CASE REPORT

Delayed Referral and Anesthetic Management of Esophageal Atresia: A Challenge for Multidisciplinary Approach?

Kusuma Edhi Kuncoro[1], Yunita Widyastuti[2]

[1] Resident, Department of Anesthesiology and Intensive Therapy, Sardjito Hospital/Universitas Gadjah Mada Yogyakarta, Indonesia
[2] Anesthesiologist Consultant of Pediatric Anesthesia, Department of Anesthesiology and Intensive Therapy, Sardjito Hospital/ Universitas Gadjah Mada Yogyakarta, Indonesia

ABSTRACT

Esophageal atresia (EA) is one of congenital anomaly which needs early surgical intervention in most cases. The needs of early referral to tertiary healthcare in developing countries like Indonesia may be an issue. Airway management, adequate ventilation and concomitant comorbidities are serious challenges for the anesthesiologist. We reported a case of a 31 days old infant diagnosed as esophageal atresia and fistula in the tracheoesophageal with bilateral pneumonia and early onset of sepsis. Delayed of referral due to limited access to tertiary hospital. Preoperative optimization and stabilization to deal with respiratory problems and inadequate nutrition has done before the definitive surgery. Airway management to ensure adequate ventilation done by careful endotracheal placement. Thoracic epidural catheter was inserted to deliver adequate analgesia and reduce opioid requirements. We transferred the patient to the neonatal intensive care unit following 3 hours of uneventful surgery.

Keywords: Esophageal atresia, Anesthetic management, Tracheoesophageal fistula, Congenital anomaly

Corresponding Author:
Kusuma Edhi Kuncoro, MD
Email: dr.kuncoro@gmail.com
Tel: +6282-221-887-664

INTRODUCTION

Esophageal atresia (EA) is a congenital defect affecting esophagus and or trachea occurred before birth. Approximately 92% patients with EA has tracheoesophageal fistula (TEF) which connects between the esophagus and the trachea or the main bronchi (1). Incidence of congenital EA/TEF is 1 : 2500–3000 live births. Gross and Vogt have proposed anatomic classification for esophageal atresia. Esophageal atresia classified according to its anatomical shape. The most common type (85%) of blind ending is the proximal esophagus, with the distal esophagus attached to the trachea in the form of tracheo-esophageal fistula or Gross Type C (1, 2). EA may also occur without TEF, i.e., pure EA. About one-third of infants with esophageal atresia are born prematurely (3). Currently, there are no genetic factors identified, but there is around 2% risk of occurrence if one of the siblings gets the esophageal atresia (1).

CASE REPORT

Here we reported a case of a 31 days old infant posted for primary esophageal anastomosis and tracheoesophageal fistula correction. Antenatal history were unremarkable, with normal vaginal delivery process, birth weight was 2600 grams. Patient hospitalized in 3rd days of life in hospital earlier due to history of hypersalivation and respiratory distress. Plain chest x-ray conducted in 7th days and revealed highly possibilities of esophageal atresia. Due to limited access to tertiary hospital, timely referral was not possible until 10th days of hospitalization. Complications due to aspiration became serious problems during first presentation in tertiary hospital as patient diagnosed with pneumonia, early onset of sepsis and failure to thrive. Urgent surgery for gastrostomy decompression and jejunostomy feeding has done in 20th days of life.

Clinical examination during preoperative evaluation revealed tachypnea with respiratory rate 75x/min, with minimal rales on lung auscultation. Routine laboratory examination showed anemia with hemoglobin level 12 gr/dL and mild hypokalemia 2.70 mmol/L. Physical examination revealed no other concomitant congenital anomalies.

General anesthesia conducted with low positive pressure ventilation inhalation technique using sevoflurane at MAC 2.5%, along with preemptive analgesic 7.5 mcg of fentanyl. Uncuff endotracheal tube size 3.0 was inserted facilitated by Miller laryngoscope blade, and confirmed

by symmetrical breath sounds on auscultation. After intubation, we inserted an artery line in right brachial artery to get beat to beat blood pressure measurement during the surgery. Maintenance of anesthesia done with sevoflurane, oxygen, air and continuous intravenous fentanyl. The surgery was conducted in the left lateral decubitus position. The surgery lasted for 3 hours uneventfully, with bleeding estimation 10 ml. Epidural catheter was inserted postoperatively in V.Th XII and V.L I interspace, to deliver continuous epidural analgesia. Patient was transferred to neonatal intensive care unit without extubation.

DISCUSSION

Surgical management of EA/TEF planned through a gradual procedure. Before the definitive repair, surgical gastrostomy planned to prevent gastric rupture which is life threatening (2). Clinical features which found in this patient includes excessive salivation, gagging, choking, coughing, respiratory distress following enteral feeding. Urgent surgery is commonly conducted within 24 to 72 hours in patient without any other comorbidities (3). Due to limited access to tertiary hospital, timely surgery was not possible. Urgent gastrostomy decompression and jejunostomy feeding been done in 20th days of life. Delayed surgical correction increases the risk of aspiration as a result of accumulation of saliva in the proximal esophageal that leads to pneumonitis (1). Multidisciplinary approach involving primary physician, midwife, nurses and pediatrician in the primary healthcare on early diagnosis of esophageal atresia is playing important role in the management of such cases. Increasing awareness of the anomaly led to early detection and referral with fewer pulmonary complications. Higher incidence of pneumonia is related to increased time of referral due to delayed diagnosis and improper shifting because of limited access to the higher level of hospital. Delayed referral from peripheral hospitals, with onset of pneumonia is significantly related to sepsis. This problem was found in this patient with clinical sign of pneumonia. Antibiotic and oxygen supplementation were administered by pediatrician in preoperative periods. About half of EA/TEF cases had concomittant congenital heart diseases therefore further cardiac evaluation is necessary. (3). Further evaluation from echocardiography showed no other cardiac abnormalities in this patient.

This patient diagnosed as EA with TEF Gross Type C. Maintenance of spontaneous ventilation is recommended in EA/TEF. Maintaining spontaneous ventilation regarded as a safe choice until certain information about airway abnormalities confirmed, considering possibility of other airway anomalies (1). Airway secretion cleared by proper suctioning, to minimize risk of aspiration. Breathing of infants is easily affected when their relatively smaller airway diameters obstructed by secretions in the endotracheal tube (3). In this patient we did induction with inhalational anesthesia using sevoflurane, with minimal positive pressure ventilation. Minimal effect on airway secretion was beneficial characteristic of sevoflurane (2). Preemptive analgesia with fentanyl was also administered to facilitated intubation. Uncuff endotracheal tube 3.0 was placed under direct laryngoscopy, and confirmed with bilateral symmetrical breath sounds on auscultation. The difficulty encountered related airway management was maintaining correct place of the ETT tip during surgical procedure especially in Gross type C, which consist of large fistula just above the carina. Precise placement of an endotracheal tube is important because positive pressure ventilation may also disrupt the fistula repair (3).

Invasive arterial monitoring indicated in patients with another comorbidities, particularly complex congenital heart disease or pulmonary disease (3). We inserted invasive monitoring arterial line on the right brachial artery to properly monitored potential hemodynamic instability related hypoxia and surgical bleeding.

In the intraoperative period, lung manipulation poses difficult challenges for anesthesiologist due to effect on oxygenation. Desaturation commonly encountered during lung manipulation (3). Periods of desaturation was overcome with increasing oxygen fraction and ask the surgeon to withhold the surgical procedure. Another potential problem in the intraoperative period related to neonatal characteristic are prone to hypothermia, hypoglycemia and dehydration (1). Maintenance fluids balanced salt solutions containing glucose was administered to reduce risk of perioperative hypoglycemia and dehydration. Surgery was lasted 3 hours uneventfully, with estimation of bleeding was 10 ml. Vital sign monitoring during the surgery were SBP 50-85 DBP 25-52, HR 104-158, RR 40-60 SpO2 90-100%. Diuresis was 1.8cc/kgBW/hour.

We transferred the patient to the neonatal intensive care unit without extubation to be monitored for further potential complications. The mortality found as high as 20% which related to other comorbidities (4). Decision of extubation is considered according to previous respiratory compromise. Complication related to extubation worsen by poor pain control, nerve injury in the vocal cord and tracheomalacia. Re-intubation can disrupt the new anastomosis post surgical procedure. Postoperative respiratory complications due to diminished respiratory effort related to pain should be prevented. Modalities to control postoperative pain includes intravenous opioid infusions and continuous regional anesthetic techniques. Opioid intravenous infusion may cause respiratory depression by over sedation which deteriorates respiratory problems (5). Regional anesthetic techniques for post thoracotomy pain in neonatal age group was safe and effective (5). Postoperative analgesia using ropivacaine 0.125% with

fentanyl 1,25 mcg was continuously administered with rate 1 ml an hour via epidural catheter. Intravenous paracetamol 20mg/kgBW administered as part of multimodal analgesia to ensure adequate pain control.

CONCLUSION

Neonates or infant with EA and TEF poses big challenges not only for the anesthesiologist and the surgeon during the surgery. Good and early awareness in primary healthcare and proper management in perioperative period influences the patient outcomes. To improve the outcomes of such cases, multidisciplinary approach emphasizes in preoperative optimization and meticulous anesthetic plan is mandatory.

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