

World Journal of *Clinical Cases*

World J Clin Cases 2022 July 16; 10(20): 6759-7186



OPINION REVIEW

- 6759 Semaglutide might be a key for breaking the vicious cycle of metabolically associated fatty liver disease spectrum?
Cigrovski Berkovic M, Rezic T, Bilic-Curcic I, Mrzljak A

MINIREVIEWS

- 6769 Drainage of pancreatic fluid collections in acute pancreatitis: A comprehensive overview
Bansal A, Gupta P, Singh AK, Shah J, Samanta J, Mandavdhare HS, Sharma V, Sinha SK, Dutta U, Sandhu MS, Kochhar R
- 6784 Frontiers of COVID-19-related myocarditis as assessed by cardiovascular magnetic resonance
Luo Y, Liu BT, Yuan WF, Zhao CX

ORIGINAL ARTICLE**Case Control Study**

- 6794 Urinary and sexual function changes in benign prostatic hyperplasia patients before and after transurethral columnar balloon dilatation of the prostate
Zhang DP, Pan ZB, Zhang HT
- 6803 Effects of the information-knowledge-attitude-practice nursing model combined with predictability intervention on patients with cerebrovascular disease
Huo HL, Gui YY, Xu CM, Zhang Y, Li Q

Retrospective Cohort Study

- 6811 Effects of Kampo medicine hangebyakujutsutemmato on persistent postural-perceptual dizziness: A retrospective pilot study
Miwa T, Kanemaru SI

Retrospective Study

- 6825 Longitudinal changes in personalized platelet count metrics are good indicators of initial 3-year outcome in colorectal cancer
Herold Z, Herold M, Lohinszky J, Szasz AM, Dank M, Somogyi A
- 6845 Efficacy of Kegel exercises in preventing incontinence after partial division of internal anal sphincter during anal fistula surgery
Garg P, Yagnik VD, Kaur B, Menon GR, Dawka S

Observational Study

- 6855 Influence of the water jet system vs cavitron ultrasonic surgical aspirator for liver resection on the remnant liver
Hanaki T, Tsuda A, Sunaguchi T, Goto K, Morimoto M, Murakami Y, Kihara K, Matsunaga T, Yamamoto M, Tokuyasu N, Sakamoto T, Hasegawa T, Fujiwara Y

- 6865** Critical values of monitoring indexes for perioperative major adverse cardiac events in elderly patients with biliary diseases

Zhang ZM, Xie XY, Zhao Y, Zhang C, Liu Z, Liu LM, Zhu MW, Wan BJ, Deng H, Tian K, Guo ZT, Zhao XZ

- 6876** Comparative study of surface electromyography of masticatory muscles in patients with different types of bruxism

Lan KW, Jiang LL, Yan Y

Randomized Controlled Trial

- 6890** Dural puncture epidural technique provides better anesthesia quality in repeat cesarean delivery than epidural technique: Randomized controlled study

Wang SY, He Y, Zhu HJ, Han B

SYSTEMATIC REVIEWS

- 6900** Network pharmacology-based strategy for predicting therapy targets of Sanqi and Huangjing in diabetes mellitus

Cui XY, Wu X, Lu D, Wang D

META-ANALYSIS

- 6915** Endoscopic submucosal dissection for early signet ring cell gastric cancer: A systematic review and meta-analysis

Weng CY, Sun SP, Cai C, Xu JL, Lv B

- 6927** Prognostic value of computed tomography derived skeletal muscle mass index in lung cancer: A meta-analysis

Pan XL, Li HJ, Li Z, Li ZL

CASE REPORT

- 6936** Autosomal dominant osteopetrosis type II resulting from a *de novo* mutation in the *CLCN7* gene: A case report

Song XL, Peng LY, Wang DW, Wang H

- 6944** Clinical expression and mitochondrial deoxyribonucleic acid study in twins with 14484 Leber's hereditary optic neuropathy: A case report

Chuenkongkaew WL, Chinkulkitnivat B, Lertrit P, Chirapapaisan N, Kaewsutthi S, Suktitipat B, Mitrpant C

- 6954** Management of the enteroatmospheric fistula: A case report

Cho J, Sung K, Lee D

- 6960** Lower lip recurrent keratoacanthoma: A case report

Liu XG, Liu XG, Wang CJ, Wang HX, Wang XX

- 6966** Optic disc coloboma associated with macular retinoschisis: A case report

Zhang W, Peng XY

- 6974** A 7-year-old boy with recurrent cyanosis and tachypnea: A case report
Li S, Chen LN, Zhong L
- 6981** Schwannomatosis patient who was followed up for fifteen years: A case report
Li K, Liu SJ, Wang HB, Yin CY, Huang YS, Guo WT
- 6991** Intentional replantation combined root resection therapy for the treatment of type III radicular groove with two roots: A case report
Tan D, Li ST, Feng H, Wang ZC, Wen C, Nie MH
- 6999** Clinical features and genetic variations of severe neonatal hyperbilirubinemia: Five case reports
Lin F, Xu JX, Wu YH, Ma YB, Yang LY
- 7006** Percutaneous transhepatic access for catheter ablation of a patient with heterotaxy syndrome complicated with atrial fibrillation: A case report
Wang HX, Li N, An J, Han XB
- 7013** Secondary positioning of rotationally asymmetric refractive multifocal intraocular lens in a patient with glaucoma: A case report
Fan C, Zhou Y, Jiang J
- 7020** Laparoscopic repair of diaphragmatic hernia associating with radiofrequency ablation for hepatocellular carcinoma: A case report
Tsunoda J, Nishi T, Ito T, Inaguma G, Matsuzaki T, Seki H, Yasui N, Sakata M, Shimada A, Matsumoto H
- 7029** Hypopituitary syndrome with pituitary crisis in a patient with traumatic shock: A case report
Zhang XC, Sun Y
- 7037** Solitary plasmacytoma of the left rib misdiagnosed as angina pectoris: A case report
Yao J, He X, Wang CY, Hao L, Tan LL, Shen CJ, Hou MX
- 7045** Secondary coronary artery ostial lesions: Three case reports
Liu XP, Wang HJ, Gao JL, Ma GL, Xu XY, Ji LN, He RX, Qi BYE, Wang LC, Li CQ, Zhang YJ, Feng YB
- 7054** Bladder perforation injury after percutaneous peritoneal dialysis catheterization: A case report
Shi CX, Li ZX, Sun HT, Sun WQ, Ji Y, Jia SJ
- 7060** Myotonic dystrophy type 1 presenting with dyspnea: A case report
Jia YX, Dong CL, Xue JW, Duan XQ, Xu MY, Su XM, Li P
- 7068** Novel mutation in the *SALL1* gene in a four-generation Chinese family with uraemia: A case report
Fang JX, Zhang JS, Wang MM, Liu L
- 7076** Malignant transformation of primary mature teratoma of colon: A case report
Liu J

- 7082** Treatment of pyogenic liver abscess by surgical incision and drainage combined with platelet-rich plasma: A case report
Wang JH, Gao ZH, Qian HL, Li JS, Ji HM, Da MX
- 7090** Left bundle branch pacing in a ventricular pacing dependent patient with heart failure: A case report
Song BX, Wang XX, An Y, Zhang YY
- 7097** Solitary fibrous tumor of the liver: A case report and review of the literature
Xie GY, Zhu HB, Jin Y, Li BZ, Yu YQ, Li JT
- 7105** MutL homolog 1 germline mutation c.(453+1_454-1)_(545+1_546-1)del identified in lynch syndrome: A case report and review of literature
Zhang XW, Jia ZH, Zhao LP, Wu YS, Cui MH, Jia Y, Xu TM
- 7116** Malignant histiocytosis associated with mediastinal germ cell tumor: A case report
Yang PY, Ma XL, Zhao W, Fu LB, Zhang R, Zeng Q, Qin H, Yu T, Su Y
- 7124** Immunoglobulin G4 associated autoimmune cholangitis and pancreatitis following the administration of nivolumab: A case report
Agrawal R, Guzman G, Karimi S, Giulianotti PC, Lora AJM, Jain S, Khan M, Boulay BR, Chen Y
- 7130** Portal vein thrombosis in a noncirrhotic patient after hemihepatectomy: A case report and review of literature
Zhang SB, Hu ZX, Xing ZQ, Li A, Zhou XB, Liu JH
- 7138** Microvascular decompression for a patient with oculomotor palsy caused by posterior cerebral artery compression: A case report and literature review
Zhang J, Wei ZJ, Wang H, Yu YB, Sun HT
- 7147** Topical halometasone cream combined with fire needle pre-treatment for treatment of primary cutaneous amyloidosis: Two case reports
Su YQ, Liu ZY, Wei G, Zhang CM
- 7153** Simultaneous robot-assisted approach in a super-elderly patient with urothelial carcinoma and synchronous contralateral renal cell carcinoma: A case report
Yun JK, Kim SH, Kim WB, Kim HK, Lee SW
- 7163** Nursing a patient with latent autoimmune diabetes in adults with insulin-related lipodystrophy, allergy, and exogenous insulin autoimmune syndrome: A case report
He F, Xu LL, Li YX, Dong YX
- 7171** Incidental diagnosis of medullary thyroid carcinoma due to persistently elevated procalcitonin in a patient with COVID-19 pneumonia: A case report
Saha A, Mukhopadhyay M, Paul S, Bera A, Bandyopadhyay T
- 7178** Macular hole following phakic intraocular lens implantation: A case report
Li XJ, Duan JL, Ma JX, Shang QL

LETTER TO THE EDITOR

7184 Is every microorganism detected in the intensive care unit a nosocomial infection? Isn't prevention more important than detection?

Yildirim F, Karaman I, Yildirim M

ABOUT COVER

Editorial Board Member of *World Journal of Clinical Cases*, Jie-Feng Huang, PhD, Associate Chief Physician, Associate Professor, Department of Orthopaedics and Traumatology, The First Affiliated Hospital of Zhejiang Chinese Medical University, Hangzhou 310006, Zhejiang Province, China. 40983285@qq.com

AIMS AND SCOPE

The primary aim of *World Journal of Clinical Cases* (*WJCC*, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

INDEXING/ABSTRACTING

The *WJCC* is now abstracted and indexed in Science Citation Index Expanded (SCIE, also known as SciSearch®), Journal Citation Reports/Science Edition, Current Contents®/Clinical Medicine, PubMed, PubMed Central, Scopus, Reference Citation Analysis, China National Knowledge Infrastructure, China Science and Technology Journal Database, and Superstar Journals Database. The 2022 Edition of Journal Citation Reports® cites the 2021 impact factor (IF) for *WJCC* as 1.534; IF without journal self cites: 1.491; 5-year IF: 1.599; Journal Citation Indicator: 0.28; Ranking: 135 among 172 journals in medicine, general and internal; and Quartile category: Q4. The *WJCC*'s CiteScore for 2021 is 1.2 and Scopus CiteScore rank 2021: General Medicine is 443/826.

RESPONSIBLE EDITORS FOR THIS ISSUE

Production Editor: *Hua-Ge Yu*; Production Department Director: *Xu Guo*; Editorial Office Director: *Jin-Lei Wang*.

NAME OF JOURNAL

World Journal of Clinical Cases

ISSN

ISSN 2307-8960 (online)

LAUNCH DATE

April 16, 2013

FREQUENCY

Thrice Monthly

EDITORS-IN-CHIEF

Bao-Gan Peng, Jerzy Tadeusz Chudek, George Kontogeorgos, Maurizio Serati, Ja Hyeon Ku

EDITORIAL BOARD MEMBERS

<https://www.wjgnet.com/2307-8960/editorialboard.htm>

PUBLICATION DATE

July 16, 2022

COPYRIGHT

© 2022 Baishideng Publishing Group Inc

INSTRUCTIONS TO AUTHORS

<https://www.wjgnet.com/bpg/gerinfo/204>

GUIDELINES FOR ETHICS DOCUMENTS

<https://www.wjgnet.com/bpg/GerInfo/287>

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH

<https://www.wjgnet.com/bpg/gerinfo/240>

PUBLICATION ETHICS

<https://www.wjgnet.com/bpg/GerInfo/288>

PUBLICATION MISCONDUCT

<https://www.wjgnet.com/bpg/gerinfo/208>

ARTICLE PROCESSING CHARGE

<https://www.wjgnet.com/bpg/gerinfo/242>

STEPS FOR SUBMITTING MANUSCRIPTS

<https://www.wjgnet.com/bpg/GerInfo/239>

ONLINE SUBMISSION

<https://www.f6publishing.com>

Management of the enteroatmospheric fistula: A case report

Jinbeom Cho, Kiyong Sung, Dosang Lee

Specialty type: Medicine, research and experimental

Provenance and peer review: Unsolicited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's scientific quality classification

Grade A (Excellent): 0
Grade B (Very good): B
Grade C (Good): C
Grade D (Fair): 0
Grade E (Poor): 0

P-Reviewer: Gu GL, China; Lima R, Chile

A-Editor: Lin FY, China

Received: September 13, 2021

Peer-review started: September 13, 2021

First decision: November 22, 2021

Revised: December 4, 2021

Accepted: May 26, 2022

Article in press: May 26, 2022

Published online: July 16, 2022



Jinbeom Cho, Kiyong Sung, Dosang Lee, Department of Surgery, College of Medicine, The Catholic University of Korea, Seoul 06591, South Korea

Corresponding author: Dosang Lee, MD, PhD, Professor, Department of Surgery, College of Medicine, The Catholic University of Korea, 222, Banpo-daero, Seocho-gu, Seoul 06591, South Korea. surgeryds@gmail.com

Abstract

BACKGROUND

Enteroatmospheric fistula (EAF) is a catastrophic complication that can occur after open abdomen. EAFs cause severe body fluid loss, hypercatabolism, and wound complications, leading to adverse clinical outcomes.

CASE SUMMARY

A 72-year-old female patient underwent ventral hernia repair. Five days after the surgery, she exhibited severe abdominal pain with septic shock. Exploratory laparotomy revealed extensive intestinal adhesions and severe intraperitoneal contamination. Since the patient was hemodynamically unstable, a salvage operation rather than definite surgery was needed, and three surgical open drains were inserted into the peritoneal cavity. Postoperative EAFs developed, and it was almost impossible to isolate and reduce the fistula output despite the use of vacuum-assisted closure dressings and endoscopic stent insertion. Finally, we anastomosed two vascular grafts to the openings of each EAF to restore enteric continuity. The inserted vascular grafts showed acceptable patency, and the patient could receive optimal nutritional support with elemental enteral feeding. She underwent EAF resection 76 d after graft implantation.

CONCLUSION

Control of the enteric effluent are key elements in achieving favorable clinical conditions which should precede definite surgery for EAFs.

Key Words: Enterocutaneous fistula; Enteroatmospheric fistula; Ventral hernia; Complication; Sepsis; Case report

©The Author(s) 2022. Published by Baishideng Publishing Group Inc. All rights reserved.

Core Tip: Enteroatmospheric fistula (EAF) is a catastrophic complication that can occur after open abdomen. EAFs cause severe body fluid loss, hypercatabolism, and wound complications, leading to adverse clinical outcomes. Small and low-output EAFs might be managed by “reduction and isolation” strategies with vacuum assisted closed dressings to achieve spontaneous healing, while large and high-output EAFs should be resected when the patients are clinically stable. Infection control and management of the enteric effluent are key elements in achieving favorable clinical conditions which should precede definite surgery for EAFs.

Citation: Cho J, Sung K, Lee D. Management of the enteroatmospheric fistula: A case report. *World J Clin Cases* 2022; 10(20): 6954-6959

URL: <https://www.wjgnet.com/2307-8960/full/v10/i20/6954.htm>

DOI: <https://dx.doi.org/10.12998/wjcc.v10.i20.6954>

INTRODUCTION

An enterocutaneous fistula (ECF) is an enteric fistula arising from the viscus organs within the peritoneum, such as the colon, stomach, and small intestine. Enteroatmospheric fistula (EAF) is an exposed ECF, and it usually develops as a complication of open abdomen. Patients with EAF have high rates of morbidities, which include fluid and electrolyte loss, acid-base imbalance, hypercatabolism, vitamin and trace element deficiencies, and wound complications[1]. We recently treated a patient who exhibited EAFs after ventral hernia repair. It was challenging to protect the surrounding skin from the enteric effluent and to deliver optimal nutritional support for this patient because it was almost impossible to isolate and reduce the fistula output. In this report, we introduce our method to control the bowel effluent from the EAF and discuss the appropriate treatment strategy for patients with high-output EAF.

CASE PRESENTATION

Chief complaints

A 72-year-old female patient presented two EAFs on her abdomen.

History of present illness

This patient visited our outpatient department with a complaint of bulging mass on her low abdomen, and underwent ventral hernia repair in our hospital. Five days after the surgery, she exhibited severe abdominal pain with septic shock. Exploratory laparotomy revealed extensive intestinal adhesions and severe intraperitoneal contamination. Since the patient was hemodynamically unstable, we could not aggressively dissect the adhesions; instead, we removed the mesh and performed blunt dissection toward the suspected injury sites and placed three open drain systems as a salvage strategy (Figure 1). Although critical care was challenging for this patient, the systemic infection was gradually resolved postoperatively, and two EAFs were developed eventually.

History of past illness

She had no known medical comorbidities except for well-controlled hypertension and diabetes.

Personal and family history

She had no personal and family history.

Physical examination

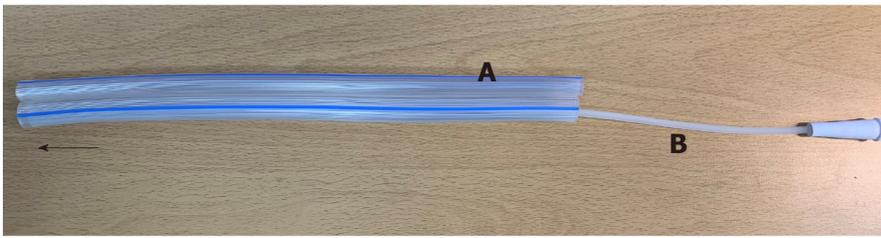
We found a bulging mass on her low abdomen, and there were no symptoms or signs of the intestinal obstruction.

Laboratory examinations

No abnormalities were found on the laboratory examinations, including complete blood cell count, cardiac markers, and coagulation profile.

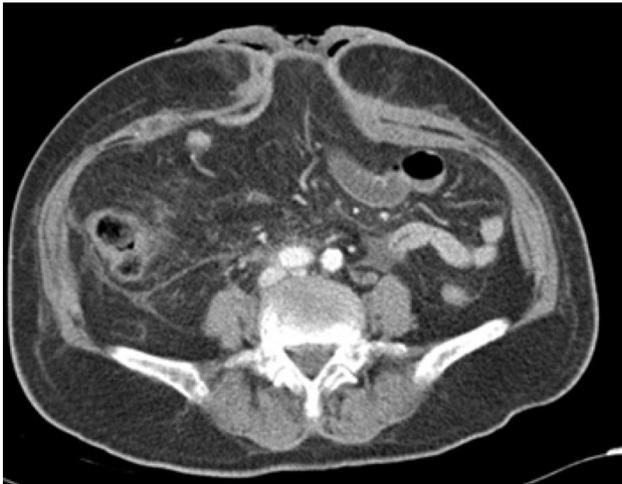
Imaging examinations

An abdominal computed tomography scan demonstrated the EAF of this patient (Figure 2).



DOI: 10.12998/wjcc.v10.i20.6954 Copyright ©The Author(s) 2022.

Figure 1 Active open drain system. Arrow indicates direction toward peritoneal cavity. A: Two penrose drains (All-silicone Penrose Drainage Tube, O.D 12 mm, Sewoon Medical CO Ltd., Seoul, Korea); B: Catheter for negative pressure application (PVC suction catheter, 12 Fr, Sewoon Medical CO Ltd., Seoul, Korea).



DOI: 10.12998/wjcc.v10.i20.6954 Copyright ©The Author(s) 2022.

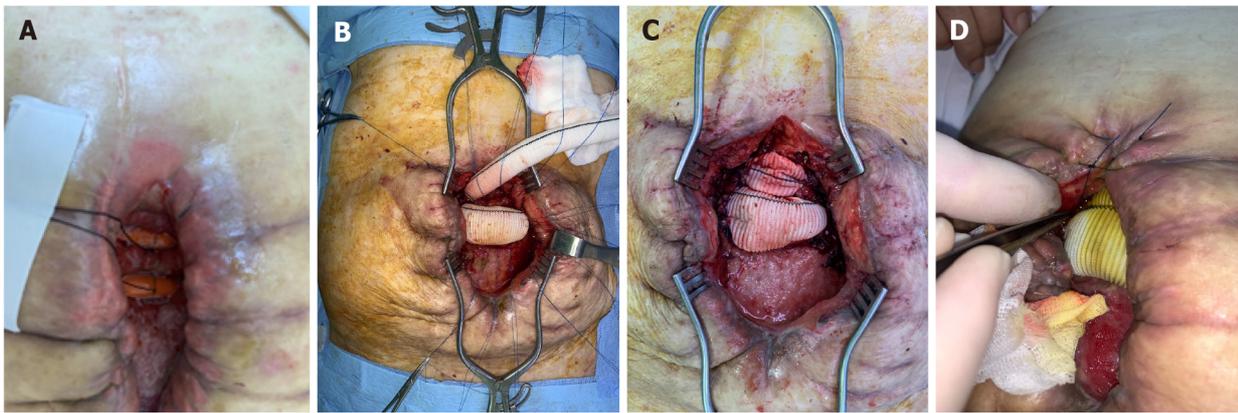
Figure 2 Abdominal computed tomography scan showed an enteroatmospheric fistula on the midline of the abdomen.

FINAL DIAGNOSIS

The final diagnosis of the presented case is the postoperative EAF.

TREATMENT

To achieve spontaneous closure of the EAFs, fasting with full caloric parenteral nutrition (PN), electrolyte repletion, antacids, octreotide, and frequent surgical wound dressing with protection of the surrounding tissue from the enteric effluent were applied in this case. However, the daily output of the EAFs consistently exceeded 1000 mL, and the surrounding tissues were severely contaminated by enteric effluent despite the use of vacuum-assisted closure (VAC) dressings. Moreover, the initiation of enteral nutrition (EN) was impossible because the output increased dramatically whenever EN was attempted. We should have reduced the fistula output to improve the patient's clinical condition. First, we opened the surgical wound and inserted rubber drains into the intestinal lumens to reduce the fistula output (Figure 3A). This strategy worked temporarily during fasting, and the fistula output decreased to < 500 mL/d; however, the fistula output returned to > 1000 mL/d as soon as EN was started, although the EN was elemental. We found that the diameter of the inserted rubber drains was insufficient for the enteric flow. Thus, endoscopic stent insertion was attempted; however, this strategy also failed because the efferent and afferent limbs of the EAFs appeared to have sharp angles, causing expulsion of the inserted stents. Subsequently, on the 32nd postoperative delirium (POD), we implanted two vascular grafts (GELWEAGE™ straights, Vasuteck Limited, Inchinnan, United Kingdom) between the openings of each EAF to restore enteric continuity (Figures 3B and C). The two EAFs had a total of 4 openings, and the two openings of each EAF could be identified because the posterior walls of the intestine were attached to each other. Anastomoses between the intestinal openings of each EAF and the vascular grafts were performed *via* the interrupted suture technique (Figure 3B). After the operation, no fistula output was observed, and elemental EN began on the 5th POD. Although the anastomoses were not completely healed and there was some leakage after the initiation of EN (Figure 3D), the anastomosed vascular graft showed acceptable patency. The output remained < 300 mL/d, and the



DOI: 10.12998/wjcc.v10.i20.6954 Copyright ©The Author(s) 2022.

Figure 3 Treatment imagines. A: Rubber drains inserted into the intestinal lumens; B: Vascular grafts anastomoses; C: To the openings of each enteroatmospheric fistula; D: Leakage from the anastomoses after the initiation of elemental enteral feeding.

patient became comfortable clinically and emotionally. EN did not proceed to polymeric formulas, and elemental EN was maintained for the risk of anastomosis breakdown.

OUTCOME AND FOLLOW-UP

The patient could be discharged from the hospital with a VAC dressing on the 16th POD after graft implantation (on the 53rd POD after ventral hernia repair) and received VAC dressing management regularly at the outpatient department. Two months after discharge, she underwent EAF resection, and the involved intestines were the distal jejunum and sigmoid colon.

DISCUSSION

EAF is not a true fistula, as it has no fistula tract, and can be caused by the following conditions: (1) Anastomosis leakage; (2) Temporary abdominal closure; (3) Adhesions between the edematous intestine and the abdominal wall; (4) Surgical site infection; (5) Burst abdomen; and (6) Bowel ischemia[1]. Among 517 patients from The American Association for Surgery in Trauma open abdomen registry, 111 (21%) developed ECF, EAF, or intra-abdominal sepsis[2]. The incidence of EAF has been reported to be 2% to 25% in trauma patients, 20% to 25% in patients with abdominal sepsis, and 50% in patients with pancreas necrosis[3]. A multivariate prognostic analysis from China demonstrated that sepsis, multiorgan dysfunction syndrome, and hemorrhage were independent risk factors for death in ECF patients, and that active lavage and drainage were protective factors[4]. Therefore, fistula-associated abdominal sepsis should be recognized and promptly treated with source control. Control of abdominal sepsis can reduce the mortality of patients with EAF[5,6]. Once sepsis and peritonitis are controlled in patients with ECF, conservative treatment can be performed for spontaneous closure of the fistula. However, in patients with EAF, spontaneous closure cannot be expected; therefore, isolation and reduction of the enteric effluent is required to achieve an optimal intra-abdominal environment and stable clinical condition for definite surgery. Various techniques using VAC dressings have been introduced to isolate enteric effluent from the surrounding tissue[7-9]. However, these methods cannot reduce the output volume; therefore, anticathartics, somatostatin analogs, antisecretories, and cholestyramine might be considered for patients with high-output fistulas[10], because fistula output reduction is crucial for simplifying fluid therapy, performing wound management, providing optimal nutritional support, and applying nursing practices. If these strategies are successful in controlling the enteric effluent, the patients can undergo definite surgery after achieving favorable clinical conditions. Such conditions might be achieved in some patients after 1-2 mo, while some patients may even need 1 year[11,12]. Fistula can cause an intraperitoneal inflammatory response and severe adhesions, for which early surgery might be dangerous[13]. The unfavorable abdominal environment can persist for 6-8 wk after exposure in the open abdominal wound[14]. One study reported that surgery-related mortality was significantly high in the period between 11 and 42 d after the development of a fistula[13]. However, in patients with high-output EAF unresponsive to isolation/reduction treatments, persistent wound contamination and malnutrition might worsen the clinical course, and it can be impossible to achieve optimal conditions for definite surgery. Our patient exhibited massive EAF output despite pharmacologic treatments and the use of a VAC dressings. We should have reduced the fistula output

to improve the patient's clinical condition. However, intraluminal approaches to reduce fistula output by restoring intestinal continuity failed. The surrounding skin was severely contaminated, causing septic wound complications, and prolonged PN eventually resulted in catheter-related complications, hepatic dysfunction, nutritional imbalance, and emotional problems. Finally, we noticed that both the efferent and afferent intestines to the EAFs were clearly exposed; therefore, we could anastomose them with vascular grafts. Although the anastomoses did not heal completely due to insufficient cellular ingrowth, intestinal edema, and an indistinct serosal layer, the enteric outflow could be controlled after the procedure. Furthermore, the additional use of VAC dressings played a key role in isolating the enteric outflow.

CONCLUSION

The EAF is a challenging condition with high morbidity and mortality rates. Small and low-output EAFs might be managed by "reduction and isolation" strategies with VAC dressings to achieve spontaneous healing, while large and high-output EAFs should be resected when the patients are clinically stable. The method introduced in this report can control enteric outflow in patients with EAFs unresponsive to conventional treatments, and this approach can be helpful in achieving favorable clinical conditions for definite surgery.

ACKNOWLEDGEMENTS

The authors thank to our surgical residents and surgical critical nursing team for their sincere assistance in surgery and post-operative management.

FOOTNOTES

Author contributions: Cho J and Sung K participated in treatment and prepared manuscript and performed the literature search; Lee D participated in manuscript revision and final review; and all authors read and approved the final manuscript.

Informed consent statement: Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Conflict-of-interest statement: All the authors report no relevant conflicts of interest for this article.

CARE Checklist (2016) statement: The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

Open-Access: This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <https://creativecommons.org/licenses/by-nc/4.0/>

Country/Territory of origin: South Korea

ORCID number: Jinbeom Cho 0000-0002-6329-016X; Kiyoung Sung 0000-0002-8369-425X; Dosang Lee 0000-0001-9592-3315.

S-Editor: Wang JJ

L-Editor: A

P-Editor: Wang JJ

REFERENCES

- 1 **Marinis A**, Gkiokas G, Argyra E, Fragulidis G, Polymeneas G, Voros D. "Enteroatmospheric fistulae"--gastrointestinal openings in the open abdomen: a review and recent proposal of a surgical technique. *Scand J Surg* 2013; **102**: 61-68 [PMID: 23820678 DOI: 10.1177/1457496913482252]
- 2 **Bradley MJ**, Dubose JJ, Scalea TM, Holcomb JB, Shrestha B, Okoye O, Inaba K, Bee TK, Fabian TC, Whelan JF, Ivatury RR; AAST Open Abdomen Study Group. Independent predictors of enteric fistula and abdominal sepsis after damage control laparotomy: results from the prospective AAST Open Abdomen registry. *JAMA Surg* 2013; **148**: 947-954 [PMID:

- 23965658 DOI: [10.1001/jamasurg.2013.2514](https://doi.org/10.1001/jamasurg.2013.2514)]
- 3 **Becker HP**, Willms A, Schwab R. Small bowel fistulas and the open abdomen. *Scand J Surg* 2007; **96**: 263-271 [PMID: [18265852](https://pubmed.ncbi.nlm.nih.gov/18265852/) DOI: [10.1177/145749690709600402](https://doi.org/10.1177/145749690709600402)]
 - 4 **Zheng T**, Xie HH, Wu XW, Chi Q, Wang F, Yang ZH, Chen CW, Mai W, Luo SM, Song XF, Yang SM, Zhou W, Liu HY, Xu XJ, Zhou Z, Liu CY, Ding LA, Xie K, Han G, Liu HB, Wang JZ, Wang SC, Wang PG, Wang GF, Gu GS, Ren JA. [Investigation of treatment and analysis of prognostic risk on enterocutaneous fistula in China: a multicenter prospective study]. *Zhonghua Wei Chang Wai Ke Za Zhi* 2019; **22**: 1041-1050 [PMID: [31770835](https://pubmed.ncbi.nlm.nih.gov/31770835/) DOI: [10.3760/cma.j.issn.1671-0274.2019.11.007](https://doi.org/10.3760/cma.j.issn.1671-0274.2019.11.007)]
 - 5 **Annibali R**, Pietri P. Fistulous complications of Crohn's disease. *Int Surg* 1992; **77**: 19-27 [PMID: [1577575](https://pubmed.ncbi.nlm.nih.gov/1577575/)]
 - 6 **Brooks NE**, Idrees JJ, Steinhagen E, Giglia M, Stein SL. The impact of enteric fistulas on US hospital systems. *Am J Surg* 2021; **221**: 26-29 [PMID: [32778398](https://pubmed.ncbi.nlm.nih.gov/32778398/) DOI: [10.1016/j.amjsurg.2020.06.017](https://doi.org/10.1016/j.amjsurg.2020.06.017)]
 - 7 **Goverman J**, Yelon JA, Platz JJ, Singson RC, Turcinovic M. The "Fistula VAC," a technique for management of enterocutaneous fistulae arising within the open abdomen: report of 5 cases. *J Trauma* 2006; **60**: 428-31; discussion 431 [PMID: [16508512](https://pubmed.ncbi.nlm.nih.gov/16508512/) DOI: [10.1097/01.ta.0000203588.66012.c4](https://doi.org/10.1097/01.ta.0000203588.66012.c4)]
 - 8 **Al-Khoury G**, Kaufman D, Hirshberg A. Improved control of exposed fistula in the open abdomen. *J Am Coll Surg* 2008; **206**: 397-398 [PMID: [18222399](https://pubmed.ncbi.nlm.nih.gov/18222399/) DOI: [10.1016/j.jamcollsurg.2007.07.027](https://doi.org/10.1016/j.jamcollsurg.2007.07.027)]
 - 9 **Verhaalen A**, Watkins B, Brasel K. Techniques and cost effectiveness of enteroatmospheric fistula isolation. *Wounds* 2010; **22**: 212-217 [PMID: [25901513](https://pubmed.ncbi.nlm.nih.gov/25901513/)]
 - 10 **Bleier JI**, Hedrick T. Metabolic support of the enterocutaneous fistula patient. *Clin Colon Rectal Surg* 2010; **23**: 142-148 [PMID: [21886463](https://pubmed.ncbi.nlm.nih.gov/21886463/) DOI: [10.1055/s-0030-1262981](https://doi.org/10.1055/s-0030-1262981)]
 - 11 **Jamshidi R**, Schechter WP. Biological dressings for the management of enteric fistulas in the open abdomen: a preliminary report. *Arch Surg* 2007; **142**: 793-796 [PMID: [17724853](https://pubmed.ncbi.nlm.nih.gov/17724853/) DOI: [10.1001/archsurg.142.8.793](https://doi.org/10.1001/archsurg.142.8.793)]
 - 12 **Marinis A**, Gkiokas G, Anastasopoulos G, Fragulidis G, Theodosopoulos T, Kotsis T, Mastorakos D, Polymeneas G, Voros D. Surgical techniques for the management of enteroatmospheric fistulae. *Surg Infect (Larchmt)* 2009; **10**: 47-52 [PMID: [19245361](https://pubmed.ncbi.nlm.nih.gov/19245361/) DOI: [10.1089/sur.2008.044](https://doi.org/10.1089/sur.2008.044)]
 - 13 **Fazio VW**, Coutsoftides T, Steiger E. Factors influencing the outcome of treatment of small bowel cutaneous fistula. *World J Surg* 1983; **7**: 481-488 [PMID: [6624123](https://pubmed.ncbi.nlm.nih.gov/6624123/) DOI: [10.1007/BF01655937](https://doi.org/10.1007/BF01655937)]
 - 14 **Hill GL**. Operative strategy in the treatment of enterocutaneous fistulas. *World J Surg* 1983; **7**: 495-501 [PMID: [6414191](https://pubmed.ncbi.nlm.nih.gov/6414191/) DOI: [10.1007/BF01655939](https://doi.org/10.1007/BF01655939)]



Published by **Baishideng Publishing Group Inc**
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA
Telephone: +1-925-3991568
E-mail: bpgoffice@wjgnet.com
Help Desk: <https://www.f6publishing.com/helpdesk>
<https://www.wjgnet.com>

