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Case report

Cephaloskeletal dysplasia (Taybi-Linder syndrome): Case report and anesthetic considerations[☆]



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ABSTRACT

Introduction: Microcephalic osteodysplastic primordial dwarfism (or Taybi-Linder syndrome) is a rare disease characterized by bone and central nervous system malformations, in addition to intrauterine retardation.

Case presentation: 20-year-old patient operated on for adhesiolysis and enteropexy due to bowel obstruction from post surgical adhesions.

Conclusion: The anesthetic considerations in these patients include the potential airway impairment secondary to facial malformations and neurological complications, primarily seizures.

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Displasia cefaloescelética (Síndrome de Taybi-Linder): Presentación de un caso y consideraciones anestésicas

RESUMEN

Introducción: El enanismo microcefálico osteodisplásico primario (o síndrome de Taybi-Linder) es una infrecuente enfermedad caracterizada por malformaciones óseas, del sistema nervioso central y crecimiento intrauterino retardado.

Presentación del caso: Paciente de 20 años intervenida de adhesiolisis y pexia intestinal por un cuadro de obstrucción intestinal por bridas postquirúrgicas.

Palabras clave:

Enanismo

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Conclusión: Como consideraciones anestésicas de estos pacientes destacamos las posibles alteraciones de la vía aérea secundarias a las malformaciones faciales y las complicaciones neurológicas, principalmente crisis convulsivas.

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Introduction

The Taybi-Linder syndrome, also known as microcephalic osteodysplastic primordial dwarfism (MOPD) types I and III, is a rare, potentially inherited autosomal recessive condition. It is characterized by intrauterine growth retardation (IGR), bone dysplasia (including the facial skeleton) and central nervous system malformations including brain malformations, refractory epilepsy, sensitive deficits, cognitive deficits and neuroendocrine disorders. Notwithstanding the potential complications that the anesthesiologist may face, primarily related to airway abnormalities and the frequent association with neurological pathology, particularly epilepsy and neuroendocrine disorders, there are very few publications in the specialized bibliography.

Majewski et al.^{1,2} classified patients with microcephalic primordial dwarfism into two categories: Seckel syndrome and osteodysplastic primordial dwarfism (ODPD) that is further subdivided into three groups: I, II and III, primarily based on the skeletal characteristics. Seckel syndrome was defined as severe IGR and postnatal dwarfism with severe microcephaly characterized by "bird-like face", micrognathia, pointed nose, and receding forehead, associated with cognitive impairment and other abnormalities but with no skeletal malformations, except for occasional dislocation of the head of radius. Patients with ODPD present the same craniofacial characteristics but associated with skeletal abnormalities. The current medical bibliography equates the definition of Taybi-Linder syndrome with ODPD types I and III.

The situations when the anesthesiologist may be faced with this pathology range from complementary testing (imaging diagnosis), mainly in pediatric patients, to perioperative management of anesthesia, primarily orthopedic surgery as a palliative approach to bone abnormalities.

Clinical case

Patient information

This case refers to a 20-year-old patient (10 kg of body weight), undergoing exploratory laparotomy due to bowel obstruction from adhesions. The patient was diagnosed with Taybi-Linder syndrome and total colonic Hirschsprung requiring total colectomy and ilio-anal anastomosis, in addition to a number of subsequent re-interventions due to obstructions secondary to intestinal adhesions. There were no difficulties with the

endotracheal intubation of the patient during the previous procedures.

Clinical findings and interventions

A detailed history of the patient was recorded during the pre-anesthesia consultation before surgery. Due to poor patient cooperation, there was some degree of difficulty to evaluate the airway, the absence of epileptic seizures in the last 5 years (without basal treatment), or any hydro electrolytic imbalances. No difficult airway predictors or difficult manual ventilation were identified during the examination of the airway; however, the patient's facial anatomy was suggestive of difficult intubation. Based on past surgical experiences with no difficulty to access the airway, no special measures were taken in this regard.

The patient arrived at the OR with adequate anxiolysis (2 mg of intranasal midazolam administered 30 min earlier) to proceed with inhaled induction (8% sevoflurane with fresh gas flow of 6 L/min and tidal volume for spontaneous breathing) while standard monitoring procedures are followed (electrocardiography, non-invasive blood pressure control, and pulse oximetry), in addition to pediatric bilateral bispectral index (BIS), including spectral density matrix (SDM) monitoring. A peripheral 22 G venous line is inserted in the right upper limb for the administration of 30 mg of Propofol, 30 µg of fentanyl, and 10 mg of rocuronium. After completing the anesthetic induction, the orotracheal intubation is performed with no preliminary manual ventilation (5.0 mm external diameter tube with pneumoplugging) for full visualization of the glottis, Cormack-Lehane Grade I.

Anesthesia is maintained with sevoflurane 0.8 CAM (BIS target 40–60) in semi-closed loop (fresh gas flow 1 L/min, 40% inspired oxygen fraction in medicinal air), and fentanyl dosing as needed for adequate analgesia. The procedure begins with a supra and infra umbilical laparotomy approach to proceed with the adhesiolysis and enteropexy. Support vasoactive treatment and blood products transfusion were not required during the intervention. No remarkable changes were observed in the BIS monitor EEG wave, with no evidence of SDM waves or registry compatible with epileptic seizures.

The postoperative analgesia was administered using a morphine-chlorine pump for 48 h and NSAIDs.

Follow-up

When the surgical procedure was over, the patient was educted from anesthesia and extubated in the OR uneventfully. The clinical evolution of the patient was

favorable and she was able to be discharged 5 days after surgery.

Discussion

Taybi-Linder syndrome or microcephalic osteodysplastic primordial dwarfism types 1 and 3 (MOPD); exhibit a phenotypic pattern characterized by intrauterine and postnatal growth retardation, microcephaly, dysmorphic facies, skeletal dysplasia, low birth weight, and brain abnormalities. According to the initial descriptions, both types were considered separate pathologies based on radiological criteria. However, more recent genetic studies have come to the conclusion that both types may be considered as two different ways of expressing the same syndrome.

The prevalence is difficult to estimate, but according to the organizations that study rare pathologies, the estimate may be less than one case per one million people. The facial pattern is characterized by a prominent nose with flat nasal bridge, bulging eyes, receding forehead and micrognathia. The most common neurological manifestations are seizures and intellectual deficit, the latter being a characteristic of the case herein discussed.³ The genetics of MOPD types 1 and 3 is autosomal recessive. Recent studies have been able to identify a snRNA (*small nuclear*) U4atac as the gene responsible for Taybi-Linder syndrome.⁴⁻⁷

The presence of neuroendocrine disorders has been documented in very few patients; however, the Taybi-Linder syndrome has been associated with incipient diabetes, electrolytic imbalances, hypothyroidism, hypothalamic disorders, hypogonadism, cryptorchidism, micropenis and hypospadias.^{8,9}

Typically, the diagnosis has been based on the patients' phenotypical and radiological characteristics; the latter include shortened tubular bones, arching of the long bones and widened intervertebral space.¹⁰ The entities considered for differential diagnosis include type 2 MOPD (radiological diagnosis) and other types of primordial dwarfism. The advances in fetal medicine have enabled the development of ultrasound screening for types 1 and 3 MOPD during the second trimester of pregnancy. Prenatal diagnosis is of the essence since currently we do not have any available therapeutic tools and the prognosis for this patient is extremely severe.

With regards to the management of anesthesia in these patients, airway management should be emphasized since the facial abnormalities may lead to a difficult airway and clinical neurological outcomes, particularly epileptic seizures. The previous surgical interventions that the patient underwent developed uneventfully; consequently, a difficult airway was not expected and anticonvulsive prophylaxis was not warranted. However, we avoided using pro-convulsive medications (i.e., etomidate) and constantly monitored the depth of anesthesia using a pediatric BIS sensor, paying special attention to the spectral density matrix; no signs of epileptic seizures were identified.

Facial malformations include microcephaly (the head-body ratio is normal at birth, but the body grows disproportionately as compared to the head during development); early closure of the fontanelles, craniosynostosis, prominent nose and bulging

eyes; small, widely separated teeth, with poor enamel and sometimes congenital absence of permanent teeth.

Informed consent

Due to the patient's cognitive impairment (mental age of approximately 3 years old), her legal representatives – in this case her parents – signed the informed consent for surgery.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that no patient data appear in this article.

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Conflicts of interest

The authors have no conflicts of interest to declare.

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