

# Postoperatif Erken Dönemde Laparoskopik Gastrostomi Düşmesi: Non-invaziv ventilasyonun nadir bir komplikasyonu

## *Dislodgement of Laparoscopic Gastrostomy During Early Postoperative Period: an unusual complication of non-invasive ventilation*

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### ÖZET

**Giriş:** Non-invaziv ventilasyonun (NIV) akut veya kronik solunum yetmezliği olan çocukların tedavisindeki yeri zaman içerisinde giderek önem kazanmıştır. Non-invaziv ventilasyon hastaların çoğunluğu tarafından iyi tolere edilmekle birlikte, çeşitli komplikasyonlara neden olabilmektedir. Burada, postoperatif erken dönemde NIV ile ilişkili olarak gastrostomisi düşen bir olgu anlatılmıştır.

**Olgu sunumu:** Serebral palsi ve epilepsi tanısıyla takip edilen 7 yaşında erkek hasta laparoskopik gastrostomi ve Nissen fundoplikasyonu sonrasında çocuk yoğun bakım ünitemize kabul edildi. Postoperatif 2. günde kendini ekstübe eden hastaya, izlemde solunum sıkıntısı gelişmesi nedeniyle NIV desteği verildi. Postoperatif 3. gün enteral beslenme başlandı ve gastrik dekompresyon sonlandırıldı. Beslenme başladıktan 2 gün sonra gastrostomi çevresinde diffüz eritem ve hassasiyet gelişirken, karın duvarında krepitasyon saptandı. Laparotomide gastrostomisinin düştüğü, mide ile karın duvarı arasında kaçak olduğu gözlemlendi ve gastrostomi revizyonu yapıldı.

**Tartışma:** Laparoskopik gastrostomi ve Nissen fundoplikasyonunun postoperatif erken dönemi NIV için mutlak kontraendikasyon oluşturmaya da beklenmeyen komplikasyonlar gözlenebilir. Postoperatif erken dönemde NIV ihtiyacı olan hastalarda enteral beslenme geciktirilmeli ve gastrik dekompresyon sürdürülmelidir. CAYD 2015;2(3):141-4.

**Anahtar kelimeler:** non-invaziv ventilasyon, laparoskopik gastrostomi, Nissen fundoplikasyonu, gastrostomi düşmesi

### ABSTRACT

**Introduction:** The use of non-invasive ventilation (NIV) has become increasingly popular in the treatment of children with acute or chronic respiratory failure. Although NIV is well tolerated by most of the patients, various complications have been described. Herein, we describe a patient who developed early gastrostomy dislodgement related with NIV.

**Case report:** A seven-year-old male patient with cerebral palsy and epilepsy was admitted to our pediatric intensive care unit after laparoscopic Nissen fundoplication and gastrostomy. On postoperative day 2, he was self-extubated and NIV was performed for respiratory distress. The feeding was started on postoperative day 3 and gastric decompression was stopped. There were diffuse erythema and significant tenderness around the gastrostomy site and subcutaneous crepitations on the abdominal wall two days after the feeding was started. Laparotomy was performed, dislodgement of gastrostomy was observed, and a leakage was found between the stomach and the abdominal wall. Gastrostomy revision was done.

**Discussion:** Although early postoperative course of laparoscopic gastrostomy and Nissen fundoplication is not a contraindication for NIV, unexpected complications can be seen. Feeding from gastrostomy tube should be delayed and gastric decompression should be provided during early postoperative course in case of NIV requirement. CAYD 2015;2(3):141-4.

**Key words:** non-invasive ventilation, laparoscopic gastrostomy, Nissen fundoplication, gastrostomy dislodgement

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## INTRODUCTION

The use of non-invasive ventilation (NIV) has become increasingly popular in the treatment of children with acute or chronic respiratory failure (CRF).<sup>1</sup> NIV effectively improves respiratory status and blood gases by recruiting the lung, reducing respiratory work, and optimizing gas exchange. NIV reduces the need for invasive mechanical ventilation (MV), the rate of reintubation, the risk of ventilator associated pneumonia, and the length of hospital stay.<sup>2</sup>

Although NIV is well tolerated by most of the patients, various complications have been described. These complications ranges from patient discomfort to life-threatening conditions like aspiration pneumonia or hypotension.<sup>1</sup> Herein, we describe a patient who developed early gastrostomy dislodgement, leakage to the abdominal wall, and subcutaneous emphysema related with NIV support after laparoscopic gastrostomy (LAPG) and Nissen fundoplication.

## CASE REPORT

A 7-year-old male patient with cerebral palsy and epilepsy was admitted to our pediatric intensive care unit (PICU) after LAPG and Nissen fundoplication. He had histories of frequent lower respiratory tract infections, CRF, gastroesophageal reflux, and inadequate oral intake. Laparoscopic gastrostomy and Nissen fundoplication was performed without complications. At the time of PICU admission he was intubated and mechanically ventilated with an  $\text{FiO}_2$  of 40% and a positive end-expiratory pressure of 5  $\text{cmH}_2\text{O}$ . His vital signs were as follows: heart rate, 113 beats/min; respiratory rate, 20 breaths/min; and oxygen saturation, 100%. Physical examination was unremarkable. Pediatric Logistic Organ Dysfunction (PELOD)<sup>3</sup> and Pediatric Risk of Mortality III (PRISM III)<sup>4</sup> scores were 1 and 0 respectively. On postoperative day 2, he was self-extubated. Four hours after extubation he had mild to moderate respiratory distress and blood gas analysis showed a compensated respiratory acidosis (pH: 7.37,  $\text{PCO}_2$ : 52.5 mmHg,  $\text{PO}_2$ : 154 mmHg,  $\text{HCO}_3^-$ : 28.6 mmol/L,  $\text{SaO}_2$ : 99%, lactate: 1.1 mmol/L). His clinical status was stable and we decided to perform intermittent bi-level positive airway pressure via an oronasal mask. NIV settings were as follows: inspiratory peak airway pressure, 15  $\text{cmH}_2\text{O}$ ; expiratory peak airway pressure, 7  $\text{cmH}_2\text{O}$ ; frequency, 20 breaths/min. We provided gastric decompression to prevent possible gastric insufflation. On postoperative day 3, gastric decompression was stopped and the patient was fed with an enteral nutrition product at a volume of 10 mL/hour by infusion. On postoperative day 4, physical examination revealed erythema around the gastrostomy site. Piperacillin tazobactam was started for wound infection. On postoperative day 5, there were diffuse erythema and significant tenderness around the gastrostomy site and subcutaneous crepitations on the abdominal wall. X-ray imaging of the abdomen revealed disseminated subcutaneous emphysema and dilated stomach. The opaque

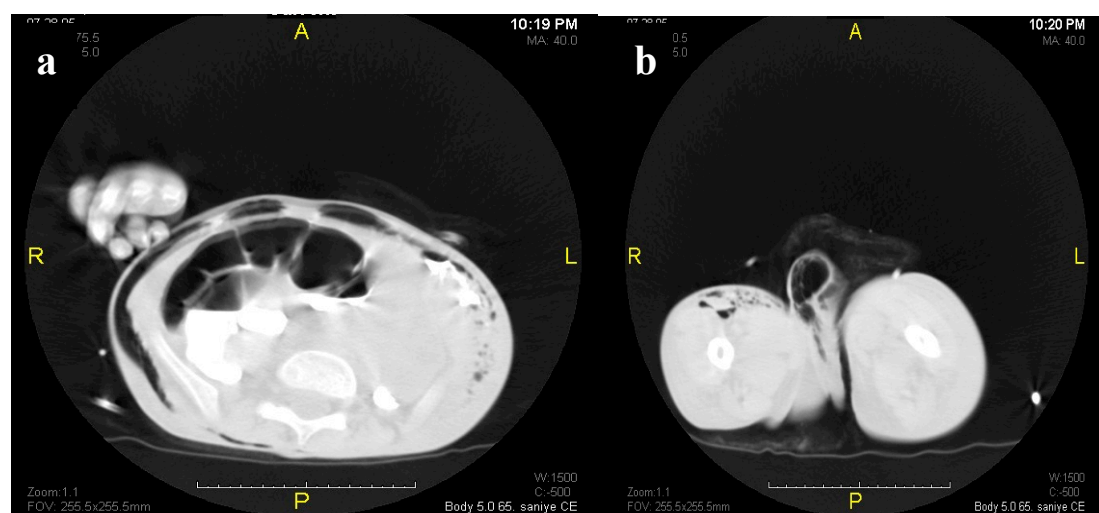
that was given from the gastrostomy tube had spread to the abdominal wall (Figure 1). Abdominal computerized tomography scan was performed and demonstrated subcutaneous emphysema on the abdominal wall, right femoral region, and scrotum (Figure 2a and 2b). Feeding was stopped and gastric decompression was provided. NIV was stopped and MV was started. Metronidazole and teicoplanin were added to his antibiotherapy. Laparotomy was performed, dislodgement of gastrostomy was observed, and a leakage was found between the stomach and the abdominal wall. Gastrostomy revision was done. The patient was mechanically ventilated for 20 days after the operation. Tracheostomy was performed on PICU day 20 and he was discharged with a home ventilator after 45 days of hospital stay.

## DISCUSSION

Non-invasive ventilation has become a standard treatment for CRF in children. In diseases like central hypoventilation or neuromuscular disorders, NIV effectively improves the respiratory status and blood gases. It is more comfortable, does not require deep sedation, offers mobility, and permits oral feeding compared to MV. Therefore, NIV positively influences quality of life in patients with CRF while prolonging their survival.<sup>5</sup> These patients have high-risk post-extubation failure after surgery and Epstein et al. showed that NIV was effective in preventing the occurrence of post-extubation failure in patients at risk.<sup>6</sup> Our patient had CRF due to neurologic impairment and admitted to PICU after surgery, so he was a good candidate for NIV.



**Figure 1.** Abdomen X-ray revealed disseminated subcutaneous emphysema, dilated stomach, and opaque on the abdominal wall



**Figure 2.** Abdominal computerized tomography scan demonstrated subcutaneous emphysema on the **a.** abdominal wall, **b.** right femoral region, and scrotum

Non-invasive ventilation can be associated with various complications which can be even life-threatening. Carron et al. performed a detailed review of the literature for NIV complications. They reported minor and major complications, those ranging from patient discomfort to life-threatening pneumonia or hypotension. They concluded that, careful patient selection and taking into account the risk factors and contraindications are important for NIV to be successful and safe.<sup>1</sup> Contraindications for NIV include respiratory or cardiac arrest, hypotension or shock, poor airway protective reflexes, recent upper airway surgery, excessive secretions, agitation, and untreated pneumothorax.<sup>7</sup> Although recent esophageal surgery is considered as a contraindication for NIV by some of the authors<sup>7</sup>, there are studies reporting the successful and safety use of NIV in the immediate early postoperative periods of laparoscopic Nissen fundoplication, Roux-en-Y gastric bypass, and even oesophagectomy.<sup>8-10</sup> So we decided to perform NIV to our patient early after procedure.

Gastrostomy is a life saving option in patients whose energy and nutrient requirements can not be met by oral food intake alone. It is especially useful in patients with neurological impairment. There are different techniques for gastrostomy insertion and these techniques include open gastrostomy, LAPG, and percutaneous endoscopic gastrostomy (PEG).<sup>11</sup> Although, PEG has become the preferred technique over the last three decades<sup>12</sup>, LAPG combines minimal invasiveness of PEG with lower complication rates.<sup>11</sup> It allows accurate placement of the gastrostomy under direct vision. Liu et al. showed that LAPG had lower early (<14 days after procedure) and overall complication rates compared to PEG. Early complications including leakage, infection, peritonitis, and gastrocolic fistula had been occurred only in 2.7% of the patients.<sup>11</sup> Dislodgement of gastrostomy is a major complication and previous studies reported a maximum rate of 5.3%.<sup>13</sup> Although he was supported with NIV, the postoperative course of our pa-

tient was uneventful in the first 3 days of PICU admission. After initiation of feeding and discontinuation of gastric decompression, leakage to the abdominal wall and subcutaneous emphysema associated with gastrostomy dislodgement had occurred. One can argue that NIV can not be the only reason for gastrostomy dislodgement in this patient as it can develop spontaneously in approximately 5% of the patients. We suggest that NIV makes it easier to develop gastrostomy dislodgement in the presence of predisposing conditions like wound infection and delay in wound healing probably together with gastric insufflation due to inadequate decompression.

## CONCLUSION

NIV is life saving for children with CRF. Although early postoperative course of LAPG and Nissen fundoplication is not a contraindication for NIV, unexpected complications can be seen. Feeding from gastrostomy tube should be delayed and gastric decompression should be provided during early postoperative course in case of NIV requirement. Also MV can be considered as an option in such patients.

## REFERENCES

1. Carron M, Freo U, BaHammam AS, Dellweg D, Guarracino F, et al. Complications of non-invasive ventilation techniques: a comprehensive qualitative review of randomized trials. *Br J Anaesth.* 2013;110:896-914.
2. Abadeso C, Nunes P, Silvestre C, Matias E, Loureiro H, et al. Non-invasive ventilation in acute respiratory failure in children. *Pediatr Rep.* 2012;4:e16. doi: 10.4081/pr.2012.e16.
3. Leteurtre S, Martinot A, Duhamel A, Proulx F, Grandbastien B, et al. Validation of the paediatric logistic organ

- dysfunction (PELOD) score: prospective, observational, multicentre study. *Lancet*. 2003;362:192-7.
4. Pollack MM, Patel KM, Ruttimann UE. PRISM III: an updated Pediatric Risk of Mortality score. *Crit Care Med*. 1996;24:743-52.
  5. Dohna-Schwake C, Stehling F, Tschiedel E, Wallot M, Mellies U. Non-invasive ventilation on a pediatric intensive care unit: feasibility, efficacy, and predictors of success. *Pediatr Pulmonol*. 2011;46:1114-20.
  6. Epstein SK, Ciubotaru RL. Independent effects of etiology of failure and time of reintubation on outcome for patients failing extubation. *Am J Respir Crit Care Med*. 1998;158:489-93.
  7. Venkataraman ST. Noninvasive ventilation: concepts and practise. In: Fuhrman BP, Zimmerman J (eds). *Pediatric Critical Care*. 4th ed. Philadelphia:Elsevier Saunders;2011:689-96.
  8. Yuan N, Wang CH, Trela A, Albanese CT. Laparoscopic Nissen fundoplication during gastrostomy tube placement and noninvasive ventilation may improve survival in type I and severe type II spinal muscular atrophy. *J Child Neurol*. 2007;22:727-31.
  9. Michelet P, D'Journo XB, Seinaye F, Forel JM, Papazian L, Thomas P. Non-invasive ventilation for treatment of postoperative respiratory failure after oesophagectomy. *Br J Surg*. 2009;96:54-60.
  10. Pessoa KC, Araújo GF, Pinheiro AN, Ramos MR, Maia SC. Noninvasive ventilation in the immediate postoperative of gastrojejunal derivation with Roux-en-Y gastric bypass. *Rev Bras Fisioter*. 2010;14:290-5.
  11. Liu R, Jiwane A, Varjavandi A, Kennedy A, Henry G, et al. Comparison of percutaneous endoscopic, laparoscopic and open gastrostomy insertion in children. *Pediatr Surg Int*. 2013;29:613-21.
  12. Singh RR, Eaton S, Cross KM, Curry JI, De Coppi P, et al. Management of complication of percutaneous gastrostomy in children. *Eur J Pediatr Surg*. 2013;23:76-9.
  13. Rosenberger LH, Newhook T, Schirmer B, Sawyer RG. Late accidental dislodgement of a percutaneous endoscopic gastrostomy tube: an underestimated burden on patients and the health care system. *Surg Endosc*. 2011;25:3307-11.