CASE REPORT – OPEN ACCESS

International Journal of Surgery Case Reports 29 (2016) 88–93

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

# The management of gastric volvulus in elderly patients

Toru Zuiki[a,*], Yoshinori Hosoya[b], Alan Kawarai Lefor[b], Hiroyuki Tanaka[c], Toshihide Komatsubara[a], Yuzo Miyahara[a], Yukihiro Sanada[b], Jun Ohki[a], Chuji Sekiguchi[d], Naohiro Sata[b]

[a] Department of Surgery, Yuki Hospital, Yuki 9629-1, Yuki City, Ibaraki, Japan
[b] Department of Surgery, Jichi Medical University, Yakushiji 3311-1, Shimotsuke City, Tochigi, Japan
[c] Department of Surgery, Koganei Chuo Hospital, Koganei 2-4-3, Shimotsuke City, Tochigi, Japan
[d] Department of Surgery, Nasu Minami Hospital, Chuo 3-2-13, Nasukarasuyama City, Tochigi, Japan

ARTICLE INFO

*Article history:*
Received 6 September 2016
Received in revised form 25 October 2016
Accepted 25 October 2016
Available online 27 October 2016

*Keywords:*
Gastric volvulus
Endoscopic reduction
Esophageal hiatal hernia
Laparoscopic surgery
Gastropexy
Case report

ABSTRACT

*INTRODUCTION:* Gastric volvulus is torsion of the stomach and requires immediate treatment. The optimal treatment strategy for patients with gastric volvulus is not established, because of significant variations in the cause and clinical course of this condition.

*PRESENTATION OF CASES:* We describe our experience with six elderly patients with gastric volvulus caused by different conditions using various approaches. This includes two patients managed with endoscopic reduction, followed by endoscopic or laparoscopic gastropexy.

*DISCUSSION:* Endoscopy is a necessary first step to determine the optimal treatment strategy, and endoscopic reduction is often effective. The indications for surgical repair of gastric volvulus depend on the patient's overall condition, and several options are available. In some elderly patients with severe comorbidities, major surgery may have an unacceptably high risk. We propose a novel treatment strategy for gastric volvulus in the elderly and a review of the literature.

*CONCLUSION:* Early endoscopy is necessary in patients with gastric volvulus. Endoscopic or laparoscopic gastropexy may be adequate therapy in selected elderly patients.



## 1. Introduction

Gastric volvulus is a relatively rare condition, which is a rotation (torsion) of the stomach, and can have a life-threatening clinical course because of resulting ischemia of the gastric wall [1]. The typical symptoms are abdominal pain and recurrent vomiting, which are not specific to this condition. The optimal treatment strategy for patients with gastric volvulus has not been established, because the cause and the clinical course in these patients have numerous patterns. We managed six elderly patients with gastric volvulus, all of whom had different patterns of this condition, in the last three years (Table 1). We present two patients in detail, and propose a novel treatment strategy based on this series of patients and a review of the literature.

## 2. Presentation of cases

### 2.1. Patient 1

An 84-year-old man presented to the emergency room with repeated emesis of black material. He had undergone coronary artery bypass grafting for angina pectoris 20 years ago. Computed tomography (CT) scan revealed that the distended stomach was twisted along the axis of the right gastroepiploic artery, which was connected to the coronary artery (Fig. 1A, B). A 3D-CT scan demonstrated mesentero-axial gastric volvulus (Fig. 1C). Emergency endoscopy revealed twisting of the gastric body and congestion with oozing of blood from the gastric mucosa (Fig. 2A). Endoscopic reduction was successfully performed under X-ray guidance. The patient tolerated oral intake soon after reduction and was discharged five days later, but he returned with the same symptoms two weeks after discharge. We then performed endoscopic reduction again and in addition, performed an endoscopic gastropexy using a Funada-type gastropexy device, which we use for placement of a percutaneous endoscopic gastrostomy (Fig. 2C). The gastropexy was placed at three points in the anterior gastric

*Abbreviations:* CT, Computed Tomography.

* Corresponding author.
*E-mail address:* th-zuiki@jichi.ac.jp (T. Zuiki).

http://dx.doi.org/10.1016/j.ijscr.2016.10.058

**Table 1**
Management of six patients with gastric volvulus.

| Age | Gender | Cause | Endoscopic Reduction Successful | Method of Repair |
|---|---|---|---|---|
| 84 | M | CABG surgery | Yes | Endoscopic gastropexy |
| 73 | M | Hiatal hernia | Yes | Laparoscopic hernia repair and Nissen fundoplication |
| 85 | F | Morgagni hernia | No | Laparoscopy → small incision laparotomy, direct closure |
| 85 | F | Hiatal hernia | Yes | Laparoscopic hernia repair and Nissen fundoplication |
| 87 | F | Hiatal hernia | Yes | Laparoscopic gatropexy |
| 90 | F | Hiatal hernia | Yes | None, observation |

CABG: Coronary artery bypass graft.

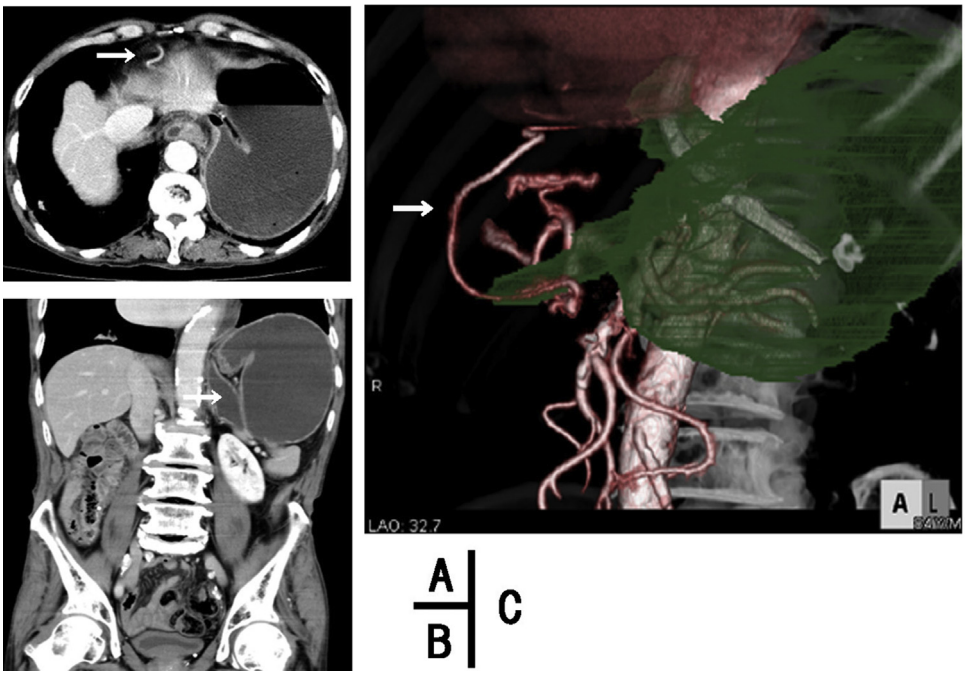


**Fig. 1.** Computed Tomography (CT) scan findings.
A. CT scan revealed a distended stomach and right gastroepiploic artery (arrow) anterior to the left lateral segment of the liver.
B. CT scan images in the coronal plane revealed twisting of the gastric body (arrow).
C. Three dimensional CT scan revealed mesenteroaxial gastric volvulus (in green) and the right gastroepiploic artery (arrow).

wall (Fig. 2D). The sutures used for gastropexy remained in place for three weeks. After the endoscopic gastropexy, gastric volvulus has not recurred for 38 months.

### 2.2. Patient 2

An 87-year-old woman was admitted with fever due to aspiration pneumonia. She was bedridden and had severe recurrent emesis after admission. CT scan of the abdomen revealed a large esophageal hiatal hernia, and most of the stomach was in the inferior mediastinum (Fig. 3A). Endoscopy revealed torsion of the stomach and endoscopic reduction was successful (Fig. 3B), but endoscopic gastropexy was impossible because the stomach was still in the mediastinum after reduction (Fig. 3C). The patient's activity level was poor, and laparoscopic gastropexy without hernia repair was felt to be suitable for this patient. Laparoscopic findings revealed a widened esophageal hiatus. The stomach did not adhere to the hernia sac in the mediastinum and was easily reduced into the abdomen. We performed gastropexy by intracorporeal suturing using non-absorbable sutures at nine points on the anterior gastric wall to prevent recurrence of torsion and herniation (Fig. 4). The postoperative course was uneventful and the patient was able to resume oral intake without vomiting. The gastric volvulus has not recurred after seven months of follow-up.

## 3. Discussion

We treated six elderly patients with gastric volvulus, which raised two important clinical issues. First, we recommend early endoscopy and decompression to identify the presence of ischemia in the gastric wall. Endoscopic decompression is effective in many patients, and reduction will be successful in some of them. Surgery is necessary in many patients to treat the underlying cause of volvulus. Second, endoscopic or laparoscopic gastropexy may be appropriate management for selected elderly patients with gastric volvulus.

Gastric volvulus is classified based on the axis of torsion, organoaxial type, mesentero-axial type, and a combined type [2,3]. The cause of volvulus is classified as primary or secondary. Primary gastric volvulus is due to the absence or laxity of the gastrocolic and gastrosplenic ligaments. Secondary volvulus is related to a splenic or diaphragmatic disorder often seen in children [2]. A patient with gastric volvulus after coronary bypass surgery has been previously reported [4], quite similar to patient 1 in this report. The clinical

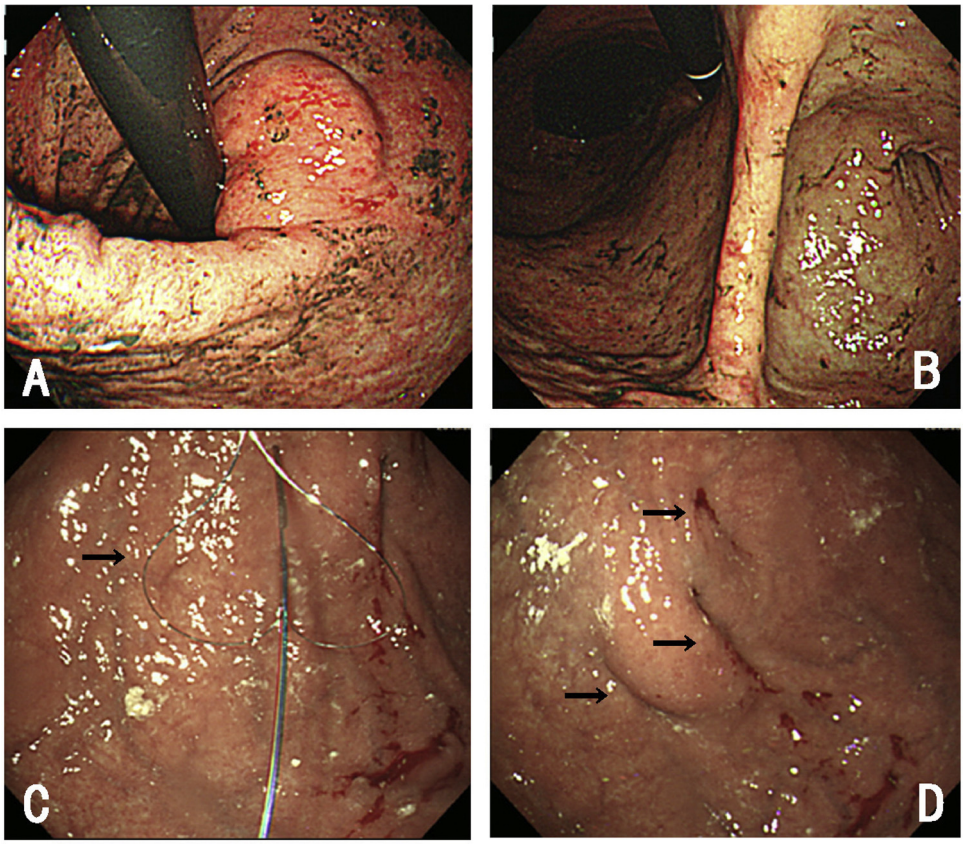


**Fig. 2.** Endoscopic findings and gastropexy.
A. Endoscopy revealed twisting of the stomach with congestion.
B. After endoscopic reduction, the axis of the stomach was normal.
C. The Funada-type gastropexy device; a thread was passed through the snare wire (arrow).
D. Gastropexy was placed at three points in the anterior gastric wall (arrows).

course of patients with gastric volvulus is classified as acute or chronic recurrent types [2]. All of the patients in this series have secondary, acute gastric volvulus. The exact incidence of gastric volvulus is unknown, and we speculate that many patients with the chronic type are never diagnosed.

Treatment of patients with gastric volvulus varies depending on the degree of injury to the gastric mucosa. CT scan is useful to demonstrate abnormal position and torsion of the stomach [5], but it is difficult to determine the degree of mucosal ischemia. Therefore, we recommend early endoscopy to evaluate ischemia in the gastric wall. Furthermore, endoscopic reduction of gastric volvulus is effective in many patients as previously reported [6], and was successful in five of the six patients in this series. The maneuver is performed by advancing the endoscope into the second portion of the duodenum by gently advancing through the narrowed and twisted gastric folds, then pulling back the endoscope while twisting to the right (similar to the right-turn-shortening technique in colonoscopy), which is known as the alpha-loop maneuver [6]. It should be performed under X-ray guidance to confirm the reduction. After successful reduction of the volvulus, symptoms usually resolve rapidly. However, if the gastric volvulus recurs frequently, surgical treatment should be considered.

Percutaneous endoscopic gastrostomy may be adequate for the management of patients who have difficulties with oral intake [7], because it is possible to combine fixation of the stomach while facilitating enteral nutrition. In contrast, gastrostomy is usually not necessary for patients who can receive adequate oral nutrition and have good activity levels, and endoscopic gastropexy alone should be adequate as described above for patient 1. We use a Funada-style gastropexy device during the process of percutaneous endoscopic gastrostomy [8].

A review of 135 Japanese patients with gastric volvulus showed that 86% of patients had secondary volvulus and 44% were related to an esophageal hiatal hernia [9]. Hiatal hernias are often seen in elderly patients with lordosis, and other comorbidities. Laparoscopic repair of large esophageal hiatal hernias has been reported [10,11]. Repair of these hernias has a high recurrence rate and an increased risk of complications. In patients with a shortened esophagus, additional fundoplication such as a Collis-Nissen procedure should be considered [11]. It is reported that reinforcement using mesh reduces the incidence of hernia recurrence, although preventing mesh-related complications is an important issue [12].

In some elderly patients, major abdominal surgical procedures may be poorly tolerated, even if performed laparoscopically. Indeed, we experienced a patient who suffered a fatal cerebral infarction which developed on postoperative day five after laparoscopic hernia repair. This is an example of why we recommend laparoscopic gastropexy [13–16] without hernia repair for elderly patients in poor overall health, as described above for patient 2. It is a less-invasive procedure which sufficiently fixes the stomach, and may be adequate treatment for patients who are not adequately treated by endoscopic gastropexy.

Non-operative management in patients with chronic gastric volvulus has been reported in the literature [17]. This may be a

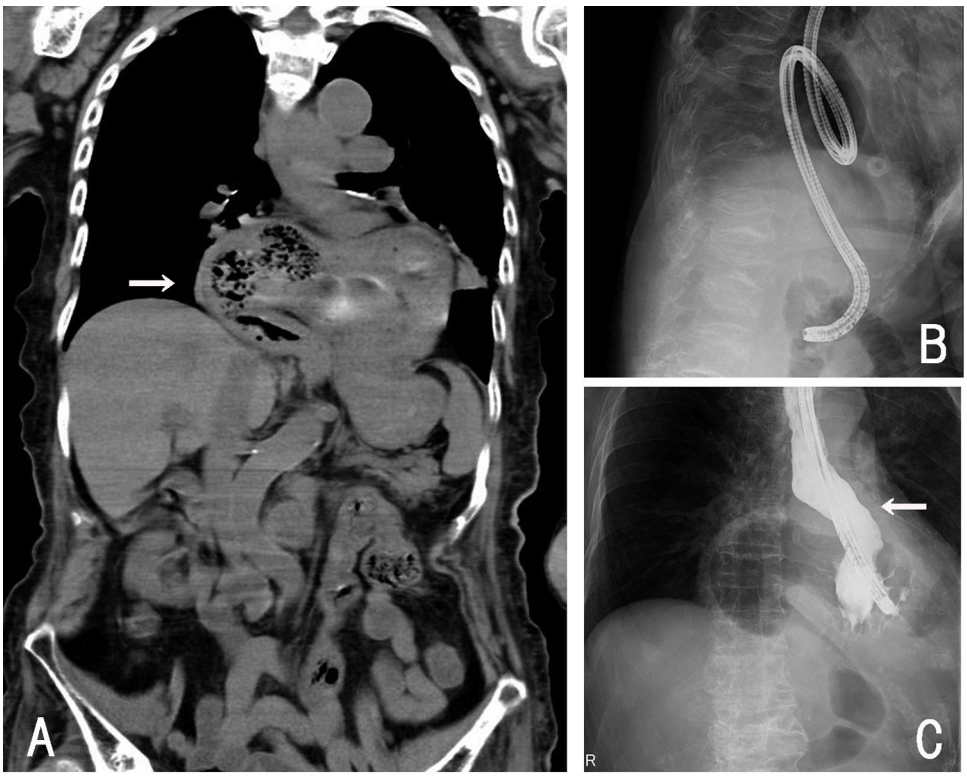


**Fig. 3.** Images of the gastric volvulus with hiatal hernia.
A. Computed tomography (CT) scan revealed an up-side down stomach in the posterior mediastinum (arrow).
B. Endoscopic reduction was performed under X-ray guidance.
C. The stomach is still in the mediastinum after reduction, and contrast agent easily refluxed into the esophagus (arrow).

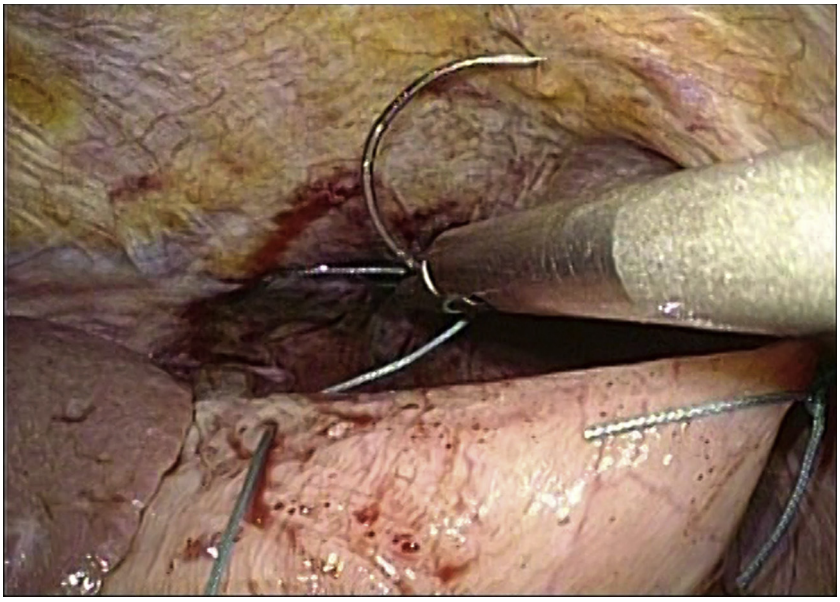

**Fig. 4.** Laparoscopic gastropexy. Laparoscopic gastropexy was performed by intracorporeal suturing.

reasonable alternative to surgical repair, because acute complications are infrequent. However, in that report, the 44 patients were not especially aged (median 71 years) and had a high recurrence rate (64%). In more aged patients such as those in our experience, the prevalence of hiatal hernia and other diaphragmatic disorders is considered to be higher, and fatal aspiration pneumonia easily occurs with recurrent vomiting because of low activity levels. Therefore, emergency endoscopy and decompression is important to prevent gastric ischemia and aspiration pneumonia, especially in elderly patients.

Collectively, we propose a novel treatment strategy for gastric volvulus in the elderly based on our series of patients and a review of the literature (Fig. 5). Many patients need surgery to fix the underlying cause, but endoscopic or laparoscopic gastropexy alone may be adequate in some elderly patients. A larger study will be

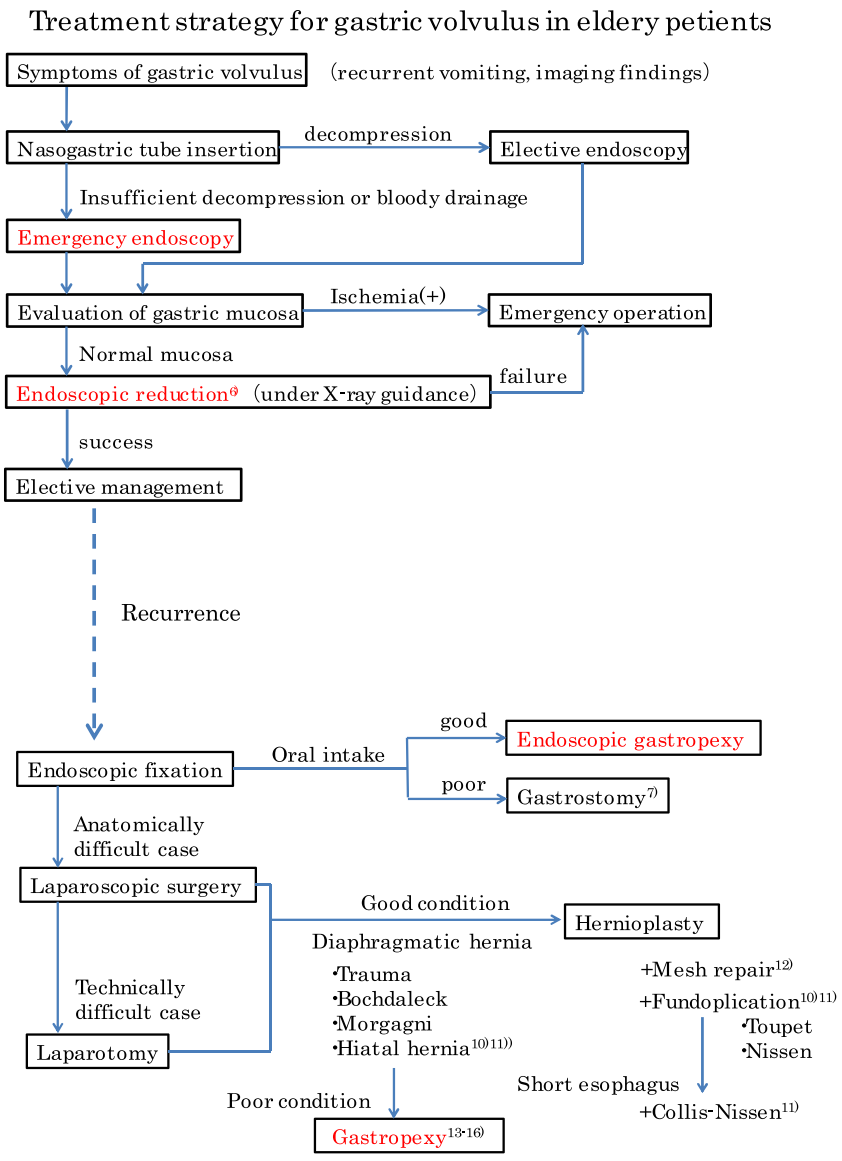


**Fig. 5.** Treatment strategy for patients with gastric volvulus.
The treatment strategy for patients with gastric volvulus is focused on endoscopic evaluation. Surgical interventions are in order of invasiveness based on a review of the literature.

needed to determine if this can be definitive therapy, and which patients it is best for.

## 4. Conclusion

Early endoscopy is necessary in patients with gastric volvulus. Endoscopic or laparoscopic gastropexy may be a less-invasive and viable alternative to more aggressive surgical procedure in some elderly patients with significant comorbidities.

## Informed consent

Written informed consent was obtained from the patients or relatives for publication of this case report and any accompanying images.

## Availability of data and materials

The dataset supporting the conclusions of this article is not included within any repository.

## Authors' contributions

TZ performed surgery, wrote the paper, made literature review, and drafted the manuscript. YH, CS, JO, and NS advised the management of gastric volvulus as expert surgeons. HT, TK, YM and YS treated the patients and assisted surgery. AL reviewed as a native speaker, and revised the manuscript.

## Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## Competing interests

The authors declare that they have no competing interests.

## Ethical approval

This paper is not a research study, so I assume we do not need the ethical approval.

## Guarantor

The manuscript has been read and approved by all of the authors and is not under consideration for publication elsewhere. Dr. Sata, who is the president of Jichi Medical University Hospital, Dr. Sekiguchi, who is the director of Nasu Minami Hospital, and Dr. Ohki who is the director of Yuki Hospital, are the Guarantors.

## Acknowledgement

All authors report no source of funding for conducting this manuscript.

## References

[1] F. Rashid, T. Thangarajah, D. Mulvey, M. Larvin, S.Y. Iftikhar, A review article on gastric volvulus: a challenge to diagnosis and management, Int. J. Surg. 8 (2010) 18–24.
[2] A. Darani, M. Mendoza-Sagaon, O. Reinberg, Gastric volvulus in children, J. Pediatr. Surg. 40 (2005) 855–858.
[3] B. Chau, S. Dufel, Gastric volvulus, Emerg. Med. J. 24 (2007) 446–447.
[4] L.A. Michel, M. Buche, L. Canniere, P. Chenu, Gastric volvulus after coronary bypass, Lancet 349 (1997) 251.
[5] M.H. Wu, Y.C. Chang, C.H. Wu, S.C. Kang, J.T. Kuan, Acute gastric volvulus: a rare but real surgical emergency, Am. J. Emerg. Med. 28 (2010) 118 (e5-e7).
[6] T.K. Tsang, R. Walker, D.J. Yu, Endoscopic reduction of gastric volvulus: the alpha-loop maneuver, Gastrointest. Endosc. 42 (1995) 244–248.
[7] J.S. Baudet, J.R. Ammengol-Miro, C. Medin, A.M. Accarino, J. Vilaceca, J.R. Malagelada, Percutaneous endoscopic gastrostomy as a treatment for chronic gastric volvulus, Endoscopy 29 (1997) 147–148.
[8] N. Okumura, N. Tsuji, N. Ozaki, N. Matsumoto, T. Takaba, M. Kawasaki, et al., Percutaneous endoscopic gastrostomy with Funada-style gastropexy greatly reduces the risk of peristomal infection, Gastroenterol. Rep. (Oxf.) 3 (2015) 69–74.
[9] S. Morita, R. Yasuoka, Y. Sonoyama, H. Fujiki, M. Mitsuo, Y. Kadotani, A case of esophageal hiatal hernia complicated by a gastric volvulus, J. Jpn. Surg. Assoc. 70 (2009) 3550–3555 (In Japanese).
[10] J.J. Andujar, P.K. Papasavas, T. Birdas, J. Robke, Y. Raftopoulos, D.J. Gagne, et al., Laparoscopic repair of large paraesophageal hernia is associated with a low incidence of recurrence and reoperation, Surg. Endosc. 18 (2006) 444.
[11] M. Morino, C. Giaccone, L. Pellgrino, Rebecchi Laparoscopic management of giant hiatal hernia: factors influencing long-term outcome, Surg. Endosc. 20 (2006) 1011–1016.
[12] R.J. Stadlhuber, A.E. Sherif, S.K. Mittal, R.J. Fitzgibbons Jr., L.M. Brunt, J.G. Hunter, et al., Mesh complications after prosthetic reinforcement of hiatal closure: a 28-case series, Surg. Endosc. 23 (2009) 1219–1226.
[13] C. Palanivelu, M. Rangarajan, A.R. Shetty, R. Senthilkumar, Laparoscopic suture gastropexy for gastric volvulus: a report of 14 cases, Surg. Endosc. 21 (2007) 863–866.
[14] U. Morelli, M. Bravetti, P. Ronca, R. Cirocchi, A. De Sol, A. Spizzirri, et al., Laparoscopic anterior gastropexy for chronic recurrent gastric volvulus: a case report, J. Med. Case Rep. 24 (2008) 244.
[15] W.T. Siu, H.T. Leong, M.K. Li, Laparoscopic gastropexy for chronic gastric volvulus, Surg. Endosc. 12 (1998) 1356–1357.
[16] A. Odaka, K. Shimomura, M. Fujioka, S. Inokuma, S. Takada, H. Yamada, et al., Laparoscopic gastropexy for acute gastric volvulus: a case report, J. Pediatr. Surg. 34 (1999) 477–478.
[17] Y.C. Hsu, C.L. Perng, C.K. Chen, J.J. Tsai, H.J. Lin, Conservative management of chronic gastric volvulus: 44 cases over 5 years, World J. Gastroenterol. 16 (2010) 4200–4205.