

Case Report

Laparoscopic Observation of Adhesive Rectal Fixation after Gant-Miwa-Thiersch Procedure for Rectal Prolapse: A Case Report

Sachio Yokoyama, Ryuma Tokunaga, Nana Maeda, Taishi Yamane and Yoshiaki Ikuta

Department of Gastroenterological Surgery, Kumamoto City Hospital, Kumamoto, Japan

Abstract

In our previous report, we have noted an increase of computed tomography (CT) attenuation values in perirectal fat tissue after Gant-Miwa-Thiersch (GMT) procedure for rectal prolapse. Based on these results, we hypothesized that the GMT procedure may have a rectal fixation effect due to inflammatory adhesions extending to the mesorectum. Herein, we report a case of laparoscopic observation of perirectal inflammation after GMT. A 79-year-old woman with a history of seizures, stroke, subarachnoid hemorrhage, and spondylosis underwent the GMT procedure under general anesthesia in the lithotomy position for rectal prolapse measuring 10 cm in length. But rectal prolapse recurred 3 weeks after surgery. Therefore, an additional Thiersch procedure was performed. However, rectal prolapse still recurred, and laparoscopic suture rectopexy was performed 17 weeks after initial surgery. During rectal mobilization, marked edema and rough membranous adhesions were observed in the retrorectal space. The average CT attenuation value obtained 13 weeks after initial surgery was found to be significantly elevated in the mesorectum compared with the subcutaneous fat, especially in the posterior side ($P < 0.05$). These findings suggest that the extension of inflammation to the rectal mesentery after the GMT procedure may have strengthened adhesions in the retrorectal space.

Keywords

rectal prolapse, Gant-Miwa-Thiersch procedure, rectopexy, mesorectum, retrorectal space

J Anus Rectum Colon 2023; 7(2): 135-138

Introduction

The Gant-Miwa-Thiersch (GMT) procedure, which involves rectal mucosal plication with anal encircling, is one of the transperineal procedures currently utilized for the treatment of rectal prolapse (RP). It is known to be minimally invasive, has a low rate of serious complications, and can be performed repeatedly even in patients with poor general health[1]. But GMT procedure has been reported to be associated with a high recurrence rate[2-4]. However, several recent studies have shown better long-term outcomes than previously reported[3-5]. Thus far, the mechanism of action of the GMT procedure is yet to be fully elucidated. Never-

theless, we have previously reported the possibility of perirectal adhesions after the GMT procedure using computed tomography (CT) imaging[5]. Herein, we report a case of laparoscopic observation of perirectal inflammation after the GMT procedure.

Case Report

A 79-year-old woman was referred from another hospital for full-thickness RP measuring 4 cm in length (Figure 1a). She had a habit of straining hard during defecation and had a history of seizures, stroke, subarachnoid hemorrhage, and spondylosis. Considering the patient's age, comorbidities,

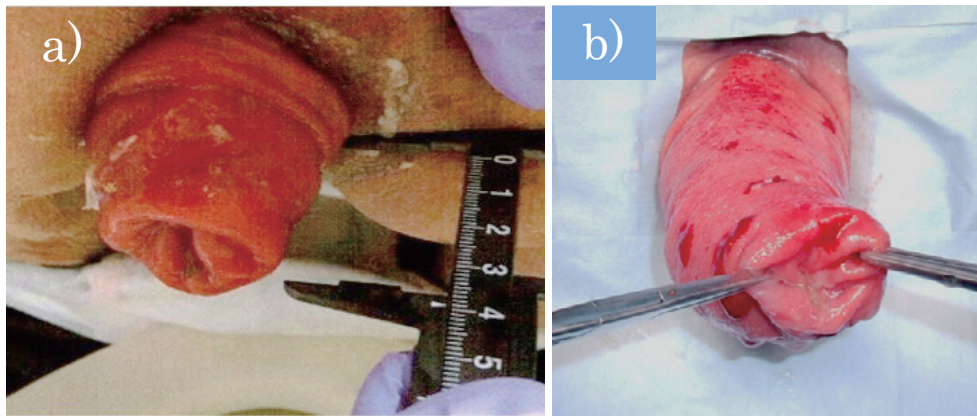


Figure 1. Appearance of the rectal prolapse. a) At the time of the first visit. b) During surgery.

and preferences, we decided to perform the GMT procedure. The surgery was performed under general anesthesia in the lithotomy position 13 weeks after the first visit due constraints brought about by the coronavirus disease 2019 (COVID-19) pandemic. Intraoperative evaluation revealed that the RP had worsened to >10 cm in length (Figure 1b). The GMT procedure was performed as previously reported[5], and CV-0 suture (W. L. Gore and Associates, Inc., Elkton, MD) was used as material for the Thiersch procedure. The patient did not develop serious postoperative complications, such as bleeding, perforation, or pelvic abscess. However, 3 weeks after surgery, RP recurred due to loosening of the Thiersch suture. Therefore, an additional CV-0 suture was placed under local anesthesia 5 weeks after the first surgery. Unfortunately, the ligature has also loosened 1 week after reinsertion of the CV-0 suture, and RP recurred. Thus, laparoscopy-assisted suture rectopexy was planned as a third surgery. Nevertheless, due to the outbreak of a new variant of COVID-19, surgery was performed 17 weeks after the initial GMT procedure.

Figure 2a-d show a laparoscopic view during rectal mobilization—with marked edema and rough and membranous adhesions noted in the retrorectal space—between the fascia propria of the rectum and the pre-hypogastric fascia, especially above the upper layer of the rectosacral fascia[6]. In contrast, no adhesions were noted on the serosal side of the rectum. The postoperative course was deemed favorable, and the patient is currently under follow-up. An abdominal-pelvic CT was performed 13 weeks after the initial GMT procedure to assess the perirectal fat tissue using the SYNAPSE VINCENT software (Fujifilm™ Co., Tokyo, Japan). The CT attenuation values around the rectum were analyzed by drawing an elliptical region of interest and compared with those recorded in the abdominal subcutaneous fat (Figure 3a, 3b). The CT attenuation values were found to be higher in the mesorectum versus the subcutaneous fat, especially in the posterior area of the mesorectum ($P < 0.05$) (Figure 4a, 4b). Such an increase in CT attenuation value

was not observed except around the rectum where the GMT procedure was performed.

Discussion

In this study, we reported a first case of laparoscopic observation of perirectal inflammatory adhesions after the GMT procedure. In the GMT procedure, it has been known that the Thiersch procedure tightens the relaxed anus and maintains the rectum in the pelvis. Nevertheless, the effect of the Gant-Miwa procedure, in which multiple tags are created to shorten the redundant rectum, has not been fully elucidated. Iida et al. reported that, if many tags are created by the Gant-Miwa procedure (especially near the anorectal junction), the prolapsed rectum would then spontaneously retract into the anus regardless of the length of the RP[4]. They hypothesized that the prolapsed rectal mucosae, as well as submucosal arteries, veins, lymphatic vessels, and nerves, are ligated, thereby facilitating the shortening of the RP[4]. We have previously reported that hyperdense fat in the mesorectum was observed up to 20 weeks after the GMT procedure on CT imaging. It has been suggested that this effect may be related to the fixation between the mesorectum and sacrum[5]. In this case, we had the opportunity to re-treat the patient post-GMT procedure laparoscopically, which allowed us to visually confirm the presence of perirectal adhesion. The reason for the occurrence of posterior dominant inflammation around the rectum following the Gant-Miwa procedure remains to be unknown. In general, the rectal wall is thin and thickens after prolapse. Therefore, even if multiple tags are formed on the mucosal side of the rectum, mechanical changes can also occur on the serosal side. We speculate that inflammatory adhesions are likely to occur mainly on the mesorectum side, where there are many vessels and nerves.

On the other hand, because the RP relapsed immediately after the loosening of the Thiersch material, the perirectal inflammatory adhesions do not appear to be sufficiently

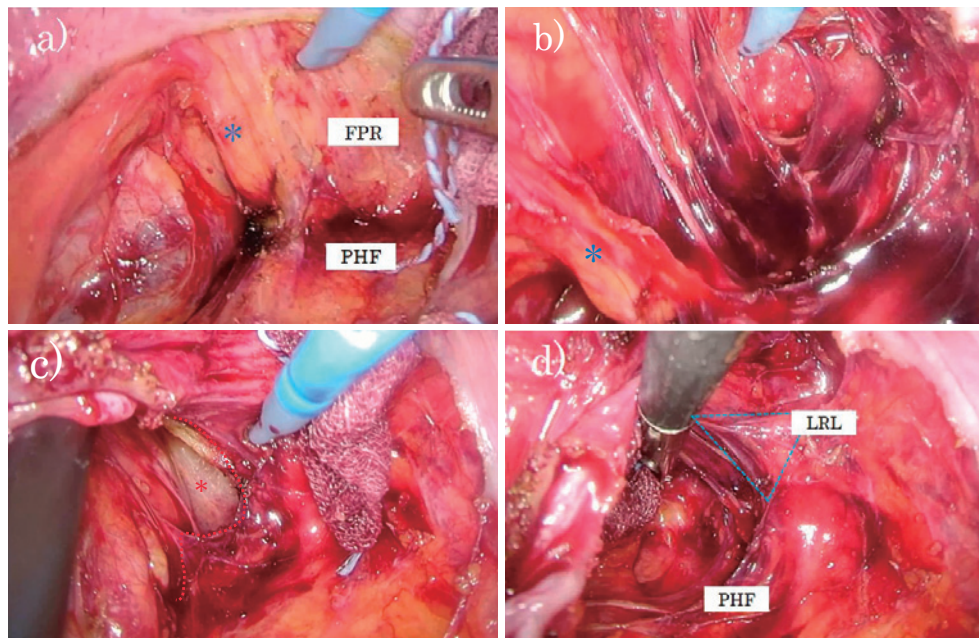


Figure 2. Rectal mobilization (laparoscopic view). a) Dissection between the fascia propria of the rectum (FPR) and the pre-hypogastric fascia (PHF) at the rectosigmoid level; the right hypogastric nerve (blue asterisk) crossed the presacral areolar tissue and adhered to the FPR. b) Sticky membranous adhesions were observed between FPR and PHF. c) Moist snowy appearance of the loose connective tissue (red asterisk) was observed below the lower layer of the rectosacral fascia (RSF) (red dashes). d) There was a serum-like exudate suggestive of serous inflammation in the right margin of the RSF. The blue triangle shows the fascial-fusion zone (lateral rectal ligament [LRL]).

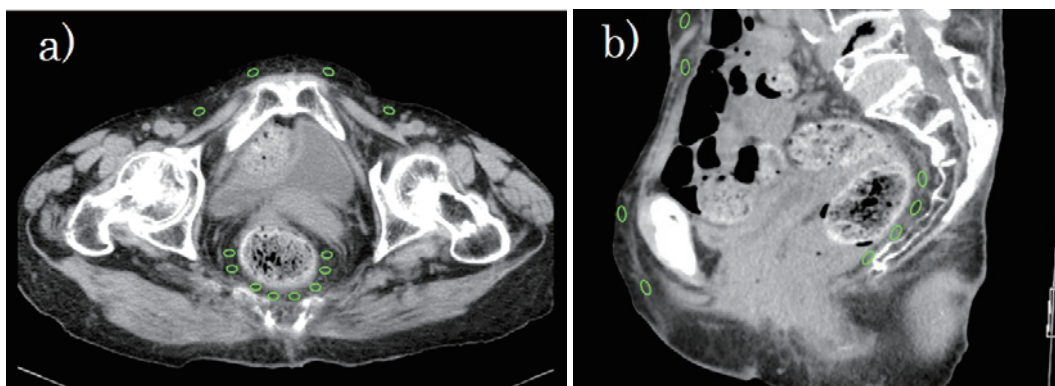


Figure 3. Computed tomography (CT) attenuation values were obtained by drawing an elliptical region of interest on a CT scan at four points in the mesorectum and the abdominal subcutaneous fat. a) S4 axial image. b) Midsagittal image.

strong for the correction of severe RP.

As per the guidelines stipulated by the Japanese Society of Coloproctology[1], the GMT procedure is recommended for RP measuring ≤ 5 cm in length. Thus, the GMT procedure was not indicated in this patient. Abe et al. reported a transperineal procedure similar to the GMT procedure, which combined injection sclerotherapy with anal encircling. They reported that mild RP can be treated with sclerotherapy alone, as it allows the shortening and fixation of the

rectum[7,8]. Similarly, the Thiersch procedure may not be deemed necessary when performing the GMT procedure in patients with mild RP who do not have a habit of straining hard during defecation. Conversely, for severe RP, transabdominal rectopexy is the first option[9], while the GMT procedure appears to be an alternative for elderly and frail patients.

This case report has a few limitations. First, we confirmed the presence of perirectal adhesions macroscopically; how-

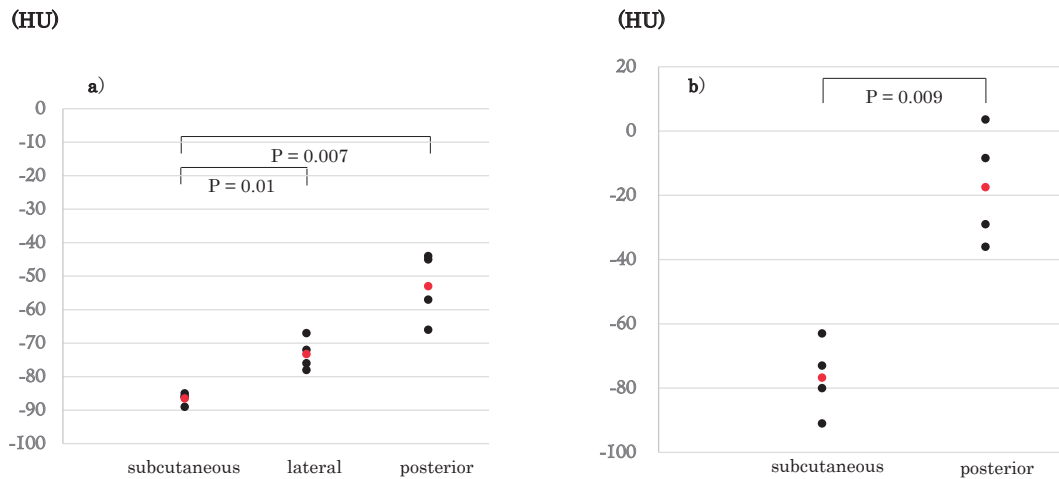


Figure 4. Distribution of computed tomography (CT) attenuation values. a) Axial view at the level of the lower margin of the fourth sacral vertebrae. b) At the midsagittal level. The red circles indicate the average CT attenuation values. HU, Hounsfield units

ever, we did not perform histological examination. Secondly, it should be noted that there was a long time gap between the recurrence of RP and laparoscopic surgery due to the COVID-19 pandemic. Hence, the inflammatory adhesion may have progressed during the interval because of the RP rather than the effect of the GMT procedure. However, in our previous study, perirectal fat density on CT was noted to be lower before versus after the GMT procedure even in long-term RP cases. Therefore, we believe that perirectal adhesion could be mainly attributed to the effect of the GMT procedure.

In conclusion, we can visually confirm that the GMT procedure may induce inflammatory adhesions around the rectum. However, the contribution of this adhesion to RP repair is yet to be determined. Therefore, in the future, we wish to verify the relationship between the CT attenuation values and treatment outcomes of the GMT procedure and to further investigate whether the Gant-Miwa procedure alone can be used to repair mild RP.

Conflicts of Interest

There are no conflicts of interest.

Author Contributions

SY participated in the concept/design and in drafting and revising the article. RT, NM, TY, and YI participated in the treatment of the patient. All authors read and approved the final manuscript.

Approval by Institutional Review Board (IRB)

Not applicable.

Informed Consent

Written informed consent was obtained from the patient

and her family.

References

1. Japanese Society of Coloproctology. Clinical guidelines for anal disease (hemorrhoids, anal fistula, anal fissure), rectal prolapse. 2nd ed. Tokyo: Nankodo Shuppan; 2020.
2. Iwaware J, Sumikoshi Y, Ono R, et al. [Etiology and treatment of rectal prolapse]. *J Jpn Soc Coloproctol.* 1989 Sep; 42(6): 981-6. Japanese.
3. Yamana T, Iwaware J. Mucosal plication (Gant-Miwa procedure) with anal encircling for rectal prolapse—a review of the Japanese experience. *Dis Colon Rectum.* 2003 Oct; 46(10 Suppl): S94-9.
4. Iida Y, Honda K, Saitou H, et al. Modified Gant-Miwa-Thiersch procedure (mucosal plication with anal encircling) for rectal prolapse. *Colorectal Dis.* 2019 May; 21(5): 588-94.
5. Yokoyama S, Ikuta Y, Tsukamoto M, et al. Effect of the Gant-Miwa-Thiersch procedure for rectal prolapse on the mesorectum. *J Anus Rectum Colon.* 2022 Jul; 6(3): 190-4
6. Ghareeb WM, Wang X, Chi P, et al. Anatomy of the perirectal fascia at the level of rectosacral fascia revisited. *Gastroenterol Rep (Oxf).* 2022 Feb; 10: 1-8.
7. Abe T, Hachiro Y, Kunimoto M. Combined aluminum potassium sulfate and tannic acid sclerosing therapy and anal encirclement using an elastic artificial ligament for rectal prolapse. *Dis Colon Rectum.* 2014 May; 57(5): 653-7.
8. Hachiro Y, Kunimoto M, Abe T, et al. Aluminum potassium sulfate and tannic acid injection in the treatment of total rectal prolapse: early outcomes. *Dis Colon Rectum.* 2007 Sept; 50(11): 1996-2000.
9. Tsunoda A. Surgical treatment of rectal prolapse in the laparoscopic era; a review of the literature. *J Anus Rectum Colon.* 2020 Jul; 4(3): 89-99.

Journal of the Anus, Rectum and Colon is an Open Access journal distributed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. To view the details of this license, please visit (<https://creativecommons.org/licenses/by-nc-nd/4.0/>).