Full mouth rehabilitation; General Anesthesia; Dental Caries; Tooth Extraction; Postoperative Complications

Introduction

Dental treatment under general anesthesia (GA) is reserved for patients whose behavior cannot be managed by nonpharmacological („tell-show-do", positive reinforcement, voice control, distraction) or pharmacological (nitrous oxide sedation, oral sedation) techniques (1). This is particularly relevant for patients with moderate to severe intellectual disabilities because these patients have poorer oral hygiene and increased dental treatment needs compared to the general, healthy population and GA is often the only way in which dental treatment can be delivered to them (2). Patients with complex medical conditions, very young children in need

Uvod

Stomatološko liječenje u općoj anesteziji (OA-i) rezervirano je za pacijente čije se ponašanje ne može kontrolirati nefarmakološkim (*reci – pokaži – učini*, pozitivno poticanje, kontrola glasom, distrakcija) ili farmakološkim metodama (sedacija dušičnim oksidulom, oralna sedacija) (1). To se posebno odnosi na one s teškim intelektualnim oštećenjima zato što imaju lošiju oralnu higijenu i povećanu potrebu za stomatološkim liječenjem u usporedbi sa zdravom, općom populacijom, te je OA često jedini način na koji se u tom slučaju može provesti stomatološko liječenje (2). Pacijenti s kompleksnim medicinskim stanjima, mala djeca kojima je

of invasive dental procedures or patients with advanced full mouth caries who require comprehensive dental treatment are also candidates for GA as well as otherwise healthy patients with extreme dental phobia or severely uncooperative patients (3).

Dental treatment under GA has several advantages: it does not require a patient's cooperation, the patient is unconscious and non-responsive to pain, certain degree of amnesia is present after the procedure and drugs can be titrated to an optimal dose. On the other hand, dental treatment under GA has its disadvantages such as the absence of patient's protective reflexes, depression of vital signs and higher rate of intra- and postoperative complications compared to local anesthesia (LA), (4). Furthermore, dental treatment under GA requires specialized equipment, facilities and trained team of professionals which is especially important for the management of intra- and postoperative complications. According to the American society of Anesthesiologists (ASA) Closed Claims project, a significantly higher proportion of fatal postoperative complications were observed when such procedures were performed in office settings compared to hospital settings. In addition, a greater proportion of complications in office-based claims were judged to be preventable by using better monitoring compared to hospital settings (5).

In Zagreb, Croatia's capital with 1 million inhabitants, dental treatment under GA was available in only one institution and the waiting time was between 6 and 12 months. Apart from Zagreb, dental treatment under GA was available in only other 4 centers in the country with similar waiting time (6). Due to an increased demand, day care dental service was started at the University Clinical Hospital Zagreb Dental Clinic in January 2017.

The aim of this study was to review first 100 patients treated at the day care dental service with the emphasis on patient characteristics, type of procedures and postoperative complications.

Materials and methods

A retrospective chart review of the first 100 patients who underwent dental treatment under GA at the Dental clinic's day care service, University Clinical Hospital Zagreb was performed following the principles of the Declaration of Helsinki. Patients were treated between January 2017 and May 2018. The main reason for the treatment under GA was noncompliance with the dental treatment under LA or extensive procedure which could not be performed under LA. Prior to the treatment, all patients underwent preoperative anesthetic evaluation for the classification of their physical status according to ASA (7). Patients were selected for the treatment under GA in a day care dental service based on the anesthesiologist's judgement/evaluation of their general condition, irrespective of their ASA status. The patients with poor general condition based on anesthesiologist's evaluation, were selected for hospital admission and excluded from this review. Preoperative dental examination was attempted in all patients as well, but in majority of cases it could not be performed because of the patient's noncompliance.

potrebno obaviti invazivni zahvat i pacijenti s uznapredovalim karijesima kojima je potrebna kompletna stomatološka sanacija, također su kandidati za OA-u kao i inače zdravi pacijenti s ekstremnom dentalnom fobijom i oni vrlo nesuradljivi (3).

Stomatološko liječenje u OA-i ima mnogobrojne prednosti – suradnja pacijenta nije potrebna, pacijent nije pri svijesti i ne osjeća bol, postoji određen stupanj amnezije nakon zahvata, a lijekovi se mogu optimalno titrirati. S druge strane, postoje i određeni nedostatci kao što su odsutnost pacijentovih zaštitnih refleksa, depresija vitalnih funkcija te veći postotak intraoperativnih i postoperativnih komplikacija u usporedbi sa zahvatima u lokalnoj anesteziji (LA-i) (4). Nadalje, stomatološko liječenje u OA-i zahtijeva specijaliziranu opremu, prostorne uvjete i uvježbano osoblje, što je posebno bitno za zbrinjavanje intraoperativnih i postoperativnih komplikacija. Prema statistikama Američkoga udruženja anesteziologa (ASA-i), znatno veći postotak fatalnih postoperativnih komplikacija događa se ako su zahvati obavljeni u ambulantama u usporedbi s onima u OA-i u bolnicama. Nadalje, veći postotak komplikacija u ordinacijama mogao je biti spriječen boljim praćenjem i nadzorom, što je izvedivije u bolničkim sustavima (5).

U Zagrebu, glavnom gradu Hrvatske s milijun stanovnika, stomatološko liječenje u OA-i bilo je dostupno u samo jednoj ustanovi, a na zahvat se čekalo od 6 do 12 mjeseci. Izvan Zagreba stomatološko liječenje u OA-i dostupno je u još četirima ustanovama, a vrijeme čekanja je slično (5, 6). Zbog povećane potrebe, sa stomatološkim liječenjem u OA-i počelo se na jednodnevnoj kirurgiji Kliničkoga bolničkog centra Zagreb u siječnju 2017. godine.

Svrha ovog istraživanja jest analizirati prvih 100 pacijenata liječenih u OA-i u sustavu jednodnevne kirurgije, s naglaskom na osobitosti pacijenata, vrstu zahvata i postoperativne komplikacije.

Ispitanici i postupci

Obavljena je retrospektivna analiza kartona prvih 100 pacijenata koji su bili podvrgnuti stomatološkom liječenju u OA-i na jednodnevnoj kirurgiji Kliničkoga bolničkog centra Zagreb slijedeći načela Helsinške deklaracije. Liječeni su od siječnja 2017. do svibnja 2018. godine. Glavni razlog za liječenje u OA-i bila je nesuradnja tijekom stomatološkog liječenja u LA-i ili preopsežan zahvat koji se nije mogao obaviti u LA-i. Prije liječenja svi su pacijenti bili na preoperativnoj obradi kod anesteziologa kako bi se klasificiralo njihovo zdravstveno stanje prema ASA-i (7). Prema procjeni anesteziologa, pacijenti s lošim općim stanjem planirani su za hospitalizaciju na bolničkom odjelu i isključeni su iz ove studije. Sve pacijente pokušalo se i preoperativno stomatološki pregledati, ali to je u većini slučajeva bilo nemoguće zbog njihove nesuradnje.

Stomatološko liječenje uključivalo je cjelokupnu sanaciju koja se sastojala od uklanjanja kamenca, restauracije svih karijesa, pečaćenja fisura, endodontskog liječenja i ekstrakcija zuba. Vidljivi kamenac uklonjen je ultrazvučnim čistačem.

Dental treatment included full mouth rehabilitation comprising of calculus removal, caries restoration, fissure sealing, root canal treatment and teeth extractions. Visible calculus was removed with ultrasonic scaler. Caries lesions were diagnosed by inspection and probing and restored with glass ionomer or composite fillings. Intact permanent molars and premolars were sealed. Root canal treatment was performed in case of iatrogenic pulp exposure in permanent teeth, using machine driven rotary endodontic instruments. Unrestorable teeth were extracted. Resorptive sutures were applied on extraction wound when necessary. The extraction site was infiltrated with 1ml of local anesthetic. Some other types of procedures (cystectomy, alveotomy, excision of the soft tissue lesion) were performed when indicated. Postoperative antibiotic was introduced based on clinical judgement. Patients were discharged on the same day, based on anesthesiologist's judgement.

Patient's demographic (sex, age) and clinical data (diagnosis, GA technique, intubation type, duration of the procedure, number of carious teeth, presence of visible calculus, number of sealed teeth, number of filled, extracted and endodontically treated teeth, discharge time, postoperative complications and their management) were collected using MedView®, software for formalized registration and subsequent analysis of clinical information (8).

The Kolmogorov-Smirnov test was used to assess the distribution of the data. Due to non-normal distribution, data were presented as median and range (median; min.-max.). The Kruskall-Wallis test was used for inter-group comparisons of quantitative data and p value lower than 0.05 ($p<0.05$) was considered statistically significant.

Results

One hundred patients (29 females and 71 males) underwent dental treatment under GA at the Dental clinic's day care dental service at the University Clinical Hospital Zagreb. Patient age ranged from 1 to 63 years with median age of 11.5. Eighty patients were treated under GA because of noncompliance due to different reasons and 20 patients were treated under GA because of either their general disease or extensive procedure which could not be performed under LA. The reasons for the treatment under GA are displayed in Table 1.

Target control infusion (TCI) anesthesia (propofol/remifentanil) was used in 87 cases, balanced general anesthesia (volatile anesthetics/nitrous oxide) in 9 cases and short-lasting inhalation anesthesia in 4 cases. Nasotracheal tube was applied in 98 patients. In 1 patient nasotracheal intubation could not be performed and instead, orotracheal tube was used. In one patient, the LMA device was placed. Fifty-eight patients received premedication (oral midazolam syrup 0.2-0.4 mg/kg) and forty-two patients were treated without premedication.

Eighty-nine patients underwent full mouth dental restoration. Median DMFT per patient was 9 (0-21). Patients with Down's syndrome had highest DMFT (13; 0-14), followed by patients with cerebral palsy (12; 4-17). However,

Karijesne lezije dijagnosticirane su inspekcijom i sondiranjem te su restaurirane staklenoionomernim ili kompozitnim ispunom. Intaktni trajni kutnjaci i pretkutnjaci su zapečaćeni. Endodontsko liječenje učinjeno je u slučaju ijatrogenog otvaranja pulpe trajnih zuba i to rotirajućim strojnim instrumentima. Zubi koji se nisu mogli sanirati ekstrahirani su. Prema potrebi rane su zašivene resorptivnim šavovima. Na mjesto ekstrakcije infiltriran je 1 ml lokalnog anestetika. Ostali zahvati (cistektomija, alveotomija, ekscizija lezija na sluznici) učinjeni su prema indikaciji. Antibiotici su postoperativno ordinirani prema kliničkoj procjeni. Pacijenti su otpušteni isti dan u skladu s procjenom anesteziologa.

Demografski (spol, dob) i klinički podatci bolesnika (osnovna bolest, tehnika OA-e, vrsta intubacije, trajanje zahvata, broj karioznih zuba, broj pečatnih ispuna, ispuna, ekstrakcija i endodontskih liječenja, vrijeme do otpusta i postoperativne komplikacije) registrirani su korištenjem računalnog programa MedView® za registraciju i naknadnu analizu kliničkih informacija (8).

Normalnost distribucije podataka testirana je Kolmogorov-Smirnovljevim testom. Zbog distribucije koja je odstupala od normalne, podatci su prezentirani kao medijan i raspon (medijan; min. – maks.). Kruskal-Wallisov test korišten je za usporedbu kvantitativnih varijabli među skupinama, a **p** vrijednosti manje od 0,05 ($p < 0,05$) smatrane su statistički značajnima.

Rezultati

Stomatološkom zahvatu u OA-i na jednodnevnoj kirurgiji Klinike za stomatologiju KBC-a Zagreb bilo je podvrgnuto 100 pacijenata (29 žena i 71 muškarac). Raspon dobi iznosio je od 1 do 63 godine, s medijanom od 11,5. Zbog nesuradnje iz različitih razloga u OA-i je liječeno 80, a 20 zbog osnovne bolesti ili opsežnog zahvata koji nije mogao biti obavljen u LA-i. Razlozi za liječenje u OA-i prikazani su u tablici 1.

Target control infusion (TCI) anestezija (propofol/remifentanil) korištena je u 87 slučajeva, opća balansirana anestezija (sevofluran/dušični oksidul) u 9 slučajeva i kratkotrajna inhalacijska anestezija u 4 slučaja. Nazotrahealna intubacija korištena je u 98 slučajeva. Jednom pacijentu nije mogla biti provedena nazotrahealna intubacija pa je postavljen orotrahealni tubus. Za jednog pacijenta korištena je laringealna maska. Premedikaciju (midazolam sirup 0,2 – 0,4 mg/kg) je dobilo 58 pacijenata, a 42 su liječena bez premedikacije.

Za 89 pacijenata provedena je kompletna stomatološka sanacija. Medijan KEP indeksa iznosio je 9 (0 – 21). Pacijenti s Downovim sindromom imali su najviši KEP (13; 0 – 14), a nakon njih pacijenti s cerebralnom paralizom (12; 4 – 17). Nije pronađena statistički značajna razlika u KEP indeksu između pacijenata s različitim dijagnozama.

Sveukupno, učinjeno je 528 ispuna, 146 pečatnih ispuna i 258 ekstrakcija. Najčešće ekstrahirani zub bio je drugi do-

Table 1 Patients' diagnosis and reason for treatment under general anesthesia
Tablica 1. Pacijentova dijagnoza i razlog za liječenje u općoj anesteziji

Reason for the treatment under general anesthesia / Razlog za liječenje u općoj anesteziji	Number of patients • Broj pacijenata
Noncompliance • Nesuradnja*	18
Autism • Autizam	29
Cerebral palsy • Cerebralna paraliza	11
Mental retardation • Mentalna retardacija	18
Down syndrome • Downov sindrom	4
Extreme dental phobia • Ekstremna dentalna fobija⁺	3
Severe gag reflex • Jaki refleks na povraćanje	2
Medically complex patients • Medicinski kompleksni bolesnici	9
Procedure too extensive for local anesthesia • Preopsežan zahvat za lokalnu anesteziju	6
Total / Ukupno	**100**

*otherwise healthy, but noncompliant patients • zdravi, ali nesuradljivi pacijenti
⁺patients experiencing series of syncopes that make treatment in local anesthesia impossible • pacijenti koji doživljavaju seriju sinkopa zbog kojih je nemoguće stomatološko liječenje u lokalnoj anesteziji

no significant difference in DMFT between the patients with different diagnosis was found.

Overall, 528 fillings, 146 fissure sealings and 258 extractions were done. Most commonly extracted teeth were lower left second deciduous molars (31) followed by lower left first permanent molars (25). Calculus removal was performed in 21 patient and endodontic treatment in 12 patients.

Statistically, a higher median number of fillings was done in patients with cerebral palsy (10; 4-17) than in noncompliant, healthy patients (2; 0-13) (p=0.018). No other significant differences in the type of procedure between patients with different diagnosis were found. The procedures performed per patient with different diagnosis are presented in Table 2.

Eleven patients underwent other types of procedures (alveotomy - 4 patients, cystectomy - 4 patients, excision of soft tissue lesions - 3 patients). Postoperative antibiotic was prescribed in 20 patients, amoxicillin with clavulanic acid in 19 patients (1 g tablets for patients > 40kg and 5 ml syrup for

nji lijevi mliječni kutnjak (31), a zatim prvi donji lijevi trajni kutnjak (25). Kamenac je uklonjen 21 pacijentu, a endodontski je liječeno njih 12.

Medijan broja ispuna kod pacijenata s cerebralnom paralizom (10; 4 – 17) bio je statistički značajno viši negoli kod nesuradljivih zdravih pacijenata (2; 0 – 13) (p = 0,018). Druge razlike u zahvatima između pacijenata s različitim dijagnozama nisu pronađene. Zahvati po pacijentu s različitim dijagnozama prikazani su u tablici 2.

Drugoj vrsti zahvata podvrgnuto je 11 pacijenata (alveotomiji – 4 pacijenta, cistektomiji – 4 pacijenta, eksciziji lezija sluznice 3 pacijenta). Antibiotike je postoperativno dobilo 20 pacijenata – amoksicilin s klavulanskom kiselinom ordiniran je u 19 slučajeva (tablete od 1 g za pacijente > 40 kg i sirup 5ml za pacijente < 40 kg, svakih 12 sati), a klindamicin (600 mg svakih 12 sati) dobio je jedan pacijent zbog alergije na penicilin.

Medijan trajanja zahvata iznosio je 1:07 sati (5 min. – 2:45 h). Isti dan otpušteno je 97 pacijenata, a medijan vre-

Table 2 Procedures (median (range)) performed per patient with different diagnosis /
Tablica 2. Zahvati [medijan (raspon)] obavljeni po pacijentu s različitim dijagnozama

Diagnosis • Dijagnoza	Fissure sealing • Pečaćenje fisura	Fillings • Ispuni	Extractions • Ekstrakcije	Endodontic treatment • Endodontsko liječenje
Noncompliance • Nesuradnja*	0 (0-0)	2 (0-13)	2 (0-12)	0 (0-1)
Autism • Autizam	0 (0-14)	6 (0-12)	2 (0-14)	0 (0-1)
Cerebral palsy • Cerebralna paraliza	0 (0-9)	10 (4-17)	1 (0-5)	0 (0-1)
Mental retardation • Mentalna retardacija	0 (0-15)	3 (0-16)	1 (0-9)	0 (0-1)
Down syndrome • Downov sindrom	0 (0-4)	5 (0-14)	3,5 (0-9)	0 (0-0)
Extreme dental phobia • Ekstremna dentalna fobija⁺	0 (0-0)	1 (0-3)	3 (0-8)	0 (0-0)
Severe gag reflex • Jaki refleks na povraćanje	1 (0-2)	7 (3-11)	1,5 (1-2)	0 (0-0)
Medically complex patients • Medicinski kompleksni bolesnici	0 (0-4)	5 (0-12)	3 (0-16)	0 (0-2)
Procedure too extensive for local anesthesia • Preopsežan zahvat za lokalnu anesteziju	0 (0-0)	0 (0-0)	0 (0-4)	0 (0-0)
Difference between the groups (p) • Razlika između skupina (p)	0,071	0,018*	0,703	0,281
Total • Ukupno	0 (0 - 15)	4,5 (0 - 17)	2 (0 - 16)	0 (0 - 2)

*significant difference (p <0,05) • značajna razlika

patients < 40 kg; bid) and clindamycin (600 mg bid.) in 1 patient because of reported penicillin allergy.

Median duration of the procedure was 1:07 hours (5 min – 2:45 hours). Ninety seven patients were discharged on the day of the procedure, with median 1:30 hours after recovery. Four patients experienced postoperative complications and 3 of them had to be hospitalized for another 24-48 hours for adequate postoperative follow-up. These patients' details are presented in Tables 3 and 4.

mena do otpuštanja iznosio je 1:30 sati nakon buđenja. Postoperativne komplikacije imala su 4 pacijenta, a 3 su hospitalizirana daljnjih 24 do 48 sati radi praćenja. Detalji o tim pacijentima nalaze se u tablicama 3. i 4.

Table 3 Demographic and clinical details of patients who experienced post-operative complications
Tablica 3. Demografske i kliničke pojedinosti pacijenata koji su imali postoperativne komplikacije

Patient • Pacijent	Sex • Spol	Age • Dob	Diagnosis • Dijagnoza	Drugs • Lijekovi	Premedication • Premedikacija	Anesthesia technique • Tehnika anestezije	Duration of the procedure (h:mm) • Trajanje zahvata (h:mm)
P 1	M	7	Mental retardation • Mentalna retardacija	None • Ništa	Midazolam	TCI	1:00
P 2	M	8	Autism • Autizam	None • Ništa	Midazolam	TCI	1:20
P 3	M	6	Mental retardation, Epilepsy • Mentalna retardacija, epilepsija	Levitracetam, Benzodiazepine, Vigabatrin, Dexamethasone Ranitidine • Levitracetam, Benzodiazepine, Vigabatrin, Deksametazon Ranitidin	Midazolam	TCI	1:15
P 4	M	19	Autism • Autizam	Methotrimeprazine • Metotrimeprazin	Midazolam	TCI	1:50

Table 4 Dental procedures, postoperative complications and their management
Tablica 4. Stomatološki zahvati, postoperativne komplikacije i njihovo zbrinjavanje

Patient • Pacijent	Fissure sealings • Pečati	Fillings • Ispuni	Extractions • Ekstrakcije	Complication • Komplikacija	Management • Zbrinjavanje
P 1	0	8	0	Bronchospasm • Bronhospazam	Reintubation, systemic steroids, antihistamines and bronchodilatators Hospitalized at the pediatric ICU Discharged after48 hours • Reintubacija, sistemski steroidi, antihistaminici i bronhodilatatori hospitaliziran na pedijatrijskoj JIL otpušten nakon 48 sati
P 2	0	9	2	Angioedema Generalized urticaria after application of suggamadex • Angioedem Generalizirana urtikarija nakon aplikacije sugamadeksa	Systemic steroids and antihistamines Hospitalized at the pediatric ICU Discharged after 48 hours • Sistemski steroidi i antihistaminici hospitaliziran na pedijatrijskoj JIL otpušten nakon 48 sati
P 3	0	10	2	Epileptic status (patient had pharmacoresistant epilepsy) • Epileptični status (pacijent je imao farmakorezistentnu epilepsiju)	i.v. midazolam Hospitalized at the pediatric neurology Discharged after 24 hours • iv. midazolam hospitaliziran na pedijatrijskoj neurologiji otpušten nakon 24 sata
P 4	6	10	3	Protracted bleeding after awakening • Produljeno krvarenje nakon buđenja	Stopped spontaneously after 3 hrs. Discharged on the same day. • Spontani prestanak nakon 3 sata otpušten isti dan

Discussion

The results of this study show that noncompliance remains the main indication for dental treatment under GA, which is in accordance with other studies found in the litera-

Rasprava

Rezultati ovog istraživanja pokazuju da je nesuradnja i dalje glavna indikacija za stomatološko liječenje u OA-i, što se slaže s rezultatima drugih istraživanja u literaturi (9 – 13).

ture (9-13). In patients with intellectual disability, it is often very difficult for the dentist to establish good communication which is essential for the application of behavior modification techniques. These patients are therefore "real" candidates for dental treatment under GA. However, nearly one fifth (18/100) of our patients were noncompliant but otherwise healthy with no intellectual or psychological impairment. These patients and especially their parents are candidates for education on proper oral hygiene and the importance of regular dental checkups in order to avoid future GA procedures and related medical risks and costs.

Median DMFT per patient was 9 (0-21) reflecting high caries activity in this population. The results from similar studies around the world vary significantly depending on the geographic area and patient characteristics (3, 9 ,11, 12). Camilleri et al. (12) reported median DMFT 8 (0-20) in primary and 2 (0-20) in permanent dentition in a sample of UK pediatric patients undergoing dental treatment in GA (ASA I and II) while Chen et al. (9) reported mean DMFT 12.5 ± 5 in a group of Taiwanese patients with special needs treated under GA. When compared to the general population in Croatia, our results show that population undergoing dental treatment in GA has increased dental treatment needs. DMFT found in this study was more than 2 times greater than average DMFT in Croatian 6 year olds (4.14) and 12 year olds (4.18), (14). Highest DMFT was found in patients with Down syndrome (13.5; 0-14) followed by patients with cerebral palsy (12; 4-17). No significant difference in DMFT was found between the patient groups, which could be due to small number of patients in each group. However, we feel that our results point to the higher caries activity and increased dental treatment needs in patients with intellectual and physical impairment.

Most common type of dental treatment were fillings with median number of 4.5 (0-17) fillings per patient. This is comparable with the results from another Croatian city where authors performed mean 3.82 ± 2.93 fillings per patient (6). The largest number of fillings was done in patients with cerebral palsy, which again points to increased treatment needs in these patients. Primary teeth were more commonly extracted than permanent, which is in concordance with other studies in the literature (3, 12). Median number of extractions per patient in our study was 2 (0-16), which is somewhat lower than the results from Kovačić et al. (3.08±3.09), (6). However, Kovačić et al. reviewed their patients for a 25 year period (1985-2009) and reported a significant decrease in the number of extractions as well as an increase in the number of fillings and endodontic treatments over time (6). Endodontic treatment is rarely performed in GA and in our study it was performed in 12 patients, in 13 permanent teeth (8 molars, 4 incisors and 1 canine). We feel that conservative treatment should have advantage over extractions irrespective of patients' mental or physical disability. Even though the follow up period in this study was short (3-18 months) it is worth mentioning that no case of endodontic flare up in our patients was reported.

Most common complications of dental treatment under GA include postoperative respiratory events, cardiac events

Ako pacijent ima intelektualne poteškoće, stomatologu je često vrlo teško uspostaviti dobru komunikaciju, što je nužan preduvjet za primjenu tehnika modifikacije ponašanja. Ti pacijenti zato su *pravi* kandidati za stomatološko liječenje u OA-i. Ipak, gotovo petina naših pacijenata (18/100) bili su nesuradljivi, iako su inače bili zdravi i bez fizičkih ili intelektualnih oštećenja. Ti pacijenti, a posebno njihovi roditelji, kandidati su za edukaciju o ispravnom obavljanju oralne higijene i o važnosti redovitih odlazaka stomatologu kako bi se izbjegli budući zahvati u OA-i i s njima povezani rizici i troškovi.

Medijan KEP indeksa iznosio je 9 (0 – 21), što pokazuje visoku aktivnost karijesa u toj populaciji. Rezultati sličnih istraživanja iz svijeta značajno variraju, ovisno o zemljopisnom području i karakteristikama pacijenata (3, 9, 11, 12). Camilleri i suradnici (12) pronašli su medijan KEP 8 (0 – 20) u mliječnoj i 2 (0 –20) u trajnoj denticiji u uzorku britanske pedijatrijske populacije liječene u OA-i (ASA I i II), a Chen i njegovi kolege (9) izvijestili su o srednjoj vrijednosti KEP indeksa od 12,5 ± 5 u skupini tajvanskih pacijenata s posebnim potrebama liječenih u OA-i. U usporedbi s općom populacijom u Hrvatskoj, naši rezultati pokazuju da populacija pacijenata liječenih u OA-i ima povećanu potrebu za stomatološkom skrbi. KEP indeks u ovom istraživanju bio je više od dva puta veći od prosječnoga KEP indeksa šestogodišnjaka (4,14) ili dvanaestogodišnjaka (4,18) u Hrvatskoj (14). Nisu utvrđene statistički značajne razlike u KEP indeksu između skupina pacijenata, što može biti zbog malog broja pacijenata u svakoj skupini. Ipak, mišljenja smo da naši rezultati upozoravaju na višu aktivnost karijesa i povećanu potrebu za stomatološkom skrbi kad je riječ o pacijentima s intelektualnim i fizičkim oštećenjima.

Najčešći zahvati bili su ispuni s medijanom od 4,5 (0 – 17) ispuna po pacijentu. Taj se rezultat može usporediti s rezultatima iz drugoga hrvatskog grada gdje su autori izradili u prosjeku 3,82 ± 2,93 ispuna po pacijentu (6). Najveći broj ispuna napravljen je pacijentima s cerebralnom paralizom, što upućuje na to da je tim bolesnicima potrebna povećana stomatološka skrb. Mliječni zubi češće su bili ekstrahirani od trajnih, što je u skladu s drugim studijama (3, 12). Medijan broja ekstrakcija po pacijentu u našem istraživanju iznosio je 2 (0 – 16), što je nešto niže od rezultata Kovačića i suradnika (3,82 ± 2,93), (6). Kovačić i suradnici su, doduše, analizirali svoje pacijente iz 25-godišnjeg razdoblja (1985. – 2009.), ali su izvijestili o smanjenju broja ekstrakcija i povećanju broja ispuna i endodontskih liječenja tijekom godina (6). Endodontsko liječenje rijetko se obavlja u OA-i i u našem istraživanju tako je liječeno 13 trajnih zuba 12 pacijenata (8 kutnjaka, 4 sjekutića i 1 očnjak). Mišljenja smo da konzervativno liječenje treba imati prednost pred ekstrakcijom, bez obzira na pacijentovo mentalno ili fizičko oštećenje. Iako je razdoblje praćenja u ovom istraživanju bilo kratko (3 –18 mjeseci), valja spomenuti da nije bilo komplikacija u endodontskom liječenju.

Najčešće komplikacije stomatološkog liječenja u OA-i uključuju postoperativne respiratorne komplikacije, kardiološke komplikacije i komplikacije povezane s lijekovima (5, 15). Slične komplikacije dogodile su se i našim pacijentima.

and drug-related events (5,15). Similar complications were observed in our patients. Three of them (P1, P2, and P3) occurred after the dental treatment had been finished, during the awakening phase and were managed accordingly. An adequate postoperative monitoring of patients was easily organized in hospital´s wards and ICUs. Complication in the fourth patient (P4), protracted bleeding from extraction wound, occurred during the recovery period. It was caused by local periodontal inflammation and perpetuated by patient's noncompliance i.e. his refusal to apply compression on the extraction wound due to autism.

The main limitation of our study is that it is a cross sectional single center retrospective study. Therefore, our results might differ from similar studies in the literature (6, 9, 10, 12, 16). Dental treatment under GA at the University Clinical Hospital Zagreb was introduced 18 months ago hence the number of participants and follow up time are relatively small. However, we feel that it is important to review our practices, analyze treatment modalities and complications to find room for improvement of our service.

Conclusion

Within the limitations of this study we can conclude the following: patients with physical and/or intellectual disabilities have higher caries activity and increased treatment needs compared to the general population. There is a need for education of patient's care givers on oral hygiene and caries prevention. Full-mouth rehabilitation under GA in day care service is a safe and effective way of providing dental care for noncompliant and medically complex patients. Complications occur rarely and are best managed if the procedure is performed in a hospital setting.

Conflict of interest

The authors report no conflicts of interest.

Kod njih troje (P1, P2 i P3) pojavile su se nakon završetka stomatološkog liječenja tijekom faze buđenja i zbrinute su na odgovarajući način. Adekvatno praćenje pacijenata organizirano je na bolničkim odjelima i u jedinicama intenzivnog liječenja. Komplikacija četvrtog pacijenta (P4) – produljeno krvarenje iz ekstrakcijske rane – dogodila se tijekom oporavka. Bila je uzrokovana lokalnom upalom i nesuradnjom pacijenta, tj. njegovim odbijanjem da komprimira ekstrakcijsku ranu zbog autizma.

Glavno ograničenje ovog istraživanja jest to što je riječ o presječnoj retrospektivnoj studiji iz jednog centra. Zato se naši rezultati mogu razlikovati od sličnih studija (6, 9, 10, 12, 16). Stomatološko liječenje u OA-i na Klinici za stomatologiju KBC-a Zagreb započeto je prije 18 mjeseci te su broj pacijenata i vrijeme praćenja razmjerno mali. Ipak, mišljenja smo da je važno revidirati postupke, analizirati načine liječenja i komplikacije kako bismo pronašli prostor za poboljšanje svoje usluge.

Zaključak

Unatoč ograničenjima ovog istraživanja, možemo zaključiti sljedeće: pacijenti s fizičkim i/ili intelektualnim oštećenjima imaju više karijesa i potrebna im je povećana stomatološka skrb u usporedbi s općom populacijom. Potrebna je edukacija skrbnika o oralnoj higijeni i prevenciji karijesa. Potpuna stomatološka sanacija u OA-i u sustavu jednodnevne kirurgije siguran je i učinkovit način pružanja stomatološke skrbi nesuradljivim i medicinski kompleksnim bolesnicima. Komplikacije se rijetko događaju i najbolje se zbrinjavaju ako se zahvat obavlja u bolnici.

Sukob interesa:

Autori nisu u sukobu interesa.

Sažetak

Svrha: Analizirati podatke o stomatološkom liječenju u općoj anesteziji (OA-i) provedenom na Klinici za stomatologiju KBC-a Zagreb s naglaskom na osobitosti pacijenata, vrste zahvata i postoperativne komplikacije. **Ispitanici i postupci:** Retrospektivna analiza kartona 100 pacijenata liječenih u OA-i na jednodnevnoj kirurgiji Klinike za stomatologiju KBC-a Zagreb. Registrirani su demografski (spol, dob) i klinički podatci bolesnika (osnovna bolest, tehnika OA-e, vrsta intubacije, trajanje zahvata, broj karioznih zuba, broj pečatnih ispuna, ispuna, ekstrakcija i endodontskih liječenja, vrijeme do otpusta i postoperativne komplikacije). **Rezultati:** U OA-i je zbog nesuradnje iz različitih razloga liječeno 80 pacijenata, a 20 zbog teškoga fizičkog stanja ili preopsežnog zahvata za lokalnu anesteziju. Medijan KEP indeksa iznosio je 9 (0 – 21). Sanaciji svih zuba podvrgnuto je 89 pacijenata, a 11 drugim vrstama zahvata. Isti dan otpušteno je 97 pacijenata. Četvero su imali postoperativne komplikacije, pa je troje hospitalizirano zbog daljnjeg praćenja od 24 do 48 sati. **Zaključak:** Pacijenti s fizičkim i/ili mentalnim oštećenjem imaju veću aktivnost karijesa i povećanu potrebu za stomatološkom skrbi u odnosu prema općoj populaciji. Stomatološko liječenje u OA-i u sustavu jednodnevne kirurgije siguran je i učinkovit način liječenja za pacijente koji ne mogu surađivati sa stomatologom.

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