Clinics in Surgery

Case Report
Published: 31 May, 2016

# Laparoscopic Dorfundoplication Plus Roux-En-Y Diversion for Intractable Duodenogastroesophageal Reflux after Billroth Reconstruction

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## Abstract

**Background:** Distalgastrectomy with Billroth I or II reconstruction may cause duodenogastroesophageal reflux and result in severe digestive even respiratory symptoms or complications, which are often refractory to medical management, then laparoscopic Dorfundoplication plus Roux-en-Y diversion can be selected.

**Methods:** Two patients with Billroth I and four patients with Billroth II had such correction for intractable postoperative duodenogastroesophageal reflux. Patient clinical and operative data were collected, then followed up for 1 year to 6 years.

**Results:** There was no mortality and morbidity after the reoperation. 5 patients had excellent symptomatic improvement and 1 not well improved. 2 patients stopped medication and 4 patients reduced medication.

**Conclusions:** Laparoscopic Dorfundoplication plus Roux-en-Y diversion can be an effective procedure to correct medically refractory duodenogastroesophageal reflux after Billroth I and II reconstruction, both digestive symptoms and associated respiratory symptom can be resolved after this procedure.

**Keywords: Billrothreconstruction; Gastroesophageal reflux; Duodenogastroesophageal reflux; Fundoplication; Roux-en-Y diversion**

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**Received Date**: *16 May 2016*
**Accepted Date:** *28 May 2016*
**Published Date:** *31 May 2016*

***Citation:***
*Hu Z-W, Wang Z-G, Yan C, Tian S-R, Deng C-R, Wu J-M. Laparoscopic Dorfundoplication Plus Roux-En-Y Diversion for Intractable Duodenogastroesophageal Reflux after Billroth Reconstruction. Clin Surg. 2016; 1: 1015.*



## Introduction

Billroth I or II anastomosis is mostly applied for distal gastrectomy. However reflux of duodenal contents into remnant stomach even esophagus and extra-esophagus can be a challenging problem after the procedure. The erosive duodenal mixed with gastric fluid is much harmful to the end organ mucosa causing severe digestive even respiratory symptoms or complications [1,2]. The main medication for gastroesophageal reflux disease (GERD), often a proton pump inhibitor (PPI), is often found to have limited effect for duodenogastroesophageal reflux (DGER) [3]. Laparoscopic fundoplication has been proved highly effective and becoming a standard antireflux procedure for GERD [4], however, a fundoplication may not sufficient to stop DGER, so we added Roux-en-Y diversion to the procedure. The purpose of this report is to describe outcome of laparoscopic Dorfundoplication plus Roux-en-Y diversion in six patients with intractable duodenogastroesophageal reflux after BillrothI and II reconstruction.

## Case Presentation

From 2009 to 2014, two Patients with Billroth I and four patients with Billroth II reconstruction underwent laparoscopic Dorfondoplication plus Roux-en-Y diversion for intractable postoperative DGER in Department of Gastroesophageal Reflux Disease of the Second Artillery General Hospital. The study was carried out with the approval of the Ethics Committee of the Second Artillery General Hospital. Written informed consent for participation in the study was obtained from the patients.

Laparoscopic Dorfondoplication plus a 40-cm Roux-limb Roux-en-Y diversion were carried out as descripted in other studies [5,6] with revision (Figure 1). The patients' demographics, DGER evaluations and reoperation outcomes of the patientswere documented. The patients were followed up for 1 to 6 years. There was no mortality and morbidity after the reoperation. 60-100% reduction

**Table 1:** Demographic data, reoperation evaluation and reoperation outcome of the patients.

| Variables | Case 1 | Case 2 | Case 3 | Case 4 | Case 5 | Case 6 |
|---|---|---|---|---|---|---|
| Sex | Female | Male | Male | Female | Female | Female |
| Age, year | 44 | 53 | 76 | 67 | 71 | 67 |
| BMI | 16.1 | 17.7 | 14.5 | 14.2 | 16.3 | 13.4 |
| Pathology of first surgery | Cancer | Dysplasia | Peptic ulcer | Peptic ulcer | Cancer | Dysplasia |
| First surgery | Billroth I | Billroth I | Billroth II | Billroth II | Billroth II | Billroth II |
| Between surgeries, year | 18 | 2 | 34 | 30 | 8 | 25 |
| DGER history, year | 15 | 2 | 3 | 30 | 5 | 25 |
| **Endoscopy** | | | | | | |
| Esophagitis | NERD | LA-B | NERD | NERD | NERD | LA-B |
| Bile reflux gastritis | Positive | Positive | Positive | Positive | Positive | Positive |
| Anastomositis | Positive | Positive | Negative | Negative | Positive | Positive |
| Hiatal hernia | Negative | Positive | Negative | Negative | Negative | Negative |
| **24-h pH monitoring (DMS)** | 7.44 | 15.47 | 3.69 | 25.64 | 113.48 | 4.59 |
| **High-resolution manometry** | | | | | | |
| MUESP, mmHg | 16.3 | 42.1 | 97.2 | 54.2 | 48.6 | 88.9 |
| MLESP, mmHg | 9.2 | 7.6 | 17.4 | 3.9 | 4.5 | 2.1 |
| Peristalsis | Normal | Normal | AP | IEM | Normal | IEM |
| Follow-up, year | 6 | 3 | 5 | 3 | 2 | 1 |
| Symptom outcome | Excellent | Excellent | Excellent | Excellent | Poor | Excellent |
| Medication reduction | Reduced | Reduced | Stopped | Reduced | Reduced | Stopped |
| Reoperation complication | None | None | None | None | None | Reduced appetite |

BMI: Body Mass Index; LA: Los Angeles Classification; DMS: Demeester Score; MUESP: Mean Upper Esophageal Sphincter Pressure (Normal Range: 34-104 Mmhg); MLESP: Mean Lower Esophageal Sphincter Pressure (Normal Range: 13-43 Mmhg); AP: Absent Peristalsis; IEM: Ineffective Esophageal Motility.

of the DGER symptoms achieved in 5 of the 6 patients, but only one not well improved. 2 patients stopped medication and 4 patients reduced medication (Table 1).

## Case 1

This 44-year-old woman underwent distal gastrectomy with Billroth I reconstruction forgastric cancer 18 years ago. Three years after the gastrectomy, the patient had daily symptom of acid regurgitation, heartburn, belch, bloating and vomit, she tried PPIs and kinetic agents without remission. The symptoms worsened with the occurrence of epigastric pain, and frequent bilious vomiting due to exacerbation of the symptoms. Traditional Chinese medicine was added to the medication formula, but still in vain. She was diagnosed as DGER and received laparoscopic Dorfondoplication plus Roux-en-Y diversion in our department December, 2009. During 6-year follow-up after the procedure, herbilious vomiting disappeared, acid regurgitation, heartburn, belch, bloating and epigastric pain were significantly relieved (reported of 70-80% reduction). Hydrotalcite and Omeprazole were still intermittently consumed. The patient was satisfied with the outcome.

## Case 2

This was a 53-year-old man who represented as chronic epigastric painbefore he underwent distal gastrectomy with Billroth I reconstruction for gastric atypical hyperplasia 2 years ago. Not only the epigastric pain had no improvement but also the patient developed the symptoms of intermittent chest pain, sore throat, nausea and vomiting stomach contents and bile after the procedure. Although high dose of PPIs and bile acid-binding agents were given to him in many hospitals, the symptoms still worsened. The symptoms also caused sleep and diet disorders, the patient had 30 kg weight loss in the two years. He also received laparoscopic hiatal hernia repair, Dorfondoplication and Roux-en-Y diversion in our department August, 2012. During 3-year follow-up after the surgery, the patient reported no nausea and vomiting, significantly relief of chest pain, sore throat and epigastric pain (of 60-80% reduction). Although he still had dyspepsia and occasionally needed almagate suspension after the procedure, he was very satisfied with the therapy.

## Case 3

This 76-year-old man had distal gastrectomy with Billroth II reconstruction for gastro duodenal ulcer 34 years ago. 3 years ago he complained of daily severe acid reflux, heartburn and bitter taste in the mouth. The symptoms was much severer after lying down at night, he was frequently waken up due to chocking of large volume of refluxing acid and bitter fluid in mouth, nasal and airway, and he was hospitalized for aspiration pneumonia 7 times during the 3 years. He had to strictly follow diet control and elevates the head of bed adding to high dose of PPIs and bile acid-binding agents only to partially reduce the symptoms. He received laproscopic Dorfondoplication and Roux-en-Y diversion October, 2010. During 5-year follow-up after the reoperation, his nocturnal chocking during sleep disappeared and sleeping became normal, he only had occasionally mild acid reflux, heartburn and bitter taste in the mouth (of 80% reduction) without medication. He still had poor appetite, but satisfied with the therapy.

## Case 4

The patient was a 67-year-old woman, she had intermittent epigastric pain, andvomiting of stomach contents and bile after distal gastrectomy with Billroth II reconstruction for Gastric ulcer 30 years

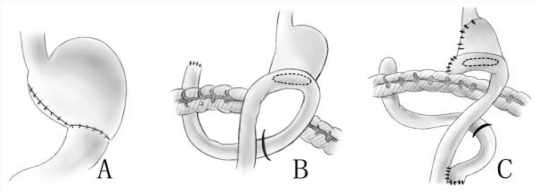


**Figure 1:** Dorfundoplication plus Roux-en-Y diversion (C) for solving duodeno gastroesophageal reflux due to distal gastrectomy with Billroth I (A) or Billroth II (B).

ago. 1 year ago, the symptoms worsened and the patient developed the symptoms of daily regurgitation, heartburn, and bitter taste in the mouth, unhealed multiple ulcers of mouth and tongue, globus sensation and throat tightness with 8 kg weight loss. PPIs, bile acid-binding agents and kinetic agents are given, the patients only had partial and wearing off response. He also received reoperation in our department June, 2012. During 3-year follow-up after the procedure, her vomiting, regurgitation, heartburn, bitter taste in the mouth, multiple ulcer of mouth and tongue, globus sensation and throat tightness disappeared, and her epigastric pain became mild (of 90% reduction). She occasionally taking digestive enzyme and hydrotalcite to promote digestion and reduce epigastric pain. She was very satisfied with the procedure.

### Case 5

The patient was a 70-year-old woman, she represented as worsening epigastric pain, bitter taste in the mouth and intermittent vomiting of stomach contents and bile 3 years after distal gastrectomy with Billroth II reconstruction for gastric ulcer 8 years ago. Although she persistently took PPIs, bile acid-binding agents, kinetic agents and Traditional Chinese medicine for 3 years, her symptoms is still severe and troublesome. She underwent reoperation in our department January, 2013. During 2-year follow-up after the procedure, her bitter taste in the mouth and vomiting disappeared, however her epigastric pain had no remission. She stopped PPI and turned to have oxycodone-acetaminophen tablet 20 mg per day for reducing epigastric pain. She was not satisfied with the procedure.

### Case 6

This is a 67-year-old woman, she had complained of regurgitation, belching, heartburn, chest pain, bitter taste in the mouth, bloating and vomiting bile since distal gastrectomy with Billroth II reconstruction for gastric atypical hyperplasia 25 years ago. The reflux contents often reached mouth, nose and even aspirated into the airway causing sore throat, globus sensation, hoarseness, postnasal drip, ears itching, teeth corrosion, irritating cough with large volume of phlegm. The symptom usually exacerbated in the morning and after meal. 2 years ago, the patient also developed the symptom of episodic laryngospasm, chest tightness and wheezing, and the cough and laryngospasm often attack at 2-4 o 'clock at night. She had to raise the head of a bed and underwent strict diet control adding to PPIs and kinetic agent's therapy. She underwent reoperation in our department July, 2014. During 1-year follow-up after the procedure, most of her esophageal, ear-nose-throat and airway symptoms disappeared. The only symptom left were mild cough, chest tightness and bloating (of 80-90% reduction) without medication. Although her appetite was reduced after the reoperation, she was satisfied with the procedure.

## Discussion

Distal gastrectomy will billroth I or II anastomosis is established procedure for the treatment of peptic ulcer and gastric cancer, however there were often DGER [1,7]. All the patents in this group had sever gastric and esophageal symptoms, and 4 of the patients also had extra-esophageal symptoms. When there isduodenogastric reflux, the patents may represent as epigastric pain and gastritis [8,9], as the duodenal fluid reflux reaches esophagus and extra-esophagus, the patients may represent as typical GERD and extra-esophageal symptoms, such as regurgitation, heartburn, globus sensation, bitter taste in the mouth, cough, laryngospasm, asthmatic symptoms, etc [10,11].

All the selected patient in this group only had partial or no response to the long term medication therapy. The retrograde flow of duodenal contents in DGER may result in weakly acidic and even alkaline gastroesophageal reflux PPIs. Gamma-aminobutyric (GABA) receptor agonist baclofen, bile acid-binding agents (Hydrotalcite, cholestyramine, sucralfate, urosodeoxycholic acid), kinetic agents can be used to reduce DGER, however all the agents had much limited effect for DGER than typical GERD. For patients with medically refractory symptoms reoperation may indicated [12,13].

Laparoscopic fundoplication is commonly used for resolving persistent symptoms of heartburn and regurgitation in GERD, especially when it is refractory to PPI treatment [4,14]. We also applied laparoscopic fundoplication on extraesophageal symptoms and obtained excellent outcomes in respect of ear-nose-throat and respiratory symptoms. Surgical restoration of the anatomical antireflux barrier at the gastroesophageal junction is a more effective method of avoiding any type of gastroesophageal reflux theoretically and is superior to medication therapy [10,15,16]. However a fundoplication dose not solve the duodenogastric reflux, but a Roux-en-Y diversion dose [17]. Roux-en-Y reconstruction for distal gastrectomy has been proven to have a lower incidence of bile reflux, remnant gastritis and reflux esophagitis with better quality of life after surgery [18,19]. As can be found in this study that most of the patients had excellent gastric, esophageal and extra-esophageal symptom control with significant medication reduction after Dorfondoplication plus Roux-en-Y diversion.

## Conclusion

Distal gastrectomy with Billroth I or II reconstruction may result in DGER and severe digestive even respiratory symptoms or complications which were often refractory to medical management. Laparoscopic or fundoplication plus Roux-en-Y diversion can be an effective procedure for medically refractory duodenogastroesophageal reflux after Billroth I and II reconstruction, both digestive symptoms and associated respiratory symptoms can be resolved after this procedure.

## References

1. Endo A, Okamura S, Kono N, Katsumi M. Esophageal reflux after gastrectomy: a hazard after Billroth-I subtotal gastrectomy. International surgery 1978; 63: 52-58.

2. Loffeld RJ. Reflux esophagitis in patients with partial gastrectomy and Billroth I or II reconstruction. Eur J Intern Med. 2006; 17: 175-178.

3. Gasiorowska A, Navarro-Rodriguez T, Wendel C, , Krupinski E, Perry ZH, Koenig K, et al. Comparison of the degree of duodenogastroesophageal reflux and acid reflux between patients who failed to respond and those who were successfully treated with a proton pump inhibitor once daily. Am J Gastroenterol. 2009; 104: 2005-2013.

4. Stefanidis D, Hope WW, Kohn GP, Reardon PR, Richardson WS, Fanelli RD. SAGES Guidelines Committee. Guidelines for surgical treatment of

gastroesophageal reflux disease. Surg Endosc. 2010; 24: 2647-2669.

5. Raue W, Ordemann J, Jacobi CA, Menenakos C, Buchholz A, Hartmann J. Nissen versus Dor fundoplication for treatment of gastroesophageal reflux disease: a blinded randomized clinical trial. Dig Surg. 2011; 28: 80-86.

6. Inokuchi M, Kojima K, Yamada H, Kato K, Hayashi M, Motoyama K, et al. Long-term outcomes of Roux-en-Y and Billroth-I reconstruction after laparoscopic distal gastrectomy. Gastric cancer: official journal of the International Gastric Cancer Association and the Japanese Gastric Cancer Association. 2013; 16: 67-73.

7. Dixon MF, O'Connor HJ, Axon AT, King RF, Johnston D. Reflux gastritis: distinct histopathological entity? J Clin Pathol. 1986; 39: 524-530.

8. Paakkonen M, Aukee S, Syrjanen K, Mantyjarvi R. Gastritis, duodenogastric reflux and bacteriology of the gastric remnant in patients operated for peptic ulcer by Billroth I operation. Annals of clinical research. 1985; 17: 32-36.

9. Graem N, Fischer AB, Hastrup N, Povlsen CO. Mucosal changes of the Billroth II resected stomach. A follow-up study of patients resected for duodenal ulcer,with special reference to gastritis, atypia and cancer. Acta pathologica et microbiologica Scandinavica Section A, Pathology. 1981; 89: 227-234.

10. Wang Z, Hu Z, Wu J, Ji F, Wang H, Lai Y, et al. Insult of gastroesophageal reflux on airway: clinical significance of pharyngeal nozzle. Front Med. 2015; 9: 117-122.

11. Wang ZG, Wu JM, Liu JJ, Wang LY, Lai YG, Ibrahim IM, et al. Respiratory distress resulting from gastroesophageal reflux is not asthma, but laryngotracheal irritation, spasm, even suffocation. Chin Med Sci J. 2009; 24: 130-132.

12. Richter JE. Duodenogastric Reflux-induced (Alkaline) Esophagitis. Curr Treat Options Gastroenterol. 2004; 7: 53-58.

13. Turk H, Hauser B, Brecelj J, Vandenplas Y, Orel R. Effect of proton pump inhibition on acid, weakly acid and weakly alkaline gastro-esophageal reflux in children. World J Pediatr. 2013; 9: 36-41.

14. Peters JH. Surgical treatment of gastroesophageal reflux disease. Gastroenterol Hepatol (N Y). 2014; 10: 247-248.

15. Liang WT, Wu JN, Wang F, Hu ZW, Wang ZG, Ji T, et al. Five-year follow-up of a prospective study comparing laparoscopic Nissen fundoplication with Stretta radiofrequency for gastroesophageal reflux disease. Minerva chirurgica 2014; 69: 217-223.

16. Hu ZW, Wu JM, Liang WT, Wang ZG. Gastroesophageal reflux disease related asthma: From preliminary studies to clinical practice. World J Respirol 2015; 5: 58-64.

17. Spisni R, Nervi M, Lijoi C, Colizzi C. [Roux loop conversion of Billroth II gastric resection complicated by alkaline reflux gastritis]. Minerva Chir. 1988; 43: 1227-1230.

18. Xiong JJ, Altaf K, Javed MA, Nunes QM, Huang W, Mai G, et al. Roux-en-Y versus Billroth I reconstruction after distal gastrectomy for gastric cancer: a meta-analysis. World J Gastroenterol. 2013; 19: 1124-1134.

19. Zong L, Chen P. Billroth I vs. Billroth II vs. Roux-en-Y following distal gastrectomy: a meta-analysis based on 15 studies. Hepatogastroenterology. 2011; 58: 1413-1424.