

Anesthetic Management in Premature Newborn with Huge Sacrococcygeal Teratoma: A Case Report

Dev Sakrokoksigeal Teratomu Olan Prematür Yenidoğanın Anestezi Yönetimi: Olgu Sunumu

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Abstract

Sacrococcygeal teratomas are the most common congenital tumors in newborns. The primary treatment is early surgical resection. However, the risks of surgical procedures and tumor morphology, as well as the challenges of premature newborns, make the anesthetic management distinguished. In this case report, we present anesthesia management of 3.420 gr newborn on the postnatal 3rd day, who was born by caesarean delivery with 176x130x130 mm huge sacrococcygeal teratoma at 32 weeks of gestation.

Keywords: Anesthesia, premature newborn, sacrococcygeal teratoma

Öz

Sakrokoksigeal teratomlar yenidoğanlarda en sık görülen konjenital tümörlerdir. Birincil tedavisi erken cerrahi rezeksiyondur. Bununla birlikte, cerrahi prosedür, tümör morfolojisi ve prematür yenidoğan ile ilişkili zorluklar anestezi yönetimini karmaşık hale getirir. Bu olgu sunumunda 3,420 gr ağırlığında, 32. gestasyon haftasında sezaryen ile doğurtulmuş, 176x130x130 mm boyutlarında dev sakrokoksigeal teratomu olan 3 günlük yenidoğanın anestezi yönetimini sunduk.

Anahtar kelimeler: Anestezi, premature yenidoğan, sakrokoksigeal teratom

Introduction

Sacrococcygeal teratoma (SCT) is the most common congenital tumors in newborns (1). The primary treatment is the total excision of the tumor as early as possible after birth (2,3). During the excision of massive tumors with high vascularity, the intraoperative phase becomes complicated due to fast and massive hemorrhage, massive transfusion, hypovolemia, hyperpotassemia, coagulopathy, acidosis, and hypothermia (1,4,5).

In this case report, we presented the anesthetic management for the excision of a huge SCT of 176x130x130 mm on the postnatal 3rd day.

Case Report

A female newborn who was diagnosed with a mass in the gluteus as shown by the prenatal ultrasound and delivered as 3.420 gr at 32 weeks of gestation by emergency caesarean section was included in the study. The mass was thought



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to be a SCT (Figure 1), thus, it was decided to perform an operation.

The newborn was assessed in intensive care preoperatively. Physical examination results were normal but SCT of approximately 20x15 cm starting from the perineum, involving the rectum and extending behind the sacrum



Figure 1. Huge sacrococcygeal teratoma of 3-day-old newborn (176x130x130 mm in size)

covered with highly vascular and regional erosions was observed. The magnetic resonance imaging showed that the mass was 135 mm on the cranio-caudal plane, 176x130 mm on the axial plane, smoothly contoured, lobulated in some regions, solid and multicystic, filling the presacral and precoccygeal region, with no extension into the abdomen. Cranial and echocardiographic images were considered to be normal, and hemoglobin was 15.7 gr/dL⁻¹, hematocrit (Hct) was 46.1%, platelet (Plt) was 158,000 µL⁻¹, ctivated partial thromboplastin time was 29.8 sec, prothrombin time was 15 sec, international normalized ratio was 1.3, fibrinogen was 121 mg/dL, and alpha-fetoprotein (AFP) was >54,000. Erythrocyte suspension (ES), fresh whole blood (WB), fresh frozen plasma (FFP) and Plt suspension were prepared preoperatively. On the postnatal 3rd day, the operating room was heated to 25 °C, infusion pumps and vasoactive drugs were prepared before anesthesia induction. Electrocardiogram, oxygen saturation and non-invasive BP were monitored. For venous access, preoperatively placed umbilical and right brachial central venous catheters were used. The induction was done with 1 µg kg⁻¹ of fentanyl, 0.6 mg kg⁻¹ of rocuronium, 8% sevoflurane and 50-50% O₂-medical air mixture, and the newborn was intubated with number 3 endotracheal tube. The anesthesia was maintained with 2-2.5% sevoflurane in 50-50% O₂-medica-air and ventilated manually throughout the operation. The fluid infusion was done using Ringer's lactate and at 0.9 NaCl 50 mL/hour. Invasive arterial pressure was monitored in the left radial artery after intubation, and nasopharyngeal temperature, urine flow and arterial blood gas (ABG) (Table 1) were monitored. The newborn was put into prone position. As the mass was huge and highly vascular, erythrocyte transfusion was started at

Table 1. Arterial blood gas analyses of the patient in preoperative, intraoperative and postoperative period

| | Preoperative | Intraoperative | Postoperative | ICU period |
|---------------------------|--------------|----------------|---------------|------------|
| pH | 7.28 | 7.22 | 7.41 | 7.45 |
| PaCO ₂ (mmHg) | 48 | 42 | 26 | 27 |
| PaO ₂ (mmHg) | 188 | 100 | 260 | 100 |
| Hct (%) | 46.7 | 30 | 22.1 | 27 |
| Hbg (gr/dL) | 15.3 | 10 | 7.1 | 9 |
| Ca ²⁺ (mmol/L) | 1 | 0.37 | 0.86 | 1.1 |
| Na ⁺ (mmol/L) | 134 | 137 | 141 | 146 |
| K ⁺ (mmol/L) | 3.5 | 3.7 | 4.2 | 3.5 |
| Glucose (mg/dL) | 78 | 377 | 275 | 152 |
| Lactate (mmol/L) | 2.2 | 2.7 | 7 | 9.9 |
| BE (mmol/L) | -4,8 | -9 | -4 | 9 |

BE: Base excess, Ca²⁺: Calcium, K⁺: Potassium, Na⁺: Sodium, Hbg: Hemoglobin, Hct: Hematocrit, ICU: Intensive care unit, PaCO₂: Partial pressure of carbon dioxide, PaO₂: Partial pressure of oxygen

the same time with the surgical excision. Whereas the heart rate (HR) was 135 bpm and the blood pressure (BP) was 85/60 mm/Hg at the beginning of the operation, sudden bradycardia (40 bpm), hypotension (20/15 mm/Hg) and circulatory collapse developed as soon as having started to excise the tumor in 30 minutes in the operation. Twenty µg of adrenalin (3 intermittent doses) and 20 µg/kg of atropine were administered, and 10 µg/kg/min of dopamine and 10 µg/kg/min of noradrenaline infusions were started, concurrently transfusion was continued with manual WB and FFP infusions. The patient had no hypothermia and her temperature was 36 °C during surgery. Hemodynamic stabilization was attained approximately 5 minutes after the circulatory collapse (HR: 120 bpm, BP: 80/50 mm/Hg). Acidosis, hypocalcemia and hyperglycemia were detected in the ABG analyses. The transfusion was maintained since Hct dropped from 46% to 30% due to the hemorrhage continuing on the surface of the mass. The operation was completed in 225 minutes with the newborn in the prone position and the mass excised weighed as 1.450 gr. Throughout the operation, total of 100 mL of ES, 235 mL of WB, 80 mL of FFP, and 600 mL of crystalloid fluid infusion were administered. At the end of the operation, the newborn was transferred to the neonatal intensive care unit (ICU) in an intubated state and without inotrope infusion. During ICU follow up, the patient also did not need inotropic agent. The mean urine output of the patient was about 5.05 cc/h in ICU. Lactate level of the patient was 2 mmol/L at the discharge from the ICU. Weighed as 1.410 gr in the early postoperative phase in the intensive care, the newborn was extubated on the postoperative 1st day. Weighed as 3.075 gr on day 65, her AFP was measured as 397 u/mL and she was discharged from the hospital.

Discussion

SCTs are surgically removed in total, the survival rate is 77%-94% (1). Timing of the surgery is recommended to be as soon as possible immediately after birth because any delay may result in the development of coagulopathy (1,4,5). In case of huge and highly vascular SCTs, it may result in massive hemorrhage complication. During the dissection of SCT, massive hemorrhage is the biggest cause of intraoperative mortality (1,4-6). The rate of hemorrhagic mortality was reported as 3.8% (6). Therefore, for patients with huge SCT, it is recommended to keep blood products available to allow for commencing transfusion as soon as the surgery begins. Also, large intravenous routes and invasive hemodynamic monitoring are recommended (1,4-7). In these operations, another problem is hypothermia, which may develop during

the operation due to loss of heat from a large tumor site in spite of all the measures taken (1,4-6).

There are studies that report more stable SCT cases requiring less blood transfusion. Silay et al. (8) experienced short-term hemodynamic instability 5 minutes after the excision of a mass of 980 g from a 40-week-old baby. They ensured hemodynamic stabilization with 100 mL of blood transfusion and volume and inotrope infusion (8). During the excision of a mass of 850 gr from a 38-week-old baby weighting 4.460 gr, Akin et al. (9) completed the operation without blood transfusion. Unlike these cases, our case was a premature, weighting 3.420 gr and the mass excised weighed 1.450 gr; in other words, the mass was too big considering the weight of the baby and highly vascular. We think that the sudden hemodynamic compromise and the need for massive blood transfusion in our case are also attributable to these causes.

Conclusion

The risk of morbidity and mortality is high while operating on particularly large SCTs with high vascularity in premature newborns. The primary cause of mortality is the massive hemorrhages from the surgical and intratumoral site. Therefore, in such patients, blood products must be prepared preoperatively, large intravenous routes must be placed, and invasive hemodynamic monitoring must be done throughout the operation.

Ethics

Informed Consent: Consent form was taken from patients.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: F.G.Ö., M.E., H.C.G., S.D., M.B.Y., N.T., A.S., Design: F.G.Ö., M.E., H.C.G., S.D., M.B.Y., N.T., A.S., Data Collection or Processing: F.G.Ö., M.E., H.C.G., S.D., M.B.Y., N.T., A.S., Analysis or Interpretation: F.G.Ö., M.E., H.C.G., S.D., M.B.Y., N.T., A.S., Writing: F.G.Ö., M.E., H.C.G., S.D., M.B.Y., N.T., A.S.

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