





## Case Report

# Trocar site hernia resulting in intestinal necrosis 48 hours after robot-assisted radical prostatectomy

Shoichiro Iwatsuki,  Shuzo Hamamoto,  Nobuhiko Shimizu, Taku Naiki,  Atsushi Okada,  Noriyasu Kawai, Keiichi Tozawa and Takahiro Yasui

Department of Nephro-urology, Nagoya City University Graduate School of Medical Sciences, Nagoya, Aichi, Japan

### Abbreviations & Acronyms

BMI = body mass index  
CT = computed tomography  
POD = postoperative day  
PSA = prostate-specific antigen  
RARP = robot-assisted radical prostatectomy  
TSH = trocar site hernia

**Correspondence:** Shuzo Hamamoto M.D., Ph.D., Department of Nephro-urology, Nagoya City University Graduate School of Medical Sciences, 1 Kawasumi, Mizuho-cho, Mizuho-ku, Nagoya, Aichi 467-8601, Japan. Email: hamamo10@med.nagoya-cu.ac.jp

### How to cite this article:

Iwatsuki S, Hamamoto S, Shimizu N *et al.* Trocar site hernia resulting in intestinal necrosis 48 hours after robot-assisted radical prostatectomy. *IJU Case Rep.* 2021; 4: 180–183.

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

Received 26 November 2020; accepted 24 February 2021.  
Online publication 16 March 2021

**Introduction:** Trocar site hernia is a potentially serious sequela of laparoscopic procedures that may lead to bowel incarceration and strangulation. We report a case of trocar site hernia secondary to robot-assisted radical prostatectomy.

**Case presentation:** A 71-year-old Japanese man underwent robot-assisted radical prostatectomy without any intraoperative events; however, a brief dislodgement of a 12-mm AIRSEAL<sup>®</sup> trocar occurred. Forty-eight hours after the procedure, the patient exhibited coffee ground vomitus. Computed tomography revealed an intestinal prolapse at the 12-mm AIRSEAL<sup>®</sup> trocar site. He was diagnosed with a strangulated bowel due to trocar site hernia. Following an emergency exploration, 25 cm of gangrenous intestine was resected, and a functional end-to-end anastomosis was performed.

**Conclusion:** In this case, brief dislodgement of the AIRSEAL<sup>®</sup> trocar may have caused severe subcutaneous emphysema and intestinal sucking. In such situations, certain closure of both, the peritoneum and the fascia, is necessary.

**Key words:** intestinal necrosis, prostate cancer, robot-assisted radical prostatectomy, surgical complication, trocar site hernia.

## Keynote message

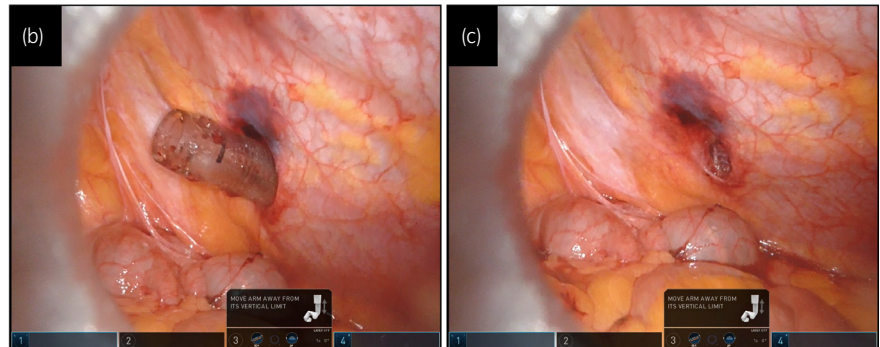
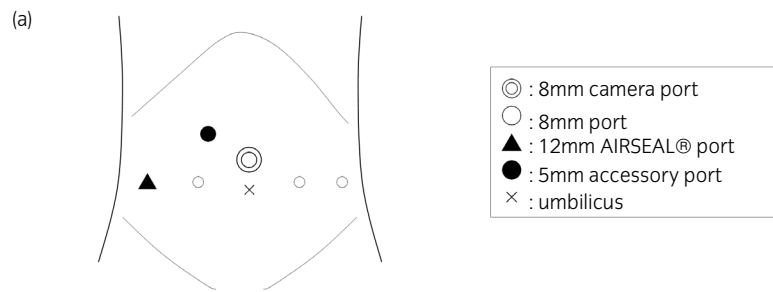
We report a case of TSH resulting in intestinal necrosis after RARP. Closure of the fascia and the peritoneum at the 12-mm trocar site should be performed to avoid such situations.

## Introduction

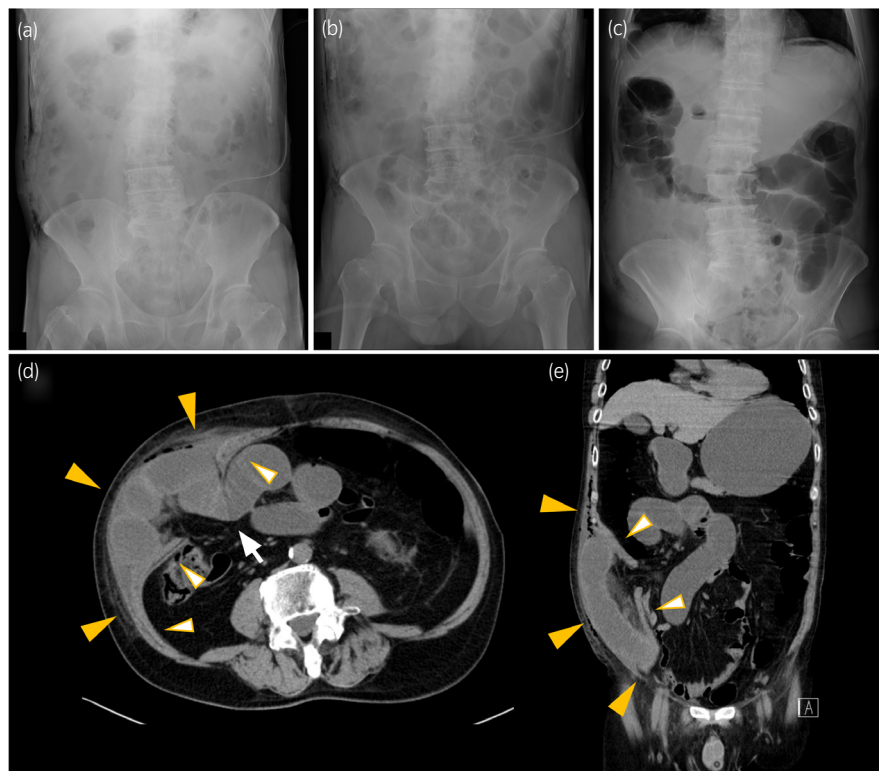
In the last decade, laparoscopic RARP has become a standard surgical procedure for patients with localized prostate cancer. We initiated RARP at our institute in May 2011 and have performed more than 800 procedures to date. Furthermore, in January 2018, we started using AIRSEAL<sup>®</sup> (CONMED, Utica, NY, USA) for creating pneumoperitoneum and allowing constant smoke evacuation. Herein, we report the case of a 71-year-old man who presented with a strangulated ileus at a 12-mm AIRSEAL<sup>®</sup> trocar site and intestinal necrosis due to TSH, 48 h after undergoing RARP.

## Case presentation

A 71-year-old Japanese man with a BMI of 22.8 kg/m<sup>2</sup> underwent RARP for prostate cancer. His initial PSA level, Gleason score, and cancer staging were 9.4 ng/mL, 4 + 4, and cT2bN0M0, respectively. The patient had a history of cerebral infarction and bipolar disorder. RARP was performed using the DaVinci Xi<sup>®</sup> system (Intuitive Surgical, Sunnyvale, CA, USA) with port placement as shown in Figure 1a. Prostate resection was performed using transperitoneal antegrade and intraperitoneal posterior approaches. The trocars were removed under laparoscopic guidance. No abnormal appearance of the port site or sucking of the intestine was observed (Fig. 1b,c). The fascia of the external oblique abdominal muscle at this site was closed with a single knotted suture using 2-0 Vicryl<sup>®</sup> (Ethicon, Somerville, NJ, USA). The procedure was completed without any intraoperative complications; the total surgery and console duration were 151 and 118 min, respectively.



**Fig. 1** (a) Port placement during RARP. (b,c) Laparoscopic appearance of the 12-mm AIRSEAL® trocar site just before (b) and after (c) removal. No sucking of the intestine or a remarkably abnormal appearance was seen.



**Fig. 2** Abdominal X-ray and CT images. (a) Just after RARP. (b) One day and (c) 2 days after RARP. (d,e) CT image reveals prolapse of the intestine (arrow) into the space between the internal (open arrowhead) and external (closed arrowhead) oblique abdominal muscles.

Immediately after the surgery, subcutaneous emphysema was observed on X-ray (Fig. 2a), which improved on POD 1 (Fig. 2b). The patient had no significant complications on POD 1. On the morning of POD 2, the pelvic drain was removed; however, he exhibited coffee ground vomiting in the afternoon, twice in quick succession. His abdomen was soft but tympanic; no metallic sound was audible. Abdominal X-ray revealed a dilated large intestine but no fluid level (Fig. 2a,b). CT revealed an intestinal prolapse into a space

between the internal and external oblique abdominal muscles at the 12-mm AIRSEAL® trocar site (Fig. 2d). Laboratory data from the investigations are summarized in Table 1. Diagnosis indicated a strangulated ileus due to TSH, and an emergency surgery was performed.

The emergency surgery was initiated using a laparoscope. A 12-mm camera port and two 5-mm assistant ports were inserted. Observation of the abdominal cavity confirmed a prolapse of the small intestine at the 12-mm AIRSEAL®

**Table 1** Perioperative laboratory data

	Preoperation	Postoperation		
		Day 0	Day 1	Day 2
White blood cell (/mL)	6400	12 000	10 700	14 800
Red blood cell ( $\times 10^4$ /mL)	421	415	392	408
Hemoglobin (g/dL)	13.6	13.2	12.7	13.3
Platelet ( $\times 10^4$ /mL)	299	298	273	278
Na <sup>+</sup> (mmol/L)	139	140	140	136
K <sup>+</sup> (mmol/L)	4.1	3.7	4.1	4.0
Cl <sup>-</sup> (mmol/L)	105	105	110	99
Creatinine (mg/dL)	0.95	1.10	0.92	1.32
Blood urea nitrogen (mg/dL)	17.6	13.7	12.8	Not assessed
C-reactive protein (mg/dL)	0.07	Not assessed	10.28	11.65

trocar site (Fig. 3a). The prolapsed intestine was carefully pulled out using Croce-Olmi forceps and it was found to be gangrenous (Fig. 3b). After restoring the prolapsed intestine into a normal position, the trocar site was closed using 0 PDS<sup>®</sup> suture (Ethicon) under laparoscopic guidance (Fig. 3c); a 4-cm incision was made, and the gangrenous intestine, which extended up to 25 cm, was explored and resected (Fig. 3d). Finally, functional end-to-end anastomosis was performed using a surgical stapler, and the procedure was completed. No drain was placed.

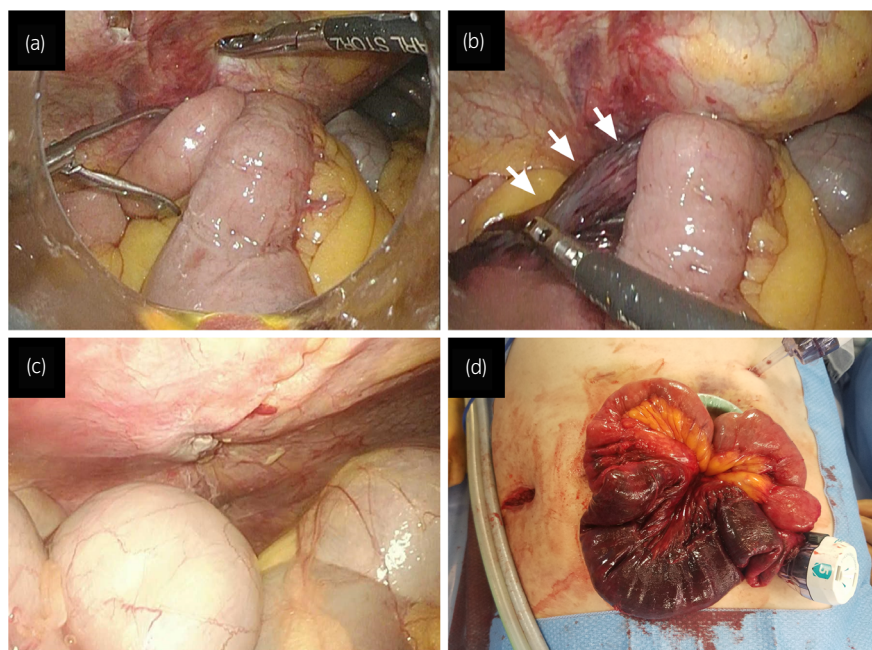
Three days after TSH repair (5 days after RARP), the patient started oral intake. The urethral catheter was removed 10 days after RARP (8 days after TSH repair), and he was discharged 15 days after TSH repair (17 days after RARP). Pathological examination of the prostate revealed adenocarcinoma, with pT2a, Gleason score 3 + 4, EPE0, RM0, v0,

ly0, pn1, sv0. Six months after RARP, his PSA level was below the measurable limit, and he had no abdominal symptoms.

## Discussion and literature review

The estimated prevalence of TSH is 0.5%.<sup>1</sup> TSH occurs regardless of the trocar size; TSH cases with 12-,<sup>2</sup> 8-,<sup>2-4</sup> and 5-mm<sup>5</sup> have been reported. Thus, although rare, TSH should be a concern in every case of laparoscopic surgery. One case of TSH has been reported with a 12-mm AIRSEAL<sup>®</sup> port;<sup>2</sup> fortunately, contrary to the present case, intestinal necrosis and resection could be avoided in this case. The occurrence of TSH is related to technical factors, including the use of pyramidal trocars or a 12-mm port, surgery duration, and patient-related factors including older age and higher BMI.<sup>1</sup> In our case, however, the duration of surgery and the patient's age were unremarkable, and the patient's BMI was almost within the normal range. One possible reason for TSH in our case could be the spontaneous dislodgement of the 12-mm AIRSEAL<sup>®</sup> trocar that occurred during the RARP procedure for 2–3 min. The pneumoperitoneum might have extended into the space between the internal and external oblique abdominal muscles, later leading to intestinal herniation and incarceration in this space. Closing the fascia lateral to the port site is controversial.<sup>6</sup> However, we strongly emphasize that an intraoperative, spontaneous dislodgement of the trocar, connected with the pneumoperitoneum tube, should be immediately attended to. In such a situation, closure of both the fascia and the peritoneum should be performed using reliable techniques<sup>7</sup> or port-site closure devices. In this case, facial and peritoneal closure might avoid TSH and intestinal necrosis.

Intestinal necrosis begins almost 6 h after constriction of blood flow; in this case, a tympanic abdomen and coffee



**Fig. 3** Laparoscopic observation during hernia repair. (a) Intestinal prolapse into the abdominal wall at the 12-mm port site is observed. (b) Upon pulling out the prolapsed intestine, necrosis (arrow) is seen. (c) The 12-mm trocar site was closed using the 0 PDS<sup>®</sup> suture under laparoscopic observation. (d) The necrotized portion of the intestine was 25 cm in length and was resected.

ground vomiting were the initial signs of TSH. We speculated that bloody vomit was suggestive of intestinal necrosis. Although TSH is a rare complication, if resection of the necrotic intestine is to be avoided, CT should be performed when a patient presents with abnormal abdominal signs after laparoscopic surgery.

## Conclusion

We report a case of TSH resulting in intestinal necrosis 48 h after RARP, which may have been caused by a brief dislodgement of the 12-mm AIRSEAL<sup>®</sup> trocar. To avoid intestinal necrosis, closure of both the fascia and peritoneum should be performed at the 12-mm trocar site.

## Conflict of interest

The authors declare no conflict of interest.

## References

- 1 Swank HA, Mulder IM, la Chapelle CF, Reitsma JB, Lange JF, Bemelman WA. Systematic review of trocar-site hernia. *Br. J. Surg.* 2012; **99**: 315–23.
- 2 Mancini M, Righetto M, Dal Moro F, Zattoni F. Incidence and treatment of incarcerated trocar-site hernias after robotic surgery: presentation of three cases. *J. Endourol. Case Rep.* 2020; **6**: 271–4.
- 3 Uketa S, Shimizu Y, Ogawa K, Utsunomiya N, Kanamaru S. Port-site incisional hernia from an 8-mm robotic trocar following robot-assisted radical cystectomy: report of a rare case. *IJU Case Rep.* 2020; **3**: 97–9.
- 4 Micelli E, Russo E, Mannella P *et al.* Severe bowel incarceration in an eight-millimeter left-lateral trocar site after robot-assisted laparoscopic colposacropexy: A case report. *Case Rep. Womens Health* 2019; **24**: e00151.
- 5 Huang M, Musa F, Castillo C, Holcomb K. Postoperative bowel herniation in a 5-mm nonbladed trocar site. *JSLs.* 2010; **14**: 289–91.
- 6 Kocher NJ, Ilinsky D, Raman JD. Incarcerated right lateral trocar-site hernia as a rare complication of robot-assisted laparoscopic prostatectomy. *J. Endourol. Case Rep.* 2017; **3**: 155–7.
- 7 Mirmilstein G, Noel J, Gbolahan O, Vasdev N, Lane T, Adshead J. The Lister AirSeal(R) port closure technique – initial patient outcomes. *Ann. R. Coll. Surg. Engl.* 2019; **101**: 606–8.