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SINGLE-PORT LAPAROSCOPIC SURGERY FOR ADHESIVE SMALL BOWEL OBSTRUCTION: A RETROSPECTIVE SINGLE-ARM MULTICENTER STUDY

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Abstract

Relevance. Adhesive small bowel obstruction is a common surgical emergency associated with substantial morbidity and frequently requires operative treatment. Although multi-port laparoscopy is widely accepted, evidence regarding the safety and feasibility of single-port laparoscopic surgery remains limited.

Objective: To evaluate the feasibility, safety, and perioperative outcomes of single-port laparoscopic surgery in the management of adhesive small bowel obstruction.

Materials and Methods. This was a retrospective, multicenter, single-arm observational study conducted from April 2018 to October 2025 and included 91 patients with adhesive small bowel obstruction. All patients were operated on by one surgeon laparoscopically using the single-port technique (single-port laparoscopic surgery). The effectiveness of single-port laparoscopic surgery was assessed by analyzing operative time, intraoperative and postoperative complications, length of hospital stay, incision length, and intraoperative blood loss.

Results. In this selected cohort, all 91 patients underwent SPLS without conversion to multi-port laparoscopy or open surgery. Postoperative complications occurred in 5 patients, corresponding to an incidence of 5.5 % (95 % CI: 1.8–12.4). Favorable outcomes were likely associated with careful patient selection and surgeon expertise, despite the technical challenges of the single-port approach. These findings suggest that SPLS may be a feasible minimally invasive approach in selected ASBO patients when performed by an experienced surgeon.

Conclusions. The findings suggest that SPLS is technically feasible and potentially safe in carefully selected patients with ASBO when performed by an experienced surgeon. However, prospective comparative studies are required to confirm its advantages over conventional laparoscopic or open approaches.

Keywords: *adhesive small bowel obstruction, single-port, laparoscopic surgery, adhesion formation.*

Introduction

Adhesive small bowel obstruction (hereinafter – ASBO) is a serious and potentially life-threatening condition that frequently requires surgical intervention. Postoperative adhesions account for approximately 60-75 % of all cases of small bowel obstruction [1]. The diagnosis of adhesive small bowel obstruction includes taking medical history, physical examination, and visualization of the abdominal cavity using ultrasound examination; computed tomography is also used for visualization. The clinical symptoms and complaints of patients with ASBO include intermittent (colicky) abdominal pain, abdominal distension, nausea, and vomiting, often accompanied by constipation [2].

The most common cause of adhesion formation in the abdominal cavity is mechanical injury of the peritoneum, for example, adhesion formation after abdominal surgery, inflammatory processes of the intestine and the abdominal cavity [3]. ASBO is

a common problem in general surgical practice and accounts for about 20 % of all emergency conditions [1]. Despite the development of preventive medicine, the development of new anti-adhesive agents, and the emergence of minimally invasive surgical methods, adhesive small bowel obstruction and its treatment continue to be a relevant topic in general surgery.

It is also important to understand the pathophysiology of ASBO. ASBO develops as a result of damage to the peritoneum, as noted above, and this triggers an inflammatory cascade with the release of cytokines, in particular interleukins IL-1, IL-6, and TNF-α. These inflammatory mediators increase vascular permeability and promote the release of fibrin-rich exudate onto the damaged peritoneal surface. A fibrin matrix is formed, which then serves as a framework for fibroblast proliferation and collagen deposition. As a result, persistent fibrous adhesions are formed [2]. These adhesions cause mechanical obstruction of the small intestine due to kinking, compression, or fixation of intestinal loops, which leads to proximal dilatation, increased intraluminal pressure, venous congestion, and edema of the intestinal wall. With prolonged obstruction, arterial blood flow is also impaired, and ischemia, mucosal damage, and, in severe cases, bowel necrosis and perforation develop [4].

There are several methods for the treatment of ASBO, and the two main categories are conservative treatment and surgical intervention. In a study written by Chang-Jun et al. (2025), different strategies for the treatment of ASBO are described. The conservative treatment group includes nutritional support, bowel decompression, and pharmacotherapy. As surgical interventions, such methods as laparotomy for adhesiolysis, laparoscopic surgery, and adhesion prevention by the use of barrier agents, such as hyaluronic acid and carboxymethylcellulose, were described [5]. In addition, there are also poorly studied but innovative methods for the treatment of adhesive bowel disease, such as advanced directions of immunomodulatory and molecular interventions (CRISPR, therapeutic delivery of miR-29b nanoparticles).

The management strategy for patients with ASBO varies depending on the severity of obstruction and the patient's clinical condition. Conservative treatment, such as nasogastric decompression and intravenous fluid therapy, is successful in approximately 70–80% of appropriately selected patients [1,2]. Recent evidence suggests that the success of conservative management is strongly influenced by patient selection and clinical characteristics [6]. It is important to choose the correct treatment method, since if conservative treatment is sufficient, surgical intervention may worsen adhesive disease. Surgical intervention becomes necessary when conservative treatment fails and when signs of complications appear [7].

As described earlier, ASBO can be treated by either laparotomy or laparoscopic adhesiolysis. In appropriately selected patients, multi-port laparoscopic surgery (hereinafter – MPLS) represents an established minimally invasive alternative to open surgery and may provide reduced surgical trauma, faster postoperative recovery, and shorter hospital stay [7; 8].

However, single-port laparoscopic surgery (hereinafter – SPLS), or single-port laparoscopy, has gained popularity in recent years as a minimally invasive approach in a number of operations, including cholecystectomy, colectomy, and others [9-13].

Compared with multi-port laparoscopic surgery, the single-port method is associated with less pronounced postoperative pain, faster recovery, and better cosmetic effect [9-15]. This method is especially popular in East Asian countries and is actively being introduced as a surgical treatment for various diseases of the abdominal cavity and pelvis.

Despite the results reported by colleagues from East Asia, single-port laparoscopy has not yet been included in the list of standard treatment methods for ASBO. Reports on the use of single-port surgery remain limited, but a hypothesis is being put forward that SPLS may become a safe and effective method and may even be used as a standard approach in patients with indications for surgery.

Objective: To evaluate the feasibility, safety, and perioperative outcomes of single-port laparoscopic surgery (SPLS) in the management of adhesive small bowel obstruction.

Materials and methods

This was a retrospective, multicenter, single-arm observational study, which included 91 patients (35 men and 56 women). Due to the absence of a comparator group, the study was designed to describe perioperative and follow-up outcomes after SPLS rather than to assess comparative effectiveness. We retrospectively analyzed all 91 patients

that were operated from April 2018 to October 2025 with SPLS technique using the common hospital database. A commercially available Octo-Port® single-port access device (South Korea) was used in all procedures. Patients were not randomly allocated to SPLS; eligibility for the procedure was determined according to the predefined inclusion and exclusion criteria. All consecutive patients who underwent SPLS during the study period and met the eligibility criteria were included in the study. The mean postoperative follow-up was 14 months.

All patients were operated on by one surgeon. Surgical interventions were performed in two hospitals: «Multidisciplinary regional hospital» Health Department of Kyzylorda region and City Hospital #3 Astana. All patients were informed in the preoperative period about the possible need for conversion to other methods. The protocol of this study was approved on 1 March 2019 by the Ethics Committee of hospitals where study was held and in accordance with the Helsinki Declaration. Moreover, the study was approved by local bioethics committee of Astana Medical University, the number of protocol is #5 (Decision of the LBC of NJSC AMU No. 5)

Instrumental diagnostic methods such as computed tomography, ultrasonography, and radiography were used for the diagnosis of ASBO.

Presence of signs of bowel perforation or necrosis at initial examination, suspicion of malignant bowel obstruction based on medical history, clinical presentation, or imaging data or patient refusal of surgical intervention were criteria for exclusion. To be included in the study, patients had to be over 18 years old, have clinically and radiologically confirmed diagnosis of adhesive bowel obstruction, should not have signs of peritonitis, and be hemodynamically stable at the stage of preoperative preparation

All patients with a clinical picture of adhesive small bowel obstruction underwent clinical evaluation, including medical history taking, physical examination, and laboratory tests. All patients received standard preoperative preparation. Each patient underwent nasogastric decompression, intravenous infusion therapy, and monitoring of vital signs prior to surgery.

Surgical procedure. The patient is placed in the supine position with the possibility of changing the position of the operating table. The operation is performed under general anesthesia. Access is achieved through a 3-4 cm umbilical incision. After layer-by-layer dissection and fasciotomy, a single-port device is installed, and CO_2 insufflation is performed at a pressure of 10-12 mmHg. The first stage consists of diagnostic inspection of the abdominal cavity. Manipulation of markedly distended bowel loops is avoided. Inspection begins with distal, collapsed segments of the small intestine, with gradual advancement proximally until the transition zone is identified. After identification of the cause of obstruction, adhesiolysis is performed. Preference is given to sharp dissection using cold scissors. Adhesions are divided perpendicular to the bowel wall with minimal traction and constant visual control of the serosa. The use of electrocautery near the bowel wall is not recommended due to the risk of thermal injury. In case of serosal injury, immediate suturing with an atraumatic suture is performed. After release of the bowel, its viability is assessed based on color, peristalsis, and mesenteric pulsation. The operation is completed by removal of the single-port device, mandatory closure of the fascia, and cosmetic closure of the skin incision.

All operated patients attended scheduled follow-up visits for the assessment of long-term outcomes.

Written informed consent was obtained from each patient in accordance with ethical standards. The ethics committees of each participating hospital granted permission for the use of the patient database.

Statistical analysis was performed using STATA MP version 18.0. Continuous variables were summarized as mean ± standard deviation and median with interquartile range. Categorical variables were presented as absolute numbers and percentages. For key binary outcomes, including postoperative complications, conversion, mortality, recurrence, and ventral hernia, 95 % confidence intervals were calculated where appropriate. Because the study had no comparator group, no between-group hypothesis testing was performed. The analysis was descriptive and exploratory.

Results

Single-port laparoscopic surgery (hereinafter – SPLS) was successfully performed in all 91 patients without conversion to multi-port laparoscopy or open surgery. The baseline clinical characteristics of the study population are presented in Table 1. The cohort included 35 men (38.5 %) and 56 women

(61.5 %) with a mean age of 51.2 ± 13.1 years. All patients had a history of previous abdominal surgery, and the majority of procedures were performed on an emergency basis (70 %, n = 64). All cases were classified as postoperative adhesive small bowel obstruction. Comorbidities were present in 20 patients (21.9 %).

Intraoperative assessment revealed varying degrees of adhesive disease. Multiple adhesions were identified in 42 patients, and extensive adhesiolysis was required in these cases. Despite the presence of dense adhesions and dilated bowel loops, the single-port approach allowed complete adhesiolysis in all patients. Bowel necrosis was detected intraoperatively in 9 patients (9.9 %), predominantly in those admitted more than 48 hours after symptom onset and with significant intestinal dilatation. Segmental bowel resection with stoma formation was performed in all 9 patients with bowel necrosis (9.9 %). Despite the need for bowel resection, all procedures were successfully completed through the single-port approach without conversion to multi-port laparoscopy or open surgery.

Operative parameters are summarized in Table 2. The mean incision length was 3.47 ± 0.39 cm (median 3.5 cm). Mean intraoperative blood loss was 85.0 ± 20.0 ml (median 87 ml). Mean operative time was 145.4 ± 33.0 minutes (median 147 minutes).

Postoperative recovery parameters demonstrated early restoration of gastrointestinal function. The mean time to initiation of oral feeding was 3.64 ± 0.8 days (median 3 days), and the mean time to mobilization was 3.48 ± 0.9 days (median 3 days). The mean length of hospital stay was 11.9 ± 1.2 days (median 12 days). Postoperative complications occurred in 5 patients (5.5 %). Hematoma and superficial surgical site infection were each observed in 2 patients (2.2 %), and prolonged postoperative ileus in 1 patient (1.1 %). No intraoperative complications, conversions, or mortality were recorded. All patients were discharged from hospital. Detailed postoperative outcomes are shown in Table 2.

The mean duration of follow-up was 14.3 ± 7.0 months (median 14 months). During the available follow-up period, no cases of postoperative ventral hernia or recurrent adhesive bowel obstruction were documented.

Discussion

Single-port laparoscopic surgery (SPLS) for adhesive small bowel obstruction (ASBO) appears to be a promising minimally invasive approach in carefully selected patients. In our cohort of 91 pa-

Table 1. Characteristics of patients operated on using the single-port method for the treatment of adhesive small bowel obstruction

Variable	n	%
Sex		
Women	56	61.5 %
Men	35	38.5 %
Age (years)		Mean (SD): 51.2 (13.1)
Previous abdominal surgery		
Yes	91	100 %
No	0	0 %
Comorbidities	20	21.9 %
Diagnosis		
Idiopathic adhesive small bowel obstruction	0	0 %
Postoperative adhesive small bowel obstruction	91	100 %

Source: completed by authors

**Note: n = number; SD = standard deviation.*

Table 1 presents the baseline characteristics of patients who underwent single-port surgery for adhesive small bowel obstruction (ASBO).

A total of 91 patients were included in the analysis. The majority were women (61.5 %), while men accounted for 38.5 % of cases. The mean age of the cohort was 51.2 ± 13.1 years.

All patients (100 %) had a history of previous abdominal surgery, confirming the postoperative etiology of obstruction in this cohort. Comorbidities were present in 21.9 % of patients. None of the cases were classified as idiopathic ASBO; all obstructions were postoperative in origin (100 %).

Table 2. Intraoperative factors, postoperative outcomes, and complications. Mean values ± standard deviation and median (interquartile range) are presented where appropriate.

Variable	Mean ± SD	Median (IQR)	n (%)
Incision length (cm)	3.47 ± 0.39	3.5 (3–4)	
Intraoperative blood loss (ml)	85.0 ± 20.0	87 (67–102)	
Operative time (min)	145.4 ± 33.0	147 (90–198)	
Time to initiation of oral feeding (days)	3.64 ± 0.8	3 (2–5)	
Time to mobilization (days)	3.48 ± 0.9	3 (2–5)	
Length of hospital stay (days)	11.9 ± 1.2	12 (10–13)	
Conversion rate			0 (0 %)
Postoperative complications (total)			5 (5.5 %)
Hematoma			2 (2.2 %)
Surgical site infection			2 (2.2 %)
Prolonged ileus			1 (1.1 %)
Mortality			0 (0 %)
Duration of follow-up (months)	14.3 ± 7.0	14 (7–20)	
Postoperative ventral hernia			0 (0 %)
Adhesion recurrence / recurrent obstruction			0 (0 %)
Discharged from hospital			91 (100 %)

Source: completed by authors.
**Note: SD = standard deviation; IQR = interquartile range.*
Table 2 summarizes intraoperative parameters, postoperative recovery outcomes, and complications.
The mean incision length was 3.47 ± 0.39 cm. Mean intraoperative blood loss was 85.0 ± 20.0 mL, and the mean operative time was 145.4 ± 33.0 minutes. Median values were comparable, indicating a relatively symmetric distribution of these variables.
Postoperative recovery was favorable. Oral feeding was initiated after a mean of 3.64 ± 0.8 days, and patient mobilization occurred at a mean of 3.48 ± 0.9 days. The mean length of hospital stay was 11.9 ± 1.2 days.
The conversion rate to open surgery was 0 %. Overall postoperative complications occurred in 5.5 % of patients. The most common complications were hematoma (2.2 %) and surgical site infection (2.2 %), followed by prolonged ileus (1.1 %). No postoperative mortality was observed.
During a mean follow-up period of 14.3 ± 7.0 months, no cases of postoperative ventral hernia or adhesion recurrence/recurrent obstruction were recorded. All patients (100 %) were discharged from the hospital.

tients, postoperative complications occurred in only 5 patients (5.49%; 95% CI: 1.8–12.4), while no recurrence was observed during a mean follow-up of 14.3 ± 7.0 months. These findings suggest that SPLS may facilitate rapid postoperative recovery while maintaining favorable short-term outcomes.

Current management of ASBO remains individualized, with treatment decisions based on the severity of obstruction, bowel viability, patient condition, and the likelihood of successful conservative treatment [1,2,4 –7,17]. Bowel ischemia remains one of the principal indications for urgent surgical intervention [3]. The favorable outcomes observed in the present study may be explained by careful preoperative patient selection, exclusion of patients with diffuse peritonitis or suspected ischemia, and the use of meticulous sharp adhesiolysis with minimal bowel manipulation. In addition, all procedures were performed by a surgeon experienced in single-port laparoscopy, which likely contributed to procedural safety and consistency.

Our findings are consistent with previous studies demonstrating the feasibility and safety of SPLS for selected patients with ASBO. Liao et al. reported low complication rates, acceptable operative time, and favorable postoperative recovery following single-incision laparoscopic surgery [10]. Similar results were reported by Choi et al. and Ohtsuka et al., confirming that SPLS is a safe and technically feasible option in selected patients with bowel obstruction [14; 15]. Suzuki et al. further demonstrated reduced postoperative pain and faster recovery while identifying dense adhesions and marked bowel dilatation as predictors of conversion [11]. Gómez et al. showed that both single-port and multi-port laparoscopy are feasible in experienced hands, em-

phasizing that operative outcomes depend primarily on patient selection, adhesive burden, and surgeon expertise rather than on the surgical platform itself [16]. Likewise, the Bologna guidelines recommend laparoscopic adhesiolysis only in appropriately selected patients because the risk of bowel injury and conversion increases with unfavorable anatomical conditions [17].

An important finding of the present study is that all patients, including those with multiple adhesions, were successfully treated using SPLS without conversion or placement of additional trocars. Although previous studies have identified multiple dense adhesions and severe bowel dilatation as predictors of conversion [11], our results suggest that the extent of adhesions alone should not be considered an absolute contraindication to SPLS when adequate visualization, careful dissection techniques, and sufficient surgical expertise are available.

Compared with conventional multi-port laparoscopic surgery, SPLS offers several theoretical advantages, including reduced abdominal wall trauma, fewer trocar-related complications, and improved cosmetic outcomes [12; 13]. However, SPLS is technically more demanding because of limited triangulation and instrument crowding. Despite these challenges, operative time in our series remained comparable with that reported for laparoscopic management of ASBO, suggesting that procedural efficiency can be maintained after the learning curve has been overcome [8; 16].

The observed postoperative recovery parameters were favorable, including the low incidence of prolonged postoperative ileus and the absence of documented recurrent adhesive bowel obstruction during follow-up. Early restoration of bowel function and mobilization observed in our cohort are consistent with previous reports describing favorable postoperative recovery after minimally invasive adhesiolysis in appropriately selected patients [9-11; 14]. However, due to the absence of a comparator group, these findings should be interpreted as descriptive rather than as evidence of superiority over other surgical approaches. Although no documented cases of recurrent adhesive bowel obstruction were observed during the available follow-up period, longer follow-up is required to assess late recurrence more reliably.

Several limitations should be acknowledged. First, this was a retrospective single-arm study without a control group, precluding direct comparison with MPLS or open surgery. Second, strict inclusion criteria may have introduced selection bias and limit the generalizability of the findings to more complex cases of ASBO. Third, all procedures were performed by a single experienced surgeon, introducing operator-dependent bias and limiting external reproducibility. The learning curve associated with single-port laparoscopy may also influence outcomes in less experienced centers. Finally, although the mean follow-up exceeded one year, it remains insufficient to reliably evaluate long-term recurrence and adhesion-related complications, particularly given the chronic nature of adhesive disease. Larger prospective multicenter comparative studies with longer follow-up are therefore warranted.

The statistical analysis was primarily descriptive because no comparator group was available. Continuous variables were summarized as mean ± standard deviation or median (interquartile range), whereas categorical variables were presented as counts and percentages. Therefore, the findings should be interpreted as exploratory rather than confirmatory.

The present study provides clinically relevant evidence supporting the feasibility and safety of SPLS for selected patients with ASBO. When performed by experienced surgeons following careful patient selection, SPLS may represent a safe minimally invasive alternative to conventional multi-port laparoscopy. However, confirmation of its comparative effectiveness requires well-designed prospective multicenter studies with appropriate control groups. Future research should also clarify long-term recurrence rates, functional outcomes, and the role of SPLS within the treatment algorithm for adhesive small bowel obstruction [16; 17].

Limitations

This study has several limitations. First, it was a retrospective single-arm study without a control group, precluding direct comparison with multi-port laparoscopy or open surgery and preventing conclusions regarding the superiority of SPLS. Second, patients were carefully selected, excluding those with diffuse peritonitis, hemodynamic instability, or suspected bowel perforation or ischemia, which may have contributed to the favorable outcomes and limits the generalizability of the findings. Third, all procedures were performed by a single experienced surgeon, ensuring technical consistency but limiting

the external reproducibility of the results. Finally, the sample size of 91 patients and a mean follow-up of 14.3 ± 7.0 months were sufficient to evaluate short-term outcomes but remain inadequate for assessing rare complications, long-term recurrence, and other late postoperative events. Therefore, the findings should be considered exploratory and require confirmation in larger prospective comparative studies with longer follow-up.

Conclusions

Within the limitations of this retrospective single-arm study, SPLS was associated with technical feasibility and favorable perioperative outcomes in carefully selected patients with ASBO. The absence of conversion, mortality, and documented recurrence during follow-up is encouraging; however, these findings should be interpreted cautiously due to the lack of a comparator group and the operator-dependent nature of the technique. Further prospective comparative studies are needed to determine whether SPLS provides measurable advantages over conventional multi-port laparoscopy or open surgery.

References

1. Tong J.W.V., Lingam P., Shelat V.G. Adhesive small bowel obstruction – an update // Acute Medicine & Surgery. – 2020. – Vol. 7(1). – Article No. 587. – DOI: https://doi.org/10.1002/ams2.587

2. Ghimire P., Maharjan S. Adhesive Small Bowel Obstruction: A Review // Journal of Nepal Medical Association. – 2023. – Vol. 61(260). – P. 390-396. – DOI: 10.31729/jnma.8134.

3. Vassiliu P., Ntella V., Theodoroleas G., Mantanis Z., Pentara I., Papoutsi E., Mastoraki A., Arkadopoulos N. Successful management of adhesion related small bowel ischemia without intestinal resection: A case report and review of literature // World Journal of Gastrointestinal Pathophysiology. – 2019. – Vol. 10(2). – P. 29-35. – DOI: https://doi.org/10.4291/wjgp.v10.i2.29

4. Li S., Li Y. Adhesive small-bowel obstruction: Conservative versus surgical management? // World Journal of Surgical Infection. – 2023. – Vol. 2(1). – P. 21. – DOI: https://doi.org/10.4103/wjsi.wjsi_3_23

5. Shen C.-J., Wang J.-J. Advancements in the clinical management of adhesive small bowel obstruction: A perspective // Medicine. – 2025. – Vol. 104(27). – Article No. 43246. – DOI: https://doi.org/10.1097/MD.0000000000043246

6. Abera S.A., Adem A.A., Endawkie A., Ahmed A.N., Mohammed S. Success rate and associated factors of conservative management of adhesive small bowel obstruction at Dessie comprehensive specialized hospital, Northeast Ethiopia // Scientific Reports. – 2025. – Vol. 15(1). – Article No. 20288. – DOI: https://doi.org/10.1038/s41598-025-20288-z

7. Assenza M. Adhesions small bowel obstruction in emergency setting: conservative or operative treatment? // Giornale di Chirurgia. – 2016. – Vol. 37(4). – P. 145-150. – DOI: https://doi.org/10.11138/gchir/2016.37.4.145

8. Darbyshire A., Kostakis I., Pucher P., Toh S., Mercer S. The impact of laparoscopy on emergency surgery for adhesional small bowel obstruction: prospective single centre cohort study // Annals of the Royal College of Surgeons of England. – 2021. – Vol. 103(4). – P. 255-262. – DOI: https://doi.org/10.1308/rcsann.2020.7079

9. Hiro J., Inoue Y., Okugawa Y., Kawamoto A., Okita Y., Toiyama Y. et al. Single-port laparoscopic management of adhesive small bowel obstruction // Surgery Today. – 2014. – Vol. 44(3). – P. 586-590. – DOI: https://doi.org/10.1007/s00595-013-0729-8

10. Liao C.-H., Liu Y.-Y., Chen C.-C., Wang S.-Y., Ooyang C.-H., Kuo I.-M., Yeh T.-S. Single-incision laparoscopic-assisted surgery for small bowel obstruction // Journal of Laparoendoscopic & Advanced Surgical Techniques. – 2012. – Vol. 22(10). – P. 957-961. – DOI: https://doi.org/10.1089/lap.2012.0193

11. Suzuki Y., Tei M., Wakasugi M., Masuzawa T., Ohtsuka M., Mikamori M. et al. Role of single-incision laparoscopic surgery in the management of small bowel obstruction // Surgical Endoscopy. – 2021. – Vol. 35(6). – P. 2558-2565. – DOI: https://doi.org/10.1007/s00464-020-07671-9

12. Romanelli J.R., Earle D.B. Single-port laparoscopic surgery: an overview // Surgical Endoscopy. – 2009. – Vol. 23(7). – P. 1419-1427. – DOI: https://doi.org/10.1007/s00464-009-0463-x

13. Tsai A.Y., Selzer D.J. Single-Port Laparoscopic Surgery // Advances in Surgery. – 2010. – Vol. 44. – P. 1-27. – DOI: https://doi.org/10.1016/j.yasu.2010.05.017

14. Choi B.J., Kim S.-J., Lee S.C., Lee J.I. Single-port laparoscopic treatment of small bowel obstruction // The American Journal of Surgery. – 2014. – Vol. 208(3). – P. 470-475. – DOI: https://doi.

org/10.1016/j.amjsurg.2014.01.013
15. Ohtsuka T., Nagai E., Toma H., Ohuchida K., Takanami H., Odate S. et al. Single-incision laparoscopy-assisted surgery for bowel obstruction: report of three cases // Surgery Today. – 2011. – Vol. 41(11). – P. 1519-1523. – DOI: https://doi.org/10.1007/s00595-010-4525-4
16. Gómez D., Cabrera L.F., Pedraza M., Mendoza A.S., Pulido-Segura J.A., Villarreal R. et al. Minimal invasive surgery for multiple adhesive small bowel obstruction: results of a comparative multicenter study // Cirugía y Cirujanos. – 2021. – Vol. 89(6). – P. 710-717. – DOI: https://doi.org/10.24875/CIRU.20000895
17. ten Broek R.P.G., Krielen P., Di Saverio S., Coccolini F., Biffl W.L., Ansaloni L. et al. Bologna guidelines for diagnosis and management of adhesive small bowel obstruction (ASBO): 2017 update of the evidence-based guidelines from the World Society of Emergency Surgery ASBO Working Group // World Journal of Emergency Surgery. – 2018. – Vol. 13. – Article No. 24. – DOI: https://doi.org/10.1186/s13017-018-0185-2

References

1. Tong, J. W. V., Lingam, P., & Shelat, V. G. (2020). Adhesive small bowel obstruction – an update. Acute Medicine & Surgery, 7(1), e587. DOI: https://doi.org/10.1002/ams2.587
2. Ghimire, P., & Maharjan, S. (2023). Adhesive small bowel obstruction: A review. Journal of Nepal Medical Association, 61(260), 390-396. DOI: https://doi.org/10.31729/jnma.8134
3. Vassiliu, P., Ntella, V., Theodoroleas, G., Mantanis, Z., Pentara, I., Papoutsi, E., Mastoraki, A., & Arkadopoulos, N. (2019). Successful management of adhesion related small bowel ischemia without intestinal resection: A case report and review of literature. World Journal of Gastrointestinal Pathophysiology, 10(2), 29-35. DOI: https://doi.org/10.4291/wjgp.v10.i2.29
4. Li, S., & Li, Y. (2023). Adhesive small-bowel obstruction: Conservative versus surgical management? World Journal of Surgical Infection, 2(1), 21. DOI: https://doi.org/10.4103/wjsi.wjsi_3_23
5. Shen, C.-J., & Wang, J.-J. (2025). Advancements in the clinical management of adhesive small bowel obstruction: A perspective. Medicine, 104(27), Article No. 43246. DOI: https://doi.org/10.1097/MD.0000000000043246
6. Abera, S. A., Adem, A. A., Endawkie, A., Ahmed, A. N., & Mohammed, S. (2025). Success rate and associated factors of conservative management of adhesive small bowel obstruction at Dessie comprehensive specialized hospital, Northeast Ethiopia. Scientific Reports, 15(1), Article No. 20288. DOI: https://doi.org/10.1038/s41598-025-20288-z
7. Assenza, M. (2016). Adhesions small bowel obstruction in emergency setting: Conservative or operative treatment? Giornale di Chirurgia, 37(4), 145-150. DOI: https://doi.org/10.11138/gchir/2016.37.4.145
8. Darbyshire, A., Kostakis, I., Pucher, P., Toh, S., & Mercer, S. (2021). The impact of laparoscopy on emergency surgery for adhesional small bowel obstruction: Prospective single centre cohort study. Annals of the Royal College of Surgeons of England, 103(4), 255-262. DOI: https://doi.org/10.1308/rcsann.2020.7079
9. Hiro, J., Inoue, Y., Okugawa, Y., Kawamoto, A., Okita, Y., Toiyama, Y., Tanaka, K., Uchida, K., Mohri, Y., & Kusunoki, M. (2014). Single-port laparoscopic management of adhesive small bowel obstruction. Surgery Today, 44(3), 586-590. DOI: https://doi.org/10.1007/s00595-013-0729-8
10. Liao, C.-H., Liu, Y.-Y., Chen, C.-C., Wang, S.-Y., Ooyang, C.-H., Kuo, I.-M., & Yeh, T.-S. (2012). Single-incision laparoscopic-assisted surgery for small bowel obstruction. Journal of Laparoendoscopic & Advanced Surgical Techniques, 22(10), 957-961. DOI: https://doi.org/10.1089/lap.2012.0193
11. Suzuki, Y., Tei, M., Wakasugi, M., Masuzawa, T., Ohtsuka, M., Mikamori, M., Saito, T., Furukawa, K., Imasato, M., Kishi, K., Tanemura, M., & Akamatsu, H. (2021). Role of single-incision laparoscopic surgery in the management of small bowel obstruction. Surgical Endoscopy, 35(6), 2558-2565. DOI: https://doi.org/10.1007/s00464-020-07671-9
12. Romanelli, J. R., & Earle, D. B. (2009). Single-port laparoscopic surgery: An overview. Surgical Endoscopy, 23(7), 1419-1427. DOI: https://doi.org/10.1007/s00464-009-0463-x
13. Tsai, A. Y., & Selzer, D. J. (2010). Single-port laparoscopic surgery. Advances in Surgery, 44, 1-27. DOI: https://doi.org/10.1016/j.yasu.2010.05.017
14. Choi, B. J., Kim, S.-J., Lee, S. C., & Lee, J. I. (2014). Single-port laparoscopic treatment of small bowel obstruction. The American Journal of Surgery, 208(3), 470-475. DOI: https://doi.

org/10.1016/j.amjsurg.2014.01.013
15. Ohtsuka, T., Nagai, E., Toma, H., Ohuchida, K., Takanami, H., Odate, S., Eguchi, D., Ueki, T., Shimizu, S., & Tanaka, M. (2011). Single-incision laparoscopy-assisted surgery for bowel obstruction: Report of three cases. Surgery Today, 41(11), 1519-1523. DOI: https://doi.org/10.1007/s00595-010-4525-4
16. Gómez, D., Cabrera, L. F., Pedraza, M., Mendoza, A. S., Pulido-Segura, J. A., Villarreal, R., Urrutia, A. A., Sanchez-Ussa, S., & Di Saverio, S. (2021). Minimal invasive surgery for multiple adhesive small bowel obstruction: Results of a comparative multicenter study. Cirugía y Cirujanos, 89(6), 710-717. DOI: https://doi.org/10.24875/CIRU.20000895
17. ten Broek, R. P. G., Krielen, P., Di Saverio, S., Coccolini, F., Biffl, W. L., Ansaloni, L., Velmahos, G. C., Sartelli, M., Fraga, G. P., Kelly, M. D., Moore, F. A., Peitzman, A. B., Leppaniemi, A., Moore, E. E., Jeekel, J., Kluger, Y., Sugrue, M., Balogh, Z. J., Bendinelli, C., & Civil, I. (2018). Bologna guidelines for diagnosis and management of adhesive small bowel obstruction (ASBO): 2017 update of the evidence-based guidelines from the World Society of Emergency Surgery ASBO Working Group. World Journal of Emergency Surgery, 13, Article No. 24. DOI: https://doi.org/10.1186/s13017-018-0185-2

ЖАБЫСҚАҚ ЖІҢІШКЕ ІШЕК ӨТІМСІЗДІГІ КЕЗІНДЕ БІРПОРТТЫ ЛАПАРОСКОПИЯЛЫҚ ХИРУРГИЯ: РЕТРОСПЕКТИВТІ БІР ТАРМАҚТЫ КӨПОРТАЛЫҚТЫ ЗЕРТТЕУ

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Аңдатпа

Өзектілігі. Жабысқақ жіңішке ішек өтімсіздігі шұғыл хирургияда жиі кездесетін аурулардың бірі болып табылады, жоғары сырқаттанушылықпен сипатталады және көп жағдайда хирургиялық емдеуді қажет етеді. Көппортты лапароскопия кеңінен қолданылғанымен, жабысқақ жіңішке ішек өтімсіздігін емдеуде бірпортты лапароскопиялық хирургияның (Single-Port Laparoscopic Surgery, SPLS) қауіпсіздігі мен техникалық орындалу мүмкіндігі туралы дәлелдер әлі де шектеулі.

Мақсаты. Жабысқақ жіңішке ішек өтімсіздігін емдеуде бірпортты лапароскопиялық хирургияның техникалық орындалу мүмкіндігін, қауіпсіздігін және периоперациялық нәтижелерін бағалау.

Материалдар мен әдістер. 2018 жылғы сәуір мен 2025 жылғы қазан аралығында жабысқақ жіңішке ішек өтімсіздігі бар 91 науқасты қамтыған ретроспективті, көпорталықты, бір топты бақылаулық зерттеу жүргізілді. Барлық науқастарға бір тәжірибелі хирург бірпортты лапароскопиялық әдіспен операция жасады. Зерттеу барысында операцияның ұзақтығы, операция кезіндегі қан жоғалту көлемі, интраоперациялық және операциядан кейінгі асқынулар, хирургиялық тілік ұзындығы және стационарда болу ұзақтығы бағаланды.

Нәтижелері. Зерттеуге енгізілген барлық 91 науқаста операция бірпортты лапароскопиялық әдіспен сәтті аяқталды, көппортты лапароскопияға немесе ашық операцияға ауысу (конверсия) қажет болған жоқ. Операциядан кейінгі асқынулар 5 науқаста анықталды, бұл 5,5 %-ды құрады (95 % сенімділік аралығы: 1,8–12,4). Қолайлы нәтижелердің алынуы мұқият іріктелген пациенттер мен хирургтың жоғары тәжірибесіне байланысты болуы ықтимал. Алынған нәтижелер тәжірибелі хирург орындаған жағдайда SPLS жабысқақ жіңішке ішек өтімсіздігі бар мұқият таңдалған пациенттер үшін

тиімді аз инвазиялық әдіс болуы мүмкін екенін көрсетеді.

Қорытынды. Бірпортты лапароскопиялық хирургия жабысқақ жіңішке ішек өтімсіздігі бар мұқият іріктелген пациенттерді емдеуде техникалық тұрғыдан орындалатын және әлеуетті қауіпсіз әдіс болып табылады. Алайда оның дәстүрлі көппортты лапароскопиямен және ашық хирургиялық тәсілмен салыстырғандағы тиімділігі мен артықшылықтарын нақтылау үшін үлкенірек іріктememен жүргізілетін проспективті салыстырмалы зерттеулер қажет.

Түйін сөздер: *жабысқақ жіңішке ішек өтімсіздігі, бірпортты лапароскопиялық хирургия, аз инвазиялық хирургия, адгезиолиз.*

ОДНОПОРТОВАЯ ЛАПАРОСКОПИЧЕСКАЯ ОПЕРАЦИЯ ПРИ СПАЕЧНОЙ ТОНКОКИШЕЧНОЙ НЕПРОХОДИМОСТИ: РЕТРОСПЕКТИВНОЕ ОДНОФАКТОРНОЕ МНОГОЦЕНТРОВОЕ ИССЛЕДОВАНИЕ

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Аннотация

Актуальность. Спаечная тонкокишечная непроходимость является одной из наиболее распространенных неотложных хирургических патологий, сопровождается высокой частотой осложнений и нередко требует оперативного лечения. Несмотря на широкое применение многопортовой лапароскопии, данные о безопасности и технической выполнимости однопортовой лапароскопической хирургии при спаечной тонкокишечной непроходимости остаются ограниченными.

Цель. Оценить техническую выполнимость, безопасность и ближайшие периоперационные результаты однопортовой лапароскопической хирургии при лечении спаечной тонкокишечной непроходимости.

Материалы и методы. Проведено ретроспективное многоцентровое одно-групповое наблюдательное исследование, включившее 91 пациента со спаечной тонкокишечной непроходимостью, прооперированного в период с апреля 2018 по октябрь 2025 года. Все операции выполнены одним опытным хирургом с использованием метода однопортовой лапароскопической хирургии. Оценивали продолжительность операции, объем интраоперационной кровопотери, интра- и послеоперационные осложнения, длину разреза и продолжительность госпитализации.

Результаты. У всех 91 пациента операция была завершена с использованием однопортового лапароскопического доступа без конверсии в многопортовую лапароскопию или лапаротомию. Послеоперационные осложнения развились у 5 пациентов, что составило 5,5 % (95% ДИ: 1,8–12,4). Благоприятные результаты, вероятно, были обусловлены тщательным отбором пациентов и опытом хирурга, несмотря на технические особенности однопортового доступа. Полученные данные свидетельствуют о том, что SPLS может быть эффективным малоинвазивным методом лечения тщательно отобранных пациентов со спаечной тонкокишечной непроходимостью.

Выводы. Однопортовая лапароскопическая хирургия является технически выполнимым и потенциально безопасным методом лечения тщательно отобранных пациентов со спаечной тонкокишечной непроходимостью. Для подтверждения ее эффективности и определения возможных преимуществ по сравнению с традиционной многопортовой лапароскопией и открытыми вмешатель-

ствами необходимы дальнейшие проспективные сравнительные исследования.

Ключевые слова: *спаечная тонкокишечная непроходимость; однопортовая лапароскопическая хирургия; малоинвазивная хирургия; адгезиолиз.*

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