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ABOUT COVER

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CASE REPORT

Simultaneous type III congenital esophageal atresia and patent ductus arteriosus in a low-weight patient: A case report

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Abstract

BACKGROUND

We report a low-birth-weight child (1.8 kg) with neonatal type III congenital esophageal atresia (CEA) combined with symptomatic patent ductus arteriosus (PDA). After comprehensive evaluation, esophageal anastomosis was performed on postnatal day 11 after excluding surgical contraindications, and arterial catheter ligation was performed at the same time. Concurrent surgery for CEA combined with PDA has not been clearly reported in the literature.

CASE SUMMARY

We report a 6-day-old female child with type III CEA and PDA. The patient presented with foam at the mouth after birth, cough and shortness of breath after feeding. At another hospital, she was considered to have neonatal pneumonia, neonatal jaundice and congenital heart disease and transferred to our hospital. After iodine oil radiography of the esophagus and echocardiography we confirmed diagnosis of CEA and PDA. The diameter of the PDA was 8 mm, with obvious left to right shunting. We performed right rear extrapleural orificium fistula ligation and esophageal anastomosis, and ligation of PDA *via* left axilla straight incision after 5 d of hospitalization. The operations were successful, and the incision healed after 12 d, and the patient was discharged. We re-examined the patient 1 mo after surgery. She did not vomit when she ate rice flour. Esophageal angiography showed no stricture of the anastomotic stoma. The patient weighed 3.2 kg.

CONCLUSION

For CEA patients with multiple risk factors, comprehensive, timely and accurate diagnosis and evaluation, and early treatment may improve prognosis.

Key Words: Congenital esophageal atresia; Patent ductus arteriosus; Low weight; One-stage operation; Case report

Core Tip: Congenital esophageal atresia (CEA) is a life-threatening malformation, and early surgical anastomosis is the only treatment. Patients with CEA often have other malformations; the most common of which are cardiovascular abnormalities, such as ventricular septal defect and tetralogy of Fallot. We report a low-birth-weight infant with CEA and severe patent ductus arteriosus. Low birth weight and serious cardiac problems are key factors affecting prognosis. We performed simultaneous esophageal anastomosis and arterial catheter ligation.

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INTRODUCTION

Congenital esophageal atresia (CEA) with or without tracheoesophageal fistula is a serious congenital malformation occurring in approximately 1 in 2500 to 1 in 4000, with a slightly higher incidence in twins[1]. About 50% of patients with CEA develop malformations of other organs[2]. The treatment of CEA has advanced in recent decades, and the overall survival rate can now exceed 90%[3].

The child in this report also had symptomatic patent ductus arteriosus (PDA). At present, medical treatment of neonatal PDA is advocated as the first-line treatment, and the necessity of early prophylactic ligation is still controversial, but persistent symptomatic PDA requires mainly surgical treatment[4]. Patient survival is directly related to birth weight and the presence of major heart defects. Infants weighing > 1500 g and without major heart problems have a survival rate close to 100%, while the survival rate for infants with one of the risk factors is reduced to 80%, and the survival rate for infants with both risk factors is further reduced to 30%-50%. Children graded as class II by Spitz[1] have body weight < 1500 g or have significant cardiac malformations, with a survival rate of 80%.

The preoperative risk grading of children is conducive to the clinical formulation of reasonable treatment plans and prognostic judgment. Therefore, after a full assessment of the child's condition, esophageal anastomosis and arterial catheter ligation were performed at the same time.

CASE PRESENTATION

Chief complaints

A 6-day-old female child presented with foam at the mouth after birth, cough and shortness of breath after feeding.

History of present illness

After birth, the child had symptoms of foaming at the mouth, coughing after breastfeeding, and shortness of breath. At another hospital, she was considered to have neonatal pneumonia, esophageal atresia, neonatal jaundice and congenital heart disease, and transferred to our hospital.

History of past illness

The child was delivered by full-term cesarean section, with no asphyxia or birth injuries at birth, and vomiting 1 d later. She was treated in the Second Hospital of Wenshan Prefecture with ventilator-assisted breathing and infusion therapy.

Personal and family history

The mother of the child had high blood pressure during the prenatal examination 2 mo before delivery and was not treated with medication. Family genetic history and history of infectious diseases were denied.

Physical examination

During physical examination, we heard abnormal systolic murmurs in the left lower sternal border second intercostal space during oxygen uptake. Blood oxygen saturation was 90%, breathing rate was 50 breaths/min, heart rate 170 beats/min, and weight 1.7 kg.

Laboratory examinations

No obvious abnormality was found in routine blood, myocardial markers and urine analyses.

Imaging examinations

Iodine oil radiography of the esophagus confirmed CEA. PDA was diagnosed after echocardiography. The diameter of ductus is 8 mm. Obviously shunt from left to right.

FINAL DIAGNOSIS

The final diagnosis was type III CEA with PDA.

TREATMENT

We provided intravenous nutritional support, appropriate jaundice treatment, and good preoperative preparation. We performed right rear extrapleural orificium fistula ligation and esophageal anastomosis, and ligation of ductus arteriosus *via* left axilla straight incision after 5 d of hospitalization. Patient's operation is successfully, the incision heals in 12 d after surgery, accord to leave hospital.

OUTCOME AND FOLLOW-UP

We re-examined the patient 1 mo after surgery (Figure 1). She did not vomit when she ate rice flour. Seven months after surgery, contrast esophagography showed no stricture of the anastomotic stoma (Figure 2). She weighed 3.2 kg.

DISCUSSION

CEA with or without tracheoesophageal fistula is a common congenital abnormality, and survival rates in patients with this condition have improved in recent decades, mainly due to neonatal intensive care, anesthesia, ventilation and nutritional support, early surgical intervention, and advances in surgical materials and technology[5]. The diagnosis of CEA can be indicated by abnormalities in the early stages of pregnancy, such as: the mother of the child has a history of polyhydramnios; the upper neck blind bag sign under B-ultrasound; proximal esophageal dilation can be seen by magnetic resonance imaging (MRI); and the distal esophagus disappears. MRI has high sensitivity and specificity and improves prenatal diagnostic rates. Postpartum diagnosis can be made by: the typical clinical symptoms of the child (excessive saliva, coughing immediately after sucking milk, dyspnea, cyanosis, *etc.*); the phenomenon of the gastric tube folding back due to obstruction; the appearance of upper neck blind bag sign on B-ultrasound; esophageal angiography; and three-dimensional computed tomography[6]. Surgery is the only treatment for children with CEA, except for neonatal acute respiratory distress, which does not necessarily require emergency management[5]. The effectiveness of surgical treatment is related to factors such as the type of CEA, birth weight, concomitant malformations, and severity of pneumonia[3]. It is necessary to fully evaluate the child and risk before surgery, which is conducive to formulating a reasonable treatment plan and judging the prognosis.

In recent years, the treatment of CEA has been developed to a certain extent. We searched PubMed (www.ncbi.nlm.nih.gov/pubmed) and Wanfang Medical network (https://med.wanfangdata.com.cn/) for articles published in the past 20 years, using the following terms: congenital esophageal atresia, patent ductus arteriosus, congenital esophageal atresia combined with patent ductus arteriosus, and congenital esophageal atresia complications. We retrieved two cases of children with polynostril malformation combined with CEA and PDA. Both patients underwent esophageal anastomosis. Aslanabadi *et al*[7] did not mention the treatment of PDA, while Numanoglu *et al*[8] treated with ibuprofen and closed PDA after treatment. There are three main treatment options for PDA: conservative, pharmacological and surgical. The child reported in this case was treated for foaming at the mouth after birth, coughing and shortness of breath after feeding. Physical examination found rough systolic murmur between the left margin of the second rib, echocardiography revealed PDA, a catheter diameter of 8 mm, and obvious left to right shunt. Combined with physical examination and auxiliary examination, symptomatic PDA was diagnosed[9]. Surgical treatment of persistent symptomatic PDA is currently advocated[4], and the child in this report had obvious respiratory symptoms, and cardiac ultrasound suggested large PDA and severe tricuspid regurgitation. Considering the burden caused by a second operation and the impact of continuous right-to-left arterial ductus shunt on cardiopulmonary function and postoperative recovery after esophageal anastomosis, we decided to perform esophageal anastomosis and PDA ligation at the same time.

As no similar cases have been treated in our hospital previously, and there are only a few reports in the literature, there is no unified standard for treatment of CEA combined with PDA or other congenital heart diseases. Therefore, we need to develop effective treatment for children in the future.

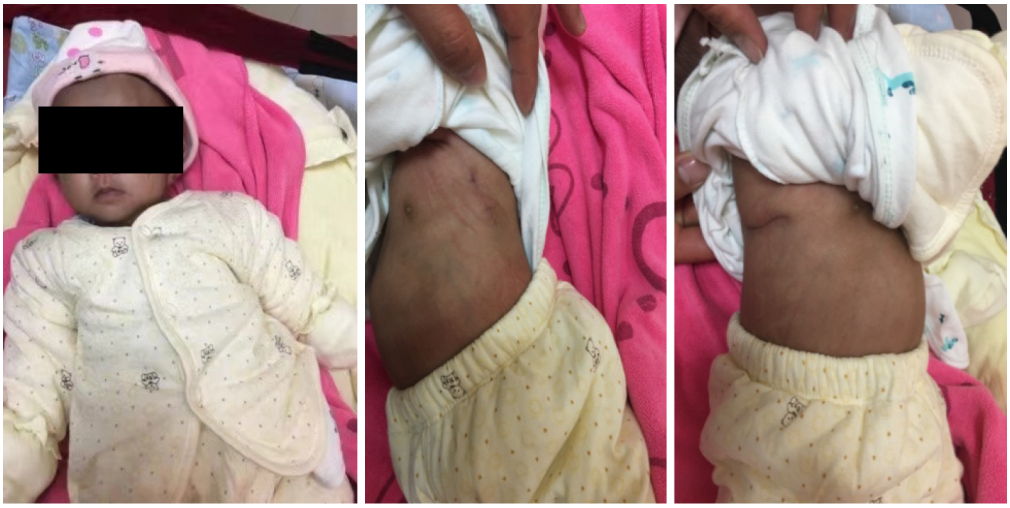

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Figure 1 Re-examination 1 mo after surgery, the child's wound healed and nutritional status was good.

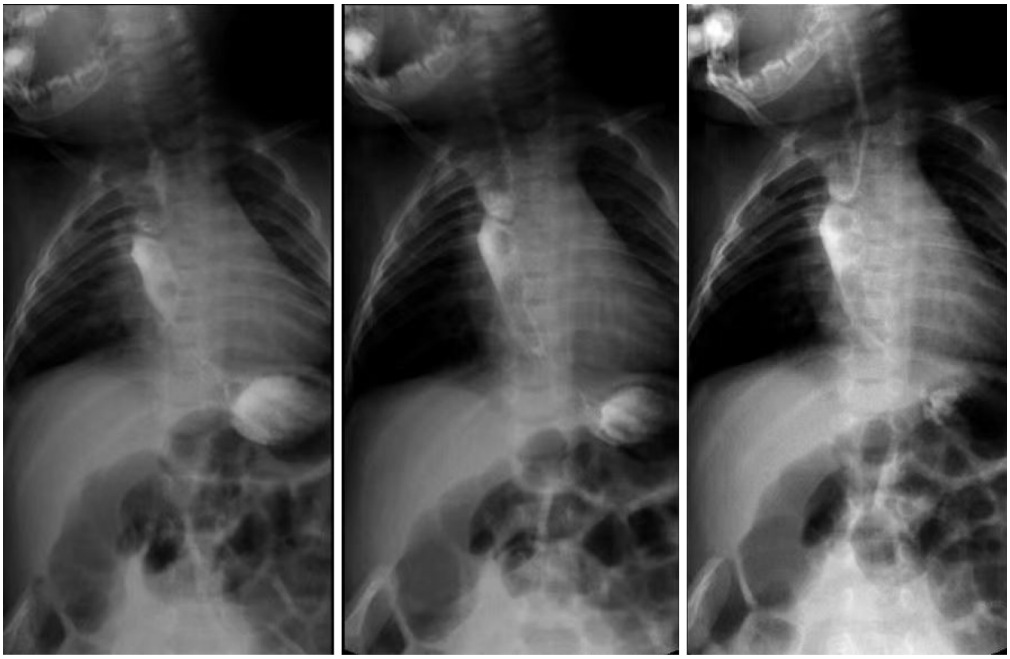

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Figure 2 Seven months after surgery, oral barium passed through the esophagus smoothly, the upper esophageal development was moderate stenosis, and the middle and lower segments were normal.

CONCLUSION

CEA combined with congenital heart disease is a life-threatening condition in children. Esophageal malformation should be treated early, but the need to the concomitant heart malformation is still controversial. The prognosis of such children is related to many factors, and clinicians should fully assess the condition of the children and grade the risk accordingly. The best treatment plan should be considered in accordance with the child's condition, care and other aspects, and follow the wishes of the child's family.

FOOTNOTES

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