

THE USE OF NEEDLE DECOMPRESSION PROCEDURES IN NEONATES TENSION PNEUMOPERITONEUM: A CASE REPORT

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Abstract: The Use of Needle Decompression Procedures in Neonates Tension Pneumoperitoneum: A Case Report. Tension pneumoperitoneum is the emergence of free air in the peritoneal cavity. There are various causes of tension pneumoperitoneum. Needle decompression is a temporary emergency measure that can be performed in patients with tension pneumoperitoneum to reduce intra-abdominal pressure. A baby boy born by cesarean section from G2P1A0 36 weeks pregnant woman with an indication of 48 hours of membrane premature rupture. 1 day after birth from the results of the abdominal X-ray appears a free air in radiologic finding. The patient then underwent needle decompression for tension pneumoperitoneum because surgery could not be performed immediately due to limited supporting facilities. Needle decompression is an effective temporary emergency measure to reduce intra-abdominal pressure in tension pneumoperitoneum patients.

Keywords: Needle Decompression, Tension Pneumoperitoneum

Abstrak: Penggunaan Prosedur Dekompresi Jarum Pada Tension Pneumoperitoneum Neonatus: Laporan Kasus. Tension pneumoperitoneum adalah munculnya udara bebas dalam rongga peritoneum. Ada berbagai penyebab ketegangan pneumoperitoneum. Dekompresi jarum merupakan tindakan darurat sementara yang dapat dilakukan pada pasien dengan tension pneumoperitoneum untuk mengurangi tekanan intraabdomen. Bayi laki-laki lahir melalui operasi caesar dari wanita hamil G2P1A0 36 minggu dengan indikasi ketuban pecah dini 48 jam. 1 hari setelah lahir dari hasil rontgen perut tampak udara bebas pada temuan radiologi. Pasien kemudian menjalani dekomposisi jarum untuk tension pneumoperitoneum karena pembedahan tidak dapat segera dilakukan karena keterbatasan fasilitas pendukung. Dekompresi jarum merupakan tindakan darurat sementara yang efektif untuk mengurangi tekanan intraabdomen pada pasien tension pneumoperitoneum.

Kata Kunci : Dekompresi Jarum, Tension Pneumoperitoneum

INTRODUCTION

Tension pneumoperitoneum is the appearance of free air in the peritoneal cavity. Tension pneumoperitoneum is usually detected through X-ray examination. The causes of tension pneumoperitoneum that occur in adults and children are different. Tension pneumoperitoneum in adults is usually caused by perforation, peritoneal dialysis, postoperative conditions, vaginal aspiration, or mechanical ventilation (Sureka et al, 2015).

Meanwhile, tension pneumoperitoneum in children is usually caused by blunt trauma, stab wounds, perforation of the GI tract, infection of the tension peritoneum due to gas-forming organisms, or steroid therapy. In neonates, the most common causes of tension pneumoperitoneum are necrotizing enterocolitis (NEC), gastric perforation, gastrointestinal obstruction, or iatrogenic causes such as perforation due to NGT uses (Ibrahim et al, 2013). NEC is a life-threatening disease with a

mortality rate of up to 50% (Cuna et al, 2018). The worldwide incidence of NEC ranges from 0.3 to 2.4 newborns per 1000 births (Afzal et al, 2017). Signs and symptoms that commonly appear in patients with tension pneumoperitoneum are tachycardia, hypotension, decreased urination, tachypnea, abdominal pain, vomiting, abdominal distension, constipation, fever, and diarrhea (Gephart et al, 2017). Tension pneumoperitoneum in neonates is usually classified into 2 categories, namely surgical tension pneumoperitoneum and nonsurgical tension pneumoperitoneum. Idiopathic tension pneumoperitoneum is included in the nonsurgical classification of tension pneumoperitoneum and usually has a better prognosis. Needle decompression is a temporary emergency measure that can be performed to help reduce intra-abdominal pressure that occurs in patients with tension pneumoperitoneum (Grewal et al, 2021).

CASE PRESENTATION

1-day-old baby boy born by cesarean section from G2P1A0 36 weeks pregnant woman with an indication of 48 hours membrane premature rupture. The baby was born crying immediately, active, clear amniotic fluid, APGAR score 9/10, birth weight 3106 g, body length 47 cm, head circumference 33 cm, chest size 33 cm, abdominal circumference 29

cm. 1 day after birth, from the observation results, the baby appears lethargic, respiratory distress was found, the respiratory rate 80 times per minutes, heart rate 200 times per minutes, SpO₂ undetected, and intercostal retraction, the baby's stomach seemed increasingly distended, hypertympanic from percussion examination, decreased perfusion, and a bluish appearance in the lower abdomen. From the results of auscultation, bowel sounds were found to be distant and decreased. The baby's stool only comes out a little and is in the form of mucus. The baby was then examined in 2 abdominal positions x-ray with the result showing a free air in the radiographic finding. The patient was consulted to a neonatologist and diagnosed with tension pneumoperitoneum, then advised to do needle decompression. The patient is then performed needle decompression to remove free air in the peritoneal cavity. At the time of needle decompression, 20 cc air mixed with meconium was showed during aspiration. After needle decompression, there was respiratory distress improvement in the patient, a respiratory rate of 56 times per minute, SpO₂ 99% on NC 1 l pm, and heart rate of 152 times per minute. The patient is assessed as transportable for referral. The patient was then referred to the advanced hospital for further treatment.



Image 1. Clinical Presentation



Image 2. Supine Abdomen X-ray



Image 3. LLD Abdomen X-Ray

Image 1.1 – 1.3 : (1) The patient clinical condition. (2) Radiograph of abdomen shows tension

pneumoperitoneum. (3) Left lateral decubitus view of abdomen shows tension pneumoperitoneum

DISCUSSION

Tension pneumoperitoneum that occurs in neonates is a rare case. In this case, tension pneumoperitoneum occurred in a 1 day-old baby. At the time of birth, the baby was in good condition, full term, with an APGAR score of 9/10, vital signs and physical examination results were within normal limits. Babies born with a history of 48 hours membrane premature rupture. Tension pneumoperitoneum symptoms appear 1 day after the baby is born. The baby also appears lethargic, respiratory

distress was found, the respiratory rate 80 times per minute, heart rate 200 times per minute, SpO₂ undetected, and intercostal retraction. Symptoms that appear are abdominal distension, hypertympy, bluish appearance in the lower abdomen, bowel sounds were found to be distant and decreased, and the baby's stool only comes out a little and is in the form of mucus. There are many causes of tension pneumoperitoneum in infants. One of the most common is NEC (Necrotizing Enterocolitis) (HE, Tao-Zhen, 2015).

NEC is caused by inflammation and cell damage in the walls of the gastrointestinal tract which can lead to organ perforation. In severe cases, NEC is accompanied by perforation, peritonitis, and sepsis. In the course of the disease, the tissue shows signs of ischemia so that necrosis and perforation can occur, either micro perforations or frank perforations. Symptoms and signs of NEC vary, including decreased appetite, blood in the stool, to signs related to respiratory failure and circulatory collapse such as cyanosis and unresponsiveness. On physical examination found abdominal distension, abdominal pain on palpation, visible intestinal loops, decreased bowel sounds, abdominal mass on palpation, and erythema on the abdominal wall. In systemic conditions, respiratory failure, circulatory collapse, and decreased peripheral perfusion can be found. The same thing happened to the patient in this case, the results of the physical examination found abdominal distention, decreased bowel sounds, and decreased peripheral perfusion of the baby. At the bottom of the baby's abdomen, it starts to appear bluish which indicates that the patient's peripheral perfusion is starting to be disturbed. Respiratory distress was also found in the patient (Ray Joseph, 2018).

As a result of these emergency findings, a needle decompression was performed. Needle decompression aims to reduce pressure on the patient's abdominal cavity to avoid tissue necrosis. Until now there is still no standard procedure for needle decompression in cases of tension pneumoperitoneum. Needle decompression in this case was carried out by first performing an aseptic antiseptic at the insertion site, namely in the umbilical area. The 1 cm above umbilical area was chosen with the consideration that air has the property of filling the space above and with the help of ultrasound it was found that the

highest peak of the tension pneumoperitoneum that occurred in this patient was in the 1 cm above umbilical area. The needle decompression procedure that will be performed is assisted by ultrasound guidance to help determine the insertion site that is farthest from the intestine to reduce the risk of hollow viscus perforation that can occur due to the needle decompression procedure. Before the insertion, local anesthesia was performed with 1cc lidocaine. Insertion was carried out using a 22G intravenous cannula at 1 cm above the umbilical cord. At the time of insertion, 20cc air bubbles appeared in the syringe, and during the aspiration test, the air was mixed with meconium. The needle was then removed when no more air was passing and the patient's abdomen appeared more supple. The former insertion area is then cleaned and covered with sterile gauze (Chiapponi et al, 2011).

After needle decompression of the abdomen, the patient appeared calmer, there was respiratory distress improvement and the vital sign was getting better. The abdomen is more supple, and the bluish appearance in the lower abdomen seems decreased. Needle decompression in cases of tension pneumoperitoneum has also been performed in India. A study was conducted on 20 neonates with tension pneumoperitoneum in India who all underwent needle decompression procedures. Needle decompression was carried out using a 16G intravenous cannula and was inserted just below the right costal arc in the midclavicular line. All of the 20 patients who underwent needle decompression showed good results as seen from the improvement in respiratory distress that occurred after several hours of needle decompression. The radiographic results after needle decompression also showed resolution of intra-peritoneal air (Fallon Sara et al, 2013).



Image 4. Needle aspiration of tension pneumoperitoneum

The needle decompression procedure is only a temporary emergency measure to stabilize the patient. The patient then requires surgery to correct the suspicion of hollow viscus perforation that has occurred. Due to limited facilities, this patient was then referred to a hospital with more complete facilities for further diagnosis and management. However, the finding of meconium during needle decompression indicates the possibility of hollow viscus perforation in this

CONCLUSION

Needle decompression is a promising life-saving procedure for tension pneumoperitoneum especially in pediatric cases, it can be effective in stabilizing the condition of a tension pneumoperitoneum patient. Needle decompression helps reduce the patient's intra-abdominal pressure thereby reducing the risk of tissue necrosis and stabilize patient's respiratory and circulatory efforts. Complications that occur from needle decompression can also be minimized by using ultrasound to determine the insertion site thereby reducing the risk of perforation due to the procedure.

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patient which causes tension pneumoperitoneum. The hollow viscus perforation that occurs is suspected to be caused by NEC (Necrotizing enterocolitis). Needle decompression in tension pneumoperitoneum has several complications that can occur including hematoma on the abdominal wall, spontaneous hemoperitoneum due to mesenteric bleeding, hollow viscus perforation, loss of catheter in the abdominal cavity, and large blood vessel lacerations (Miller J et al, 2007).

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