



(CASE REPORT)



General anesthesia as one visit dental management for down syndrome child with hypothyroidism and post closure of heart valves

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Abstract

Introduction: Several studies have stated that the prevalence of dental caries in children with Down Syndrome (DS) is quite high (89%), as is the prevalence of periodontitis (59%). Several systemic conditions with DS always hamper their dental management. Thus, appropriate management behavior is needed to improve oral health care.

Case History: An 8-year-old boy, with DS, complaining that his teeth often experienced spontaneous pain and swelling. Medical history revealed that the patient had hypothyroidism and post-closure of heart valves. During intraoral examination, multiple caries and multiple gangrene radix were found. The patient was uncooperative (Frankl scale number 1). One-visit dental management by GA was performed on the patient, resulting in the patient never experiencing toothache again and having a good appetite.

Discussion: Uncooperative DS children with several accompanying systemic conditions make dental examination and treatment difficult to do in regular dental office. Because of these conditions require appropriate behavioral management to carry out dental treatment. Based on aspects of safety and effectiveness, GA is one of the behavioral management that can be done. Related to it, GA requires a multidisciplinary team, to consider each stage of the procedure. This method makes the dental treatment can be done in one-visit, helps decrease the child's anxiety, and makes the dental experience safe and less painful.

Conclusion: For patients with several systemic conditions, behavioral management with GA as one-visit dental management is a good option.

Keywords: Down syndrome; General Anesthesia; Human and Illness; Health Risks; Psychological Well-being

1. Introduction

Down syndrome (DS), mostly trisomy 21 type, is one of the most common conditions known to be associated with chromosomal abnormalities. Incidence rate of DS in population has been variable between 1 and 4 per 1000. Several systemic conditions, namely immune system disorders, such as hypothyroidism, and congenital heart disease, such as ventricular septal defect, often accompany children with DS. The abnormalities of the immune system increase the risk of infection and require a longer recovery time compared to children without DS [1,2]. In addition to systemic conditions, they also experience a high prevalence of periodontitis and dental caries, which are caused by various factors, both systemic, as well as local factors [3].

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Unfortunately, children with DS experience some degree of intellectual disability that lead to some behavioral challenges, one of them is to hinder oral care, either at home or dental office [1]. Several studies have stated that the prevalence of dental caries in children with DS is quite high (89%), as is the prevalence of periodontitis (59%) [8,9]. Uncooperative behavior during dental treatment coupled with systemic conditions and poor oral health, put children with DS at increased risk of tooth extraction and infection, as well as expensive restoration work [4]. One of the behavioral management options that can be chosen is doing procedure under general anesthesia (GA). This behavioral management generally used for children with DS with developmental disorders, such as mental retardation and have difficulties in cooperating with dental treatments. Instead of using sedatives, GA is preferred by doctors to perform comprehensive dental treatment in patients with severe disorders based on safety and efficacy aspects [5,6]. This case report describes behavioral management with GA as a one-visit comprehensive dental procedure for a child with DS, which can help reduce children's anxiety and make the dental experience safe and less painful.

2. Case History

An 8-year-old boy, with DS, came to Airlangga University Hospital with complaints that his teeth often experienced spontaneous pain and swelling. The patient's parents claimed to have a history of hypothyroidism and post-closure of heart valves. In addition, since the first visit, the patient had shown very uncooperative behavior during dental examination due to a previous traumatic experience with the dentist. Based on the Frankl behavioral rating scale, the patient showed a rating scale of 1, which is definitely negative [7]. Because of these conditions, it was decided to undergo comprehensive dental treatment under GA. During intraoral examination, multiple caries and multiple gangrene radix were found (**Figure 1a and Figure 1b**). An orthopantomogram could not be performed on this patient due to his uncooperativeness.

GA was carried out after an examination by a pediatrician and anesthesiologist. Several examinations of systemic conditions were carried out including Complete Blood Cell Test, Hypothyroidism, and Echocardiogram. All examinations showed normal and controlled conditions. However, the result of the thorax examination showed a picture of pneumonia. Before the procedure, the patient was instructed to fast for 8 hours and pre-medicated with cefazolin and midazolam. GA was performed with an endotracheal tube through the nose and sevoflurane was induced.

After the patient was anesthetized, several dental treatment were carried out, including the application of Silver Diamine Fluoride (SDF) to 52, 74, 75, 84 to stop the caries process (**Figure 2a**), then continued with filling using GIC II LC (**Figure 2b**). Apart from that, the teeth that had deep carious perforations (55, 54, 64, 65, 85) and the remaining roots (51, 61, 62) were also extracted (**Figure 2c**), followed by suturing using Vicryl 4.0 (absorbable silk). Lastly, a topical fluoride application was applied (**Figure 2d**). After all procedures had been performed, the patient's parents were given instructions, including if the patient's consciousness had recovered well, he was allowed to drink, not to eat or drink hot or warm, not to play with or suck on scars, and not to rinse his mouth vigorously, instruction for maintaining oral hygiene and routine control.

One month later, the control was carried out, and the patient's parents admitted that the patient had never experienced toothache and his appetite had increased. On intraoral examination, there were no visible GIC fillings or suturing threads, but the caries appeared to have stopped due to the application of SDF and the extraction wound looked good (**Figure 3a and 3b**). Finally, follow-up instructions were given (dietary control, brushing teeth twice a day with toothpaste containing fluoride, routine dental examinations, and re-use of topical fluoride every 3 months, and recommendation for rehabilitation of masticatory function).



Figure 1 Intraoral photograph showed tooth condition. Figure 1a: on the maxilla, there were 52 reversible pulpitis; 54, 55, 64, 65 necrotic pulps; 51, 61, 62 gangrene radix. Figure 1b: on the mandible, there were 74, 75, 84 reversible pulpitis.

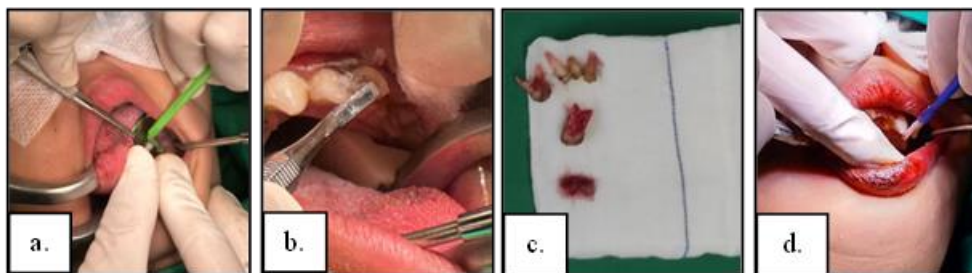


Figure 2 Comprehensive dental treatments that were done under GA. Figure 2a: application of SDF to 52, 74, 75, 84. Figure 2b: filling using GIC II LC to 52, 74, 75, 84. Figure 2c: extractions of 51, 54, 55, 61, 62, 64, 65, 85. Figure 2d: topical fluoride application was applied

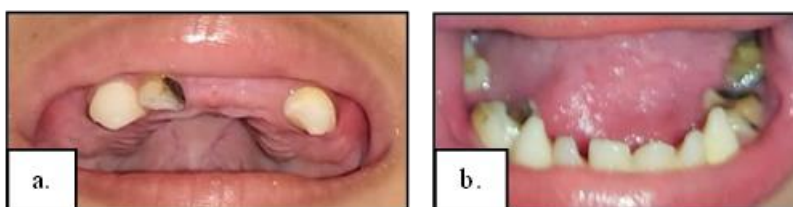


Figure 3 Intraoral photograph showed tooth condition after one month. Figure 3a: 52 shown no visible GIC fillings, but caries had stopped due to SDF; region 51, 54, 55, 61, 62, 64, 65, 85 shown no suturing threads, but the extraction wound looked good. Figure 3b: 74, 75, 84 also shown no visible GIC fillings, but caries had stopped due to SDF

3. Discussion

The level of cooperation of children with DS in receiving dental treatment depends on their intelligence level. DS child with a high level of intelligence can be treated at the dental chair in the usual way for conservative procedures. The patient's low level of cooperation makes dental examination and treatment difficult [1]. Several behavioral rating scales have been developed for the classification of child's behavior during dental visits, and one of the most commonly used is the Frankl rating scale. The Frankl rating scale categorizes the child's behavior into 4 categories, starting from rating 1 (definitely negative), 2 (negative), 3 (positive), and 4 (definitely positive). In this case, the patient was uncooperative. According to theory, this refers to Frankl Scale number 1, which indicates resistance to treatment, forced crying, or other obvious evidence of extreme negativism [7]. This patient showed an uncooperative attitude because he had a history of trauma during previous visits to the dentist.

Apart from that, several systemic conditions that accompany it are also factors that need to be considered in dental treatment. Children with DS are generally accompanied by systemic conditions such as immune system disorders and congenital heart disease, which increases the risk of infection and requires a longer recovery time than other children. Thus, children with DS are often found to have poor oral hygiene [1,2]. Poor oral hygiene was also seen in this case, which the main problem was multiple caries and gangrene radix. The patient also had a history of ventricular septal defects, hypothyroidism, and very low cooperativeness. Some of these conditions, both low levels of behavior and systemic conditions, cause the need for appropriate behavioral management to carry out dental treatment, one of which is GA.

The most common indications for GA are a lack of patient cooperation and several comorbidities. Instead of using sedatives, GA is preferred by doctors to perform comprehensive dental treatment in patients with severe disorders based on safety and efficacy aspects, despite the potential risks associated with anesthesia. Either GA or sedation have serious risks, especially in patients presenting a high score according to the American Society of Anesthesiologist (ASA) classification of physical status, cardiovascular problems, and respiratory or central nervous system pathologies. To avoid these risks, a thorough preoperative preparation and optimum conditions should be followed [6,10].

Thus, GA requires multidisciplinary collaboration to consider each stage of the procedures (determining the indication for GA, Preoperative evaluation, Premedication, Intraoperative management, and postoperative management) [6]. These theories were taken into consideration in choosing a treatment plan in this case. Treatment was carried out by a

multidisciplinary team, including pediatric dentists, oral surgeons, pediatricians, and anesthesiologists. The patient's controlled systemic condition in this case was the reason for dental treatment with GA. With a comprehensive dental care approach under GA, the dental treatment can be done thoroughly in 1 visit. This will help decrease the child's anxiety and make the dental experience safe and less painful.

4. Conclusion

For patients with several systemic conditions, behavioral management with GA as one-visit dental management is a good option.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this document.

Statement of informed consent

Informed consent was obtained from patient included in the study.

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