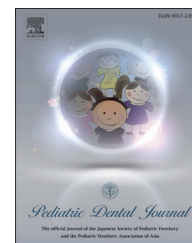


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Original Article

The prevalence of iron deficiency anemia in children with severe early childhood caries undergoing dental surgery under general anesthesia



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ABSTRACT

Purpose: Severe early childhood caries (SECC) is known to affect young children worldwide. However, there is little information about the effects of SECC on iron deficiency anemia (IDA). The aim of this study was to investigate the IDA in children with severe caries undergoing dental surgery under general anesthesia.

Methods: A total of 160 children were evaluated; age ranged from two to six years and mean age was 4.8 ± 1.1 years. Before performing general anesthesia, blood samples were assessed regarding hemoglobin (Hgb), hematocrit (Hct), mean corpuscular volume (MCV) as biochemical indicators of IDA.

Results: The mean deft score was 10.1 ± 4.1 . The children in this study were defined to have SECC. All of the anemia-related measurements were in the standard ranges, except for MCV values. There were no statistically significant differences between serum Hgb ($p = 0.205$) and Hct levels ($p = 0.386$), but statistically significant differences were found among serum MCV levels ($p = 0.018$) in children with severe caries. Pearson Correlation analysis among SECC and Hgb ($p = 0.54$), Hct ($p = 0.88$) and MCV ($p = 0.39$) revealed that there were no significant differences.

Conclusions: There was no association between SECC and serum Hgb, Hct and MCV levels, but low levels of MCV might be an indicator of microcytic anemia which is most commonly caused by iron deficiency. In the present study, we concluded that SECC might be a risk marker for iron deficiency.

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1. Introduction

Iron deficiency anemia (IDA) can be caused by several factors, including dietary factors, genetic factors, inflammatory processes and environmental factors like low socioeconomic status and dental caries [1,2]. This type of anemia leads to learning and memory inabilities, reduced fine motor skills and increased anxiety in childhood [3]. Approximately, the prevalence of IDA in preschool children is 47.4% worldwide [4]. IDA is generally diagnosed by abnormally low hemoglobin (Hgb value under 11 g/dL <5 years of age or Hgb value under 11.5 g/dL \geq 5 years of age), hematocrit value (Hct <34% <5 years of age and Hct <35% \geq 5 years of age), as well as mean corpuscular volume value (MCV <73 fl <5 years of age and MCV <75 fl \geq 5 years of age) as biochemical indicators [5].

Similarly, SECC is a multifactorial disease and numerous risk factors (biological, psychosocial and behavioral) can contribute to this disease [6]. In the literature, SECC is widespread in developing countries [7,8] as well as in low socioeconomic strata of industrialized countries [9,10]. This disease is defined as the presence of any smooth surface caries for children under the age of 3 and the presence of one or more smooth surface lesions in any primary maxillary anterior teeth or a defts score of 4 for children aged 3–5 years [6]. It may affect more than one quarter of young children [11,12]. Particularly in developing countries, IDA and dental caries are the most common and widespread public health problems [13]. Families with lower income usually consume unhealthy, calorie-dense, high sugar content, nutrient poor diets [14]. Additionally, excessive consumption of cow's milk or prolonged breastfeeding may contribute both to SECC and iron deficiency anemia (IDA) during early childhood [15]. Severe early childhood caries and IDA are conditions of childhood diseases that affect many children worldwide. A better understanding of these diseases will serve to enhance our current preventive and health promotion interventions. The prevalence of SECC is quite high (69.8%) in Turkey and the relationship of IDA with SECC has not been studied yet [16,17]. The aim of this study was to investigate the prevalence of IDA in children with SECC undergoing dental surgery under general anesthesia.

2. Material and method

This longitudinal study was performed with assessing the blood sample records of pediatric patients who had severe tooth decay involving multiple primary teeth. Before administering general anesthesia, blood samples were collected from each participant. Patients' dental treatment were performed under general anesthesia due to lack of cooperation. One pediatric dentist performed dental examinations to determine the deft scores of the patients. Before general anesthesia procedures, potential risks or the possibility of post-operative discomfort and possible benefits were explained to the parents or caregivers of the children. The children underwent full dental rehabilitation between October 2012 and July 2014 under general anesthesia in Sifa University Faculty of Medicine in Izmir, Turkey (Fig. 1).

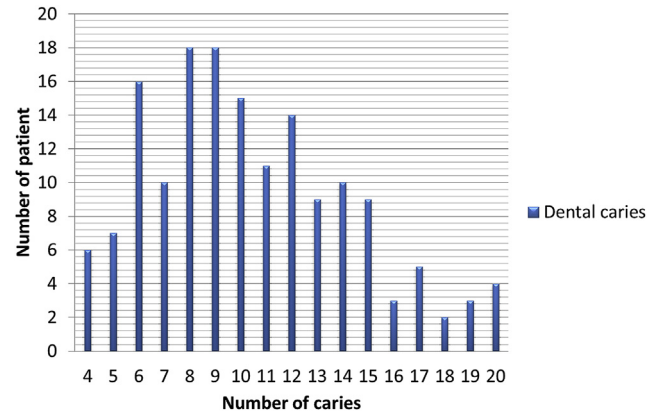


Fig. 1 – Patients with number of dental caries.

2.1. Inclusion criteria

1. Children <72 months of age who presented with SECC.
2. No chronic illnesses apart from dental caries
3. No previous dental treatment like restorations or extractions.
4. All treatments were completed at one appointment under general anesthesia.

2.2. Exclusion criteria

1. Children who were already diagnosed with IDA and under a doctor's care,
2. Children already under treatment for other anemias such as Hemolytic anemia, neoplasms of the bone marrow, numerical insufficiency of erythroid cells in the bone marrow, aplastic anemia etc.
3. Known blood dyscrasia,
4. Any known form of hemoglobinopathy,
5. Medical problems causing the reduction of salivary flow rate like diabetes mellitus or children with chemotherapy who had been diagnosed with malignancy,
6. Mental or physical disabilities,
7. Children who had undergone major surgery,
8. Patients requiring non-restorative procedures such as the treatment of traumatic injuries, tooth transplantation, removal of impacted supernumeraries under general anesthesia.

2.3. Biochemical measurements

Before performing general anesthesia, a 5 mL blood sample was collected from each patient on the same day. The blood samples were immediately transported and analyzed by the department of Laboratory Medicine at Sifa University. Blood analysis included examination of anemia-related parameters like red blood cell count (RBC), concentration of hemoglobin (Hgb), hematocrit value (Hct), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC) and Red Cell Distribution Width (RDW).

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