CASE REPORT

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Anesthesia Management in a Rare Syndrome "Cornelia de Lange"

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ABSTRACT Cornelia de Lange Syndrome (CdLS) is a rare genetic disease characterized by several congenital anomalies including craniofacial, cardiovascular, genitourinary and musculoskeletal system. In CdLS, motor and mental retardation, short neck, microcephaly, micrognathia, high palate, hypertrichosis, typical facial appearance, various extremity abnormalities, gastrointestinal and cardiac anomalies may be present. The management of anesthesia in these patients can become very complex as it affects many systems. We aimed to discuss the cases that should be considered during anesthesia in pediatric cleft palate surgery with CdLS, as there are few case reports in the literature on the anesthetic management of these patients.

Keywords: Cornelia de Lange; multiple anomalies; difficult airway; anesthesia management

Cornelia de Lange syndrome (CdLS), also known as Brachmann-de Lange syndrome, is a rare, genetic disease that occurs at a rate of 0.5-1/10,000 to 1/30,000 at birth and characterized by craniofacial anomalies, congenital heart disease, growth retardation, mental retardation, gastrointestinal, genitourinary and musculoskeletal system malformations.[1-3] In classical CdLS, microcephaly, micrognathia, short neck, ear, nose and tooth anomalies, high palate and usually submucous cleft palate may be present. Congenital heart diseases are seen in 25-30% of patients, epilepsy in 20%, and gatroesophageal reflux in more than 85-90%.[3-7] Due to different deformities and congenital anomalies, various problems, especially difficult airway, may be encountered in the management of anesthesia in these patients.[1-6] The literature contains a small number of case reports on the anesthesiologic treatment of this syndrome.[1,4-6,8,9] As a result, we aimed to discuss perioperative anesthesia management and the factors to consider in a child with CdLS who has a short neck, micrognathia, macroglossia, syndactyly, hypotonicity, motor, and mental retardation, and underwent cleft palate repair.

CASE REPORT

In the preanesthetic evaluation of a 34-month-old girl with a weight of 9.4 kg, a height of 85 cm, and a diagnosis of CdLS, planned for cleft palate repair, it was observed that she had syndactyly in hands and feet, hypotonicity, short neck, micrognathia, macroglossia, height, weight, motor and mental development retardation for her age (Figure 1). Since she was a pediatric case, head and neck movements and mallampati score could not be evaluated completely. The patient with a history of supraventricular tachycardia had mild mitral insufficiency and a slight gradient increase in the pulmonary artery in her echocardiogram

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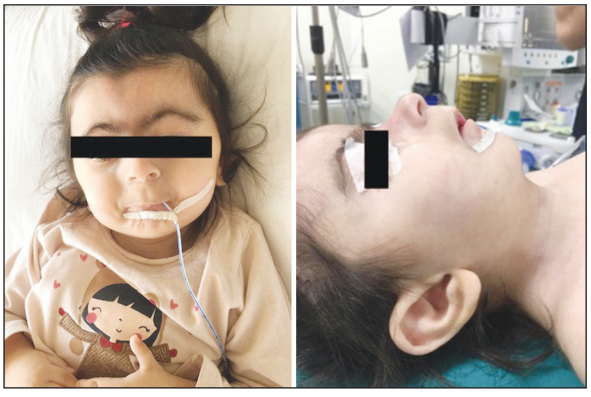

FIGURE 1: Particular features of patient with Cornelia de Lange syndrome: Micrognathia and short neck, eyebrow fusion, elongated philtrum.

(ECHO). A difficult airway was predicted for the patient, whose laboratory tests did not reveal any pathology, and the necessary preparations were made and she was taken to the operating room. After standard anesthesia monitoring, the patient, who was applied anesthesia induction with 4-6% sevoflurane in an oxygen-air mixture, could be ventilated with a double-handed mask using an oral airway since it was difficult to ventilate with a mask. After sevoflurane induction, vascular access was achieved and 5 µg of remifentanil and 5 mg of rocuronium were administered intravenously, and the Cormack-Lehane score was found to be 3 in direct laryngoscopy performed by an experienced anesthesiologist. Endotracheal intubation was performed orally, in the second attempt, using a 3.5 size cuffed tube with spiral and using a stylet. Anesthesia was maintained with sevoflurane and remifentanil infusion during the operation, which lasted approximately two hours. Considering that the nostrils of the patient with ventilation-intubation difficulty were narrow, the nasal root was flattened, edema might develop in the mouth and tongue due to retractors, and the airway opening might become narrower after the operation, she was decided to be sent to the pediatric intensive care unit in the postoperative period, and to be extubated after the edema subsided and adaptation of the patient to palate repair. The patient, who was transferred to pediatric intensive care unit as sedated and curarized, was extubated the next day without any problem. Written informed consent was obtained from the parents for publication of this case report.

DISCUSSION

Problems may occur during intubation in CdLS due to a short and stiff neck, gothic palate or cleft palate. In pediatric patients, the use of a classical laryngeal mask, a Fastrach laryngeal mask, or fiberscope-assisted intubation has been suggested as an effective alternative to tracheal intubation.[1,6-8,10] In a 12-month-old child who underwent ureterocystoneostomy surgery for vesicoureteral reflux, it is stated, that after induction of anesthesia with sevoflurane (5%) in nitrous oxide/oxygen due to difficult intubation, airway clearance was obtained with a laryngeal mask under direct vision of the fiberoptic bronchoscope, and then the endotracheal tube (4.0 mm) was inserted using a guidewire and tube changer stylet.[11] Blind nasal or awake fiberoptic intubation may be more suitable in adult patients for spontaneous breathing, since laryngoscopy and insertion of the laryngeal mask may be difficult due to mouth-opening limitations and prominent dental disorders.[5,7,12] Since organ immaturity is common, a small endotracheal tube is recommended, particularly in children with laryngeal hypoplasia.[6] Furuya et al. stated that they used the airwayscope to predict a difficult airway and conducted endotracheal intubation without the use of muscle relaxants in a 22-month-old child with micrognathia and a short neck who underwent palatoplasty.[8] Induction was performed with dexmedetomidine and sevoflurane, and laryngeal reflex inhibition was accomplished with propofol, and intubation was performed without suppressing spontaneous breathing. However, muscle relaxants may be required for conducting laryngoscopy and intubation with minimal trauma in certain surgical interventions due to increased airway sensitivity.[6,7] Endotracheal intubation and the use of muscle relaxants were mandatory in our patient, as cleft palate repair was to be performed.

It has also been stated that congenital heart diseases might cause hypoxic attacks in addition to the difficult airway.[4] Nakajima et al. stated a 21-year-old patient with tetralogy of Fallot, micrognathia, and mental health issues who was predicted to have a difficult airway and received dental care under general anesthesia. They thought that anesthetic management

might be complicated because of a history of anoxic seizures and a difficult airway in childhood. In the patient in whom vascular access was opened after induction with sevoflurane inhalation with nitrous oxide/oxygen, nasal fiberoptic intubation was used due to restricted mouth opening, propofol and remifentanil infusion were used for maintenance, and no postoperative complications were observed in the patient who was extubated during spontaneous breathing.[4] Although, in our case, there was no pathological finding other than mild mitral insufficiency and a mild gradient increase in the pulmonary artery on ECHO, the cardiology was consulted and the patient was taken into operation.

Acute pneumonia or bronchitis is shown as the most common cause of death in children with CdLS. The pediatric patient has a low immunoglobulin A level and a tendency to frequent respiratory tract infections, according to Takeshita et al.'s case study.[6] Endotracheal intubation should be performed carefully, the depth of anesthesia should be sufficiently controlled, and the length of anesthesia and operation should be kept as short as possible because these patients are highly susceptible to respiratory tract infections and the airway is considered to be irritable.[6]

Because convulsions may also occur with CdLS, abnormal electroencephalography (EEG) waves may occur depending on the anesthetics used (e.g., enflurane, ketamine, droperidol). Even if no motor seizures are detected in a patient with epileptic EEG waves, caution should be taken during anesthesia applications to prevent convulsions, and these agents should be avoided. It is stated that hyperventilation and high body temperature also cause convulsions. Szyca et al. reported that atropine and ketamine were used to induce anesthesia in 2 female patients aged 14 and 16 years with developmental and mental retardation, hirsutism, structural extremity anomalies, and abnormal facial development who underwent laparoscopic Nissen fundoplication, and then sevoflurane was used to provide appropriate intubation conditions.[7] As there is no mention of convulsions or EEG pathology in this case study, ketamine may be considered.

Although there are no specific findings in the laboratory and pathological examinations described in the literature regarding CdLS, various organ function disorders have been reported.[6] Laboratory tests were found to be normal also in our patient.

In conclusion, it is difficult to create a standard anesthesia scheme in patients with CdLS, individual planning should be made considering the existing malformations. It should be remembered that in operations involving the oral cavity, such as palatoplasty, tonsillectomy, and adenoidectomy, the airway opening becomes narrower because of oedema that may develop in the oral mucosa and tongue in the postoperative period, and that extubation is as important as intubation in these patients. Communication with the intensive care team about any airway issues that arise during the postoperative period may help to avoid invasive procedures like a tracheostomy. We believe that case reports like these, which are uncommon today and bring other risks because they influence organ systems other than the difficult airway, would be beneficial.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

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