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CASE REPORT

Anesthetic management of a low birth weight infant with immature teratoma

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ABSTRACT

Intrapericardial teratomas are rare but potentially fatal. Early diagnosis and decision for treatment can be accomplished with prenatal ultrasound. The most common squeal of intrapericardial teratomas are pericardial effusion and pressure on the structures of the cardiovascular and/or respiratory system at birth. Herein we report a case of the diagnosis and anesthetic management of an intrapericardial immature teratoma in a low weight premature neonate.

Key words: Intrapericardial teratoma, premature, anesthetic management

Introduction

Cardiac tumors in infants are rare with an incidence of 0.0017–0.28% [1]. Teratomas are one of the rarely seen primary cardiac tumors. They are congenital tumors often present with symptoms by exerting pressure on the structures of the cardiovascular and/or respiratory system at birth and can potentially be fatal [2-4]. They can be diagnosed in utero with prenatal ultrasound or soon after birth with the evidence of massive pericardial effusion, cardiac compression, and severe cardio-respiratory distress [4, 5]. Herein, we report a case of intrapericardial immature teratoma in a low weight premature neonate that was diagnosed with fetal echocardiogram and its successful surgical and anesthetic management.

Case Report

A 30-year-old healthy primigravida woman, delivered a female baby weighing 1950 g at 32 weeks of gestation (WOG). No risk factors for fetal cardiac abnormalities were identified prenatally and during the follow-up. The pregnancy had a normal course until approximately 22 WOG when the fetal ultrasound confirmed a 3-cm cystic intrapericardial heterogeneous mass in the mediastinum, originating from the left atrium and causing pericardial effusion. Fetal echocardiogram confirmed normal cardiac structures and functions. A premature caesarean delivery was scheduled. A baby girl weighing 1950 g was born. APGAR scores at the 1st and 5th minutes were 5 and 6, respectively. She was intubated in order to provide airway safety and efficient cardiopulmonary resuscitation (CPR) was carried out for two minutes. Afterwards, she was monitored in the neonatal intensive care unit before the operation. Confirmative postnatal echocardiography showed a 3.2 × 3.0 cm cystic intrapericardial mass with pericardial effusion and decreased left ventricular flow. It was shown on Computed Tomography (CT) angiography that the teratoma was located above the entire anterior mediasten, and was covering the pericardium. The serum alpha-fetoprotein (AFP) level was unaccountably high. After an informed consent was obtained from the mother, the baby was operated on the 3rd day postpartum. The baby was administered intravenous ampicillin (50 mg/kg/dose) and gentamicin (5 mg/kg/dose) preoperatively. The preoperative heart rate was 165 beats/min and systolic blood pressure was 56 mmHg. The SpO_2 before the induction was 89%. After administration of 100% O_2, SpO_2 increased to 99% and intravenous 4%

dextrose in 0.18% saline infusion (3 ml/kg/h) was started. General anesthesia was maintained with 50% oxygen, 2% sevoflurane inhalation and intravenous 1 mg midazolam and 1 mg vecuronium. A central venous line and an arterial line were established. The pericardium was opened via a midsternotomy and the mass was completely removed without cardiopulmonary by-pass. The extracted lesion was approximately 4×4×3.5 cm in size. It was located on the great vessels, with its volume covering the larger part of the left atrium and pressing on the left superior lobe of the lung. Although the pressing mass led to a decrease in left lung expansion, there were no prominent abnormalities concerning the blood gas values. Also in the intraoperative period, hypoglycemia (the blood glucose level 38 mg/dl) was treated with a bolus dose of intravenous 1 ml/kg of 10% dextrose and the same glucose infusion rate was maintained without any further complication. The oxygen saturations were maintained between 99-100% during the intraoperative and postoperative periods. The baby was intubated in intensive care unit. She was in normal sinus rhythm without any vasoactive drug support and later extubated on the postoperative 2nd day.

On the pathological examination it was shown that the mass was encapsulated, deep red in color, multilobulated, consisting of solid and cystic portions 3-6 mm in diameter. Accordingly, the diagnosis was immature teratoma, grade II. Post-operative serum AFP level had an increasing trend. Therefore, the initiation of chemotherapy was planned with the Pediatric Oncology and Cardiovascular Surgery departments in a multidisciplinary manner.

Discussion

Teratomas are usually benign embryonal neoplasms associated with pericardial effusion, cardiac compression and cardiorespiratory distress seen after delivery. They originate from three germinal layers (endoderm, mesoderm, and neuroectoderm) [6-8]. Intrapericardial teratomas have a rare incidence (5–6/10, 000) in children [9]. Although usually diagnosed in neonates and infants, as in this case they are sometimes discovered prenatally and alpha-fetoprotein levels are elevated in the newborn period [10,11]. Sevoflurane is the inhalational induction agent of the choice in most neonates. It has a rapid onset with cardiovascular stability. For all procedures, neonates require tracheal intubation and ventilation. This is because the functional residual capacity is reduced so that closing volumes are near to tidal volumes leading to the risk of ventilation/perfusion mismatch. Maintenance of anesthesia is with oxygen in either nitrous oxide or air. It is important to avoid administration of excessive concentrations of oxygen in prematures. In this case besides prematurity, intracardiac mass, pericardial effusion, and immature lung development, hypoventilation of the left lung contributed to respiratory distress of the baby. Due to the potential risks of the intracardiac mass, such as pericardial effusion and external compression on the heart, great vessels or lungs, patient needed a long-term close follow-up [12].

Although prenatal follow-up by ultrasound is highly vital, its diagnosis is usually difficult before the 23rd gestational week. The fetal ultrasound scans usually show large pericardial effusion with an intrapericardial mass, in this case, there was pericardial effusion with no need of drainage [13]. Although two-dimensional echocardiography is used most frequently due to the fact that it is the easiest and the most accurate diagnostic imaging modality for primary cardiac tumors, magnetic resonance imaging may have advantages in defining the relationship of the tumor to adjacent structures [3]. In this patient, the CT scan served as an important method in the preoperative assessment of the intrapericardial mass. A definitive diagnosis was established by thoracotomy, resection and microscopic examination of the lesion. With surgical removal, both the diagnosis and the resection were maintained. Unless the mass is not anteriorly placed, a rescue cardiopulmonary bypass would be necessary. Hence, the cardiovascular surgeon should be ready to proceed with median sternotomy and drain the effusion and pull up the tumor if required immediately during this critical event [14].

In this patient, the teratoma was located on a critical area. Surgical removal was not only potentially diagnostic but also lifesaving. Even in premature newborns like this patient, general anesthesia can be maintained in a safe way with a successful anesthetic agent and surgical management with a multidisciplinary approach.

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