Brain Abscess Due to Neglected Tetralogy of Fallot: A Case Report

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Abstract

BACKGROUND: Tetralogy of Fallot (TOF) is a type of congenital heart disease accounts for about 10% of all congenital cardiac deformities, and is the most common cyanotic lesion after the 1st year of life. The ideal age for correction of tetralogy of Fallot is still under discussion. Non-cardiac manifestation due to oxygen deficiency has to be aware of in cyanotic patient is brain abscess, because of the right-left shunt in long standing TOF.

AIM: The objectives of the study were to report a case of neglected TOF.

CASE REPORT: A 1-year-old male presented to Murni Teguh Memorial Hospital with the chief complaint of stiffed neck for the past 3 days and got fever for 10 days before admitted, with nausea and vomiting. He was diagnosed with Tetralogy of Fallot through an echocardiography examination when he was 2 months old, but never go through any medical nor surgical treatment. The boy responded to verbal, no eye contact, high grade fever, stiffed neck, Kernig sign, and Brudzinski sign was found, and the right extremities were spastic, clubbing finger. On cardiac examination, there was systolic murmur grade ¾ in the left second intercostal space. Echocardiography evaluation revealed dilated RA-RV, no PDA shunt, large mal alignment ventricular septal defect, overriding aorta > 50%, right ventricular hypertrophy, and severe infundibular pulmonary stenosis, consistent with Tetralogy of Fallot. During hospitalization, there were several episodes of seizure and decreased of consciousness, brain CT investigation was done. The abscess was evacuated and a ventriculoperitoneal shunt was performed. One week after the operation, the patient developed abdominal distention, green bile such as vomiting, decreased bowel movement, and soon muscular defense. From the plain abdominal, X-ray and CT revealed peritonitis and intestinal obstruction. An emergency laparotomy was performed, followed by adhesiolysis and jejunostomy due to jejunal perforation. The boy passed away after several episodes of septic shock.

CONCLUSIONS: We would like to emphasis the consequence of the neglected treatment in infant with TOF.

Introduction

Tetralogy of Fallot (TF) is the most common cyanotic congenital heart lesions. TF consists of four abnormalities such as pulmonary stenosis or obstruction of the right ventricular outflow, ventricular septal defect, overriding aorta, and right ventricular hypertrophy [1], [2], [3]. Cerebral abscess is one of the complication in uncorrected TF and usually seen in patient older than 2 years old [1].

Case Report

A 1-year-old boy was admitted to the Emergency Ward of Murni Teguh Memorial Hospital, Medan. The patient presented with stiffed neck for the past 3 days, fever for 10 days before admission, with nausea and vomiting. He was diagnosed with Tetralogy of Fallot through an echocardiography examination when he was 2 months old (Figure 1), but never go through any medical nor surgical treatment. The patient was quickly consulted to the neurosurgery
metronidazole 150 mg IV 3 times daily, Amikacin 50 mg twice daily, and Phenytoin 35 mg IV twice daily. Fever begins to resolve. One week after the operation, the patient developed abdominal distention, green bile like vomiting, decreased bowel movement, and soon muscular defense. A three position abdominal X-ray and abdominal computed tomography were performed and revealed peritonitis and intestinal obstruction. An emergency laparotomy was performed, followed by adhesiolysis and jejunostomy, during surgery jejunal perforation was found. Postoperatively, the boy was on total parenteral nutrition (TPN), intravenous antibiotics were given continuously. Four weeks after laparotomy and jejunostomy, an surgical anastomosis was performed, the patient was given parenteral nutrition, trophic feeding, and enteral nutrition.

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**Discussion**

Non-cardiac manifestation due to oxygen deficiency that has to be aware of in cyanotic patient is brain abscess because of right-left shunt in long standing TOF. The severity of the shunt is determined by the degree of pulmonary stenosis [1]. The degree of right-to-left shunt is responsible for the hypoxia of cerebral tissue which could lead to cerebral infarction that is considered as a precursor of cerebral abscess [3], [4]. An early TF repair is preferred to
avoid prolonged hypoxemia and the risk of cyanotic spells, preserves myocardial function and to minimize secondary damage to the heart and other organs [5]. 

TF in this patient was diagnosed early since he was 2 months old and advised for corrective surgery, but never go through any medical nor surgical treatment, because the child appear normal to the parents. TF symptoms may be vary depending on the severity of the obstruction, some infants may look normal due to less obstruction, but the obstruction generally gets worse over time and the child may developed blue lips at several months age [2]. An echocardiography was done during hospitalization and revealed dilated RA-RV, large malalignment VSD (ventricular septal defect), overriding aorta > 50%, right ventricular hypertrophy, and severe infundibular pulmonary stenosis. During hospitalization, the patient developed several cyanotic spell. Definitive repair in patients aged older than 12 months has been shown to be associated with increased mortality [6]. Most infants have surgical repair at 3–6 months of age [2]. An multivariate analysis showed that the risk of post-operative complications was 40% lower in infants ≥ 91 days old compared to those ≤30 days old [7].

In this case, the patient has a severe infundibular pulmonary stenosis and repeated occurrence of cyanotic spell that is an indication for surgical repair. Unrepaired TF in this patient resulted in cerebral abscess. The treatment in cerebral abscess is surgical intervention; in this case, a surgery was performed to evacuate abscess and a ventriculoperitoneal shunt was performed. The patient still go through several cyanotic spell. One week after surgery, an intestinal obstruction was found and was treated through an emergency laparotomy surgery, during surgery jejunal perforation was found, jejunostomy was formed. Guney et al. conducted a study on abdominal problems in congenital cardiac disease, concluded that gastrointestinal system complication and mortality rates were higher in cyanotic congenital cardiovascular abnormalities patients [8].

Wanty, 2004, reported a case of recurrent cerebral abscess in tetralogy of Fallot that resolved and no further complaint were seen after TF total correction [4]. In this case, the patient was treated for cerebral abscess, but in the meantime, TF was not repaired, in further evaluation, a new suspected lesion for cerebral abscess was found in the cerebellar region as shown in Figure 4. As long as the TF is not repaired, there were no guarantee that no other complication will arise that would eventually lead to morbidity and mortality. We have lost this patient after he had failed to survive after suffered several episodes of septic shock.

References

1. Bernstein D. Cyanotic congenital heart lesions: Lesions associated with pulmonary blood flow. In: Nelson Textbooks of Pediatrics. 20th ed. Amsterdam: Elsevier; 2016. p. 2211-5.
2. O’Brien P, Marshall AC. Cardiology patient page. Tetralogy of Fallot. Circulation. 2014;130(4):e26-9. PMid:25047589
3. van Arsdell GS, Maharaj GS, Tom J, Rao VK, Coles JG, Freedom RM, et al. What is the optimal age for repair of tetralogy of Fallot? Circulation. 2000;102(3):III123-9. https://doi.org/10.1161/01.cir.102.suppl_3.iii-123 PMid:11082374
4. Sahly W, Pelupessy J. Recurrent cerebral abscess in tetralogy of Fallot. Pediatr Indon. 2004;44(5):206.
5. Taubesberger MI, Lechner E, Mair R, Hofer A, Sames-Dolzer E, Tulzer G. Early primary repair of tetralogy of Fallot in neonates and infants less than four months of age. Ann Thorac Surg. 2008;86(6):1928-35. https://doi.org/10.1016/j.athoracsur.2008.07.019 PMid:19022010
6. Kim H, Sung SC, Kim SH, Chang YH, Lee HD, Park JA, et al. Early and late outcomes of total repair of tetralogy of Fallot: Risk factors for late right ventricular dilatation. Interact Cardiovasc Thorac Surg. 2013;17(6):956-62. https://doi.org/10.1093/icvts/ivt361 PMid:23956267
7. Yang S, Wen L, Tao S, Gu J, Han J, Yao J, Wang J. Impact of timing on in-patient outcomes of complete repair of Tetralogy of Fallot in infancy: An analysis of the United States National Inpatient 2005-2011 database. BMC Cardiovasc Disord. 2019;19(1):46. https://doi.org/10.1186/s12872-019-0999-1 PMid:3080830
8. Güney LH, Arat C, Bezyazpinar DS, Arda İS, Arslan EE, Hiçsönmez A. Abdominal problems in children with congenital cardiovascular abnormalities. Balkan Med J. 2015;32(3):285-90. https://doi.org/10.5152/balkanmedj.2015.151045 PMid:26185717