

Endoluminal Vacuum Therapy : A clinical case of 7-year-old child with an Iatrogenic Esophageal Perforation

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ABSTRACT

Vacuum therapy is a method of treatment of difficult to heal wounds using negative pressure. This method of therapy has been used since ancient times and has undergone lots of modifications.

Endoscopic vacuum therapy could be applied intracavitary for the upper and lower gastrointestinal tract and intraluminally for the upper gastrointestinal tract.

In adult patients the method is successful in more than 75% of cases, while there are still not enough clinical trials on children, the results so far are close to those in adults.

We present a clinical case of 7-year-old child with an iatrogenic esophageal perforation. An intraluminal endoscopic vacuum therapy was administered and was enough for a complete closure of the defect and resumption of oral intake at discharge.

KEYWORDS: Vacuum therapy, intraluminally, iatrogenic esophageal perforation ,endoscopic vacuum therapy.

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I. INTRODUCTION

Vacuum therapy is a method of treating hard to heal wounds using negative pressure. The first data could be found about vacuum therapy dates back to ancient times and has been modified many times throughout history. The use of a polyurethane sponge and active aspiration was introduced back in the 1990s by Dr. Louis Argenta and Dr. Michael Morykwas. In 2001. Dr. Rolf Weidenhagen administered endoscopic vacuum therapy on the lower gastrointestinal tract, and in 2008. Dr. Jochen Wedemeyer applied it to the upper gastrointestinal tract.

Endoscopic vacuum therapy can be applied intracavitary for the upper and lower gastrointestinal tract and intraluminally in the upper gastrointestinal tract. It provides prolonged drainage and rapid repair of the abscess cavity. Good infection control, mechanical cavity size reduction and granulation support are also achieved. There is a high acceptance and a high compliance from the patients.

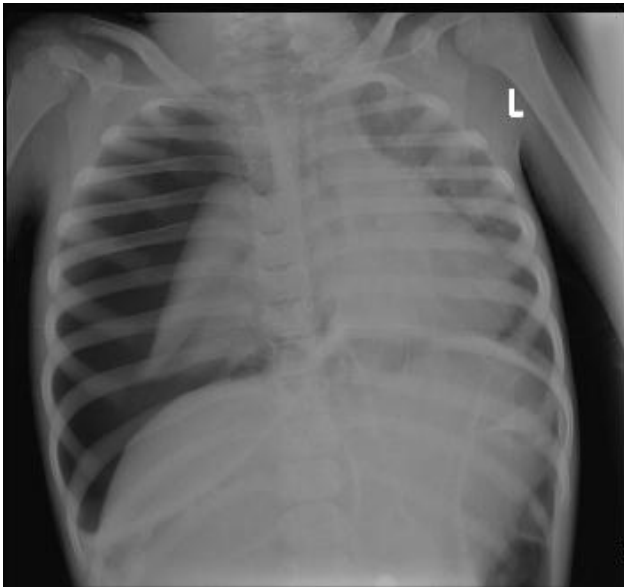
The disadvantages of this method are the huge number of interventions that are carried out and the long hospital stay.

Clinical studies in adult patients have shown good results with a success rate of over 75-80%. In pediatric patients, clinical publications and studies are performed in smaller test groups but also showed a high success rate.

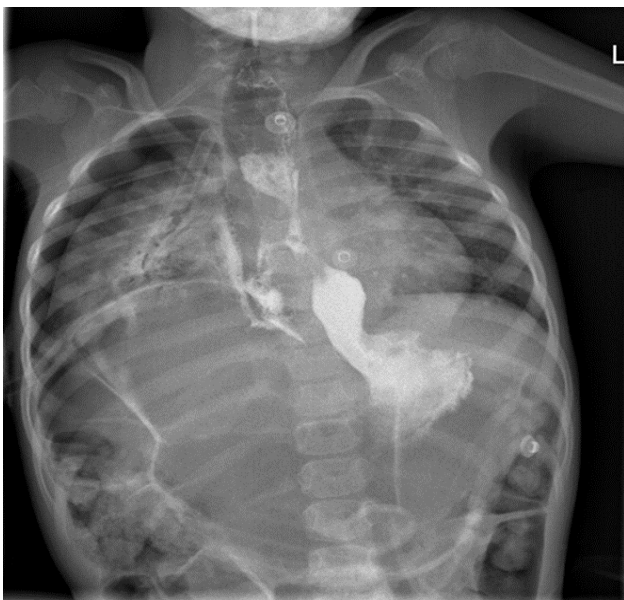
Clinical case

We present a case of 7-year-old child with complicated polymalformative Cornelia de Lange syndrome. GERD, with reflux esophagitis and a stricture of the lower third of the esophagus were presented, necessitating frequent dilatations. Due to severe hypotrophy, gastrostomy was performed to improve enteral intake at the age of 5.

8 hours after another dilatation of the esophagus, with an increasing diameter of the silicone bouges that were used, a sharp deterioration in the child's condition was registered - clinical and radiological data for a complete pneumothorax on the right side. A chest drainage was performed.



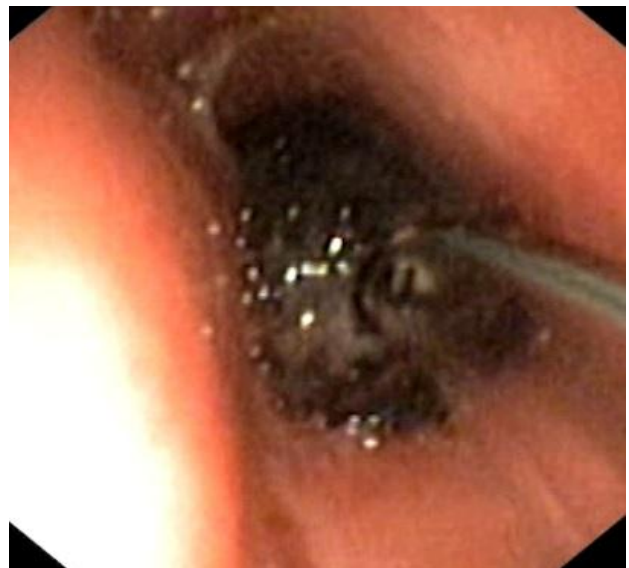
An X-ray contrast study of the esophagus with a water-soluble contrast showed evidence of an esophageal perforation. Antibiotic treatment with broad-spectrum antibiotics was initiated.



A gastroscopy was performed 12 hours after dilatation and a perforation opening 5mm in diameter, 13 cm from the upper incisor teeth was visualized.



The vacuum system was fashioned by suturing a polyurethane sponge, modeled according to the defect on the tip of the nasogastric tube 14CH diameter. A guiding wire was introduced through the gastrostomy, which was gripped with a grasper and was pulled out through the mouth. The wire was sutured to the nasogastric tube and using flexible endoscopy the sponge was positioned at the perforation site. Vacuum system was attached to an active aspiration system with 150mBar (112mmHg).



During the clinical observation and treatment - febrile intoxication syndrome, respiratory symptomatology with symptoms of acute respiratory failure and profuse pus-like secretions from the tracheobronchial tree were registered. The patient necessitating frequent aspirations.

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Gastroscopy was performed on days 3 and 6 with the replacement of the vacuum system. The examinations did not visualize the perforation orifice, but found the presence of fibrin deposits and fresh granulations at the site of the perforation.



The child remained in a severely impaired general condition with clinical and imaging evidence for a right-sided lung hypoventilation.

Flexible gastroscopy performed on the 9th day did not show a perforation orifice. Clean granulations were shown on the place of the perforation. The vacuum system was removed and a protective nasogastric tube was positioned. An X-ray contrast study of the esophagus with water-soluble contrast was also performed. No evidence of leakage was found.

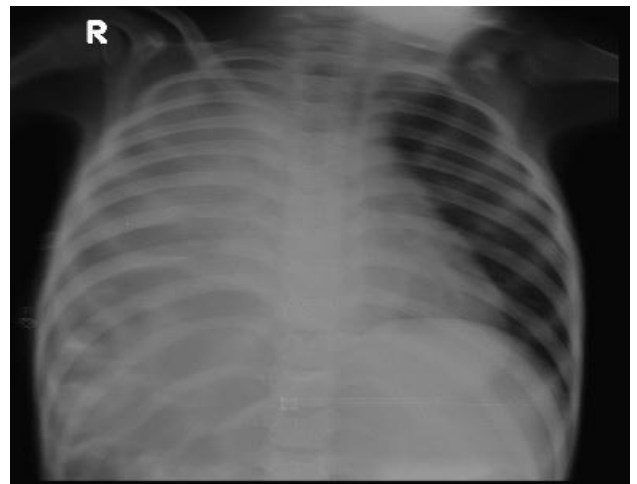


A subsequent bronchoscopy was performed. It showed very thick whitish secretions filling the right main and segmental bronchi. A lavage and an aspiration were conducted. The chest drain was removed simultaneously.

In the following days two more bronchoscopies with bronchial lavage were performed. The child remains in severely impaired general condition, febrile up to 40 degrees.

On day 16, a gastroscopy was performed and showed no pathological findings or signs of perforation in the esophagus. The nasogastric tube was removed. Pneumatic dilatation of the esophageal stricture was performed.

Due to evidence of encapsulated pleural effusion on the right side, VATS on the right side was done.



The revision of the right pleural cavity revealed a large amount of coagulated haemothorax and encapsulated pleural empyema at the level of the esophageal perforation. Debridement and decortication of the pleural cavity were performed. Two chest tubes were placed.



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A multidrug-resistant *Pseudomonas aeruginosa* was isolated from the throat secretion and pleural exudate, necessitating the replacement an antibiotics. Relevant antibiotic therapy was undertaken.

In the next days, there was an improvement of the overall condition. From the third day on the fever peaks were reduced.

After the 5th postoperative day the child was permanently afebrile. The chest tubes were removed.

The child was discharged on the 30th day of perforation, permanently afebrile, with bilateral vesicular breathing, without wheezing. Peroral intake of fluids and mushy food were restored.

II. CONCLUSION

Despite of the small number of clinical studies of endoscopic vacuum therapy in children, its results are similar to those in adult patients.

The method can be used as an alternative to high volume resection surgery.

Endoscopic vacuum therapy facilitates drainage and rehabilitation and improves the granulation. There is also good tolerance and receptivity of the method from children and their parents.

The disadvantage remains the huge number of intervention and long-term hospital treatment.

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