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Contents

Thrice Monthly Volume 9 Number 22 August 6, 2021

REVIEW

- 6178** COVID-19 infection and liver injury: Clinical features, biomarkers, potential mechanisms, treatment, and management challenges

Sivandzadeh GR, Askari H, Safarpour AR, Ejtehad F, Raeis-Abdollahi E, Vaez Lari A, Abazari MF, Tarkesh F, Bagheri Lankarani K

- 6201** Gastrointestinal manifestations of systemic sclerosis: An updated review

Luquez-Mindiola A, Atuesta AJ, Gómez-Aldana AJ

MINIREVIEWS

- 6218** Mesenchymal stem cell-derived exosomes: An emerging therapeutic strategy for normal and chronic wound healing

Zeng QL, Liu DW

- 6234** Role of autophagy in cholangiocarcinoma: Pathophysiology and implications for therapy

Ninfolle E, Pinto C, Benedetti A, Marziani M, Maroni L

ORIGINAL ARTICLE

Case Control Study

- 6244** Risk factors for intussusception in children with Henoch-Schönlein purpura: A case-control study

Zhao Q, Yang Y, He SW, Wang XT, Liu C

Retrospective Study

- 6254** Sequential therapy with combined trans-papillary endoscopic naso-pancreatic and endoscopic retrograde pancreatic drainage for pancreatic pseudocysts

He YG, Li J, Peng XH, Wu J, Xie MX, Tang YC, Zheng L, Huang XB

- 6268** Retrospective study of effect of whole-body vibration training on balance and walking function in stroke patients

Xie L, Yi SX, Peng QF, Liu P, Jiang H

- 6278** Risk factors for preoperative carcinogenesis of bile duct cysts in adults

Wu X, Li BL, Zheng CJ, He XD

- 6287** Diagnostic and prognostic value of secreted protein acidic and rich in cysteine in the diffuse large B-cell lymphoma

Pan PJ, Liu JX

- 6300** Jumbo cup in hip joint renovation may cause the center of rotation to increase

Peng YW, Shen JM, Zhang YC, Sun JY, Du YQ, Zhou YG

Clinical Trials Study

- 6308** Effect of exercise training on left ventricular remodeling in patients with myocardial infarction and possible mechanisms
Cai M, Wang L, Ren YL

Observational Study

- 6319** Analysis of sleep characteristics and clinical outcomes of 139 adult patients with infective endocarditis after surgery
Hu XM, Lin CD, Huang DY, Li XM, Lu F, Wei WT, Yu ZH, Liao HS, Huang F, Huang XZ, Jia FJ
- 6329** Health-related risky behaviors and their risk factors in adolescents with high-functioning autism
Sun YJ, Xu LZ, Ma ZH, Yang YL, Yin TN, Gong XY, Gao ZL, Liu YL, Liu J
- 6343** Selection of internal fixation method for femoral intertrochanteric fractures using a finite element method
Mu JX, Xiang SY, Ma QY, Gu HL

META-ANALYSIS

- 6357** Neoadjuvant chemotherapy for patients with resectable colorectal cancer liver metastases: A systematic review and meta-analysis
Zhang Y, Ge L, Weng J, Tuo WY, Liu B, Ma SX, Yang KH, Cai H

CASE REPORT

- 6380** Ruptured intracranial aneurysm presenting as cerebral circulation insufficiency: A case report
Zhao L, Zhao SQ, Tang XP
- 6388** Prostatic carcinosarcoma seven years after radical prostatectomy and hormonal therapy for prostatic adenocarcinoma: A case report
Huang X, Cai SL, Xie LP
- 6393** Pyogenic arthritis, pyoderma gangrenosum, and acne syndrome in a Chinese family: A case report and review of literature
Lu LY, Tang XY, Luo GJ, Tang MJ, Liu Y, Yu XJ
- 6403** Malaria-associated secondary hemophagocytic lympho-histiocytosis: A case report
Zhou X, Duan ML
- 6410** Ileal hemorrhagic infarction after carotid artery stenting: A case report and review of the literature
Xu XY, Shen W, Li G, Wang XF, Xu Y
- 6418** Inflammatory myofibroblastic tumor of the pancreatic neck: A case report and review of literature
Chen ZT, Lin YX, Li MX, Zhang T, Wan DL, Lin SZ
- 6428** Management of heterotopic cesarean scar pregnancy with preservation of intrauterine pregnancy: A case report
Chen ZY, Zhou Y, Qian Y, Luo JM, Huang XF, Zhang XM

- 6435** Manifestation of severe pneumonia in anti-PL-7 antisynthetase syndrome and B cell lymphoma: A case report
Xu XL, Zhang RH, Wang YH, Zhou JY
- 6443** Disseminated infection by *Fusarium solani* in acute lymphocytic leukemia: A case report
Yao YF, Feng J, Liu J, Chen CF, Yu B, Hu XP
- 6450** Primary hepatic neuroendocrine tumor – ¹⁸F-fluorodeoxyglucose positron emission tomography/computed tomography findings: A case report
Rao YY, Zhang HJ, Wang XJ, Li MF
- 6457** Malignant peripheral nerve sheath tumor in an elderly patient with superficial spreading melanoma: A case report
Yang CM, Li JM, Wang R, Lu LG
- 6464** False positive anti-hepatitis A virus immunoglobulin M in autoimmune hepatitis/primary biliary cholangitis overlap syndrome: A case report
Yan J, He YS, Song Y, Chen XY, Liu HB, Rao CY
- 6469** Successful totally laparoscopic right trihepatectomy following conversion therapy for hepatocellular carcinoma: A case report
Zhang JJ, Wang ZX, Niu JX, Zhang M, An N, Li PF, Zheng WH
- 6478** Primary small cell esophageal carcinoma, chemotherapy sequential immunotherapy: A case report
Wu YH, Zhang K, Chen HG, Wu WB, Li XJ, Zhang J
- 6485** Subdural fluid collection rather than meningitis contributes to hydrocephalus after cervical laminoplasty: A case report
Huang HH, Cheng ZH, Ding BZ, Zhao J, Zhao CQ
- 6493** Phlegmonous gastritis developed during chemotherapy for acute lymphocytic leukemia: A case report
Saito M, Morioka M, Izumiyama K, Mori A, Ogasawara R, Kondo T, Miyajima T, Yokoyama E, Tanikawa S
- 6501** Spinal epidural hematoma after spinal manipulation therapy: Report of three cases and a literature review
Liu H, Zhang T, Qu T, Yang CW, Li SK
- 6510** Abdominal hemorrhage after peritoneal dialysis catheter insertion: A rare cause of luteal rupture: A case report
Gan LW, Li QC, Yu ZL, Zhang LL, Liu Q, Li Y, Ou ST
- 6515** Concealed mesenteric ischemia after total knee arthroplasty: A case report
Zhang SY, He BJ, Xu HH, Xiao MM, Zhang JJ, Tong PJ, Mao Q
- 6522** Chylothorax following posterior low lumbar fusion surgery: A case report
Huang XM, Luo M, Ran LY, You XH, Wu DW, Huang SS, Gong Q
- 6531** Non-immune hydrops fetalis: Two case reports
Maranto M, Cigna V, Orlandi E, Cucinella G, Lo Verso C, Duca V, Picciotto F

- 6538** Bystander effect and abscopal effect in recurrent thymic carcinoma treated with carbon-ion radiation therapy: A case report
Zhang YS, Zhang YH, Li XJ, Hu TC, Chen WZ, Pan X, Chai HY, Ye YC
- 6544** Management of an intracranial hypotension patient with diplopia as the primary symptom: A case report
Wei TT, Huang H, Chen G, He FF
- 6552** Spontaneous rupture of adrenal myelolipoma as a cause of acute flank pain: A case report
Kim DS, Lee JW, Lee SH
- 6557** Neonatal necrotizing enterocolitis caused by umbilical arterial catheter-associated abdominal aortic embolism: A case report
Huang X, Hu YL, Zhao Y, Chen Q, Li YX
- 6566** Primary mucosa-associated lymphoid tissue lymphoma in the midbrain: A case report
Zhao YR, Hu RH, Wu R, Xu JK
- 6575** Extensive cutaneous metastasis of recurrent gastric cancer: A case report
Chen JW, Zheng LZ, Xu DH, Lin W

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Abdominal hemorrhage after peritoneal dialysis catheter insertion: A rare cause of luteal rupture: A case report

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Abstract

BACKGROUND

Abdominal hemorrhage is a complication of peritoneal dialysis catheter (PDC) insertion that cannot be neglected, and its causes are mainly related to surgical injury. This article reports a case of massive abdominal hemorrhage that was caused by a rare rupture of corpus luteum shortly after PDC during the initiation of peritoneal dialysis (PD) insertion.

CASE SUMMARY

A 37-year-old woman was surgically placed a Tenckhoff catheter because of end-stage renal disease. On the third postoperative day, the color of the abdominal drainage fluid was pink, and deepened gradually. It turned pale after initiating conservative treatment. On the tenth postoperative day, the color of the abdominal drainage fluid suddenly turned dark red, and the color progressively deepened. The patient's hemoglobin dropped from 88 g/L to 57 g/L. Abdominal computed tomography (CT) indicated abdominal effusion and a high-density shadow in the abdominal cavity. The surgeon performed a laparotomy and found that the corpus luteum had ruptured on the right side and a left ovarian blood body had formed. The gynecologist repaired the ovary and performed a bilateral oophoroplasty. After the operation, the patient stopped bleeding and hemodialysis was temporarily stopped. PD was resumed after half a month. The patient's condition improved, and she was discharged 14 d after the laparotomy.

CONCLUSION

If abdominal hemorrhage occurs in women of childbearing age after PDC inser-

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tion, luteal rupture should be considered as the cause.

Key Words: Abdominal hemorrhage; Peritoneal dialysis; Catheter insertion; Angiography; Exploratory laparotomy; Luteal rupture; Case report

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Core Tip: This article presents a rare case of abdominal hemorrhage during the induction of peritoneal dialysis (PD) shortly after PD catheter (PDC) insertion. Rupture of the corpus luteum was found to be the cause. We suggested that rare causes such as luteal rupture should be considered when abdominal hemorrhage occurs after PDC insertion, especially in women of childbearing age. Abdominal hemorrhage is difficult to control, and it is very important to understand the indications for exploratory laparotomy when progressive massive abdominal hemorrhage occurs after PDC insertion and conventional treatment is ineffective.

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INTRODUCTION

Abdominal hemorrhage is a complication of peritoneal dialysis catheter (PDC) insertion that cannot be neglected. Its common causes include intraoperative hemorrhage, catheter injury, rupture of abdominal organs, and abnormal coagulation function. Here, we present a case of abdominal hemorrhage during the induction of peritoneal dialysis (PD) shortly after PDC insertion in which a rare cause of rupture of the corpus luteum was found.

CASE PRESENTATION

Chief complaints

The patient was a 37-year-old woman who was admitted to the hospital because of end-stage renal disease. She wanted to receive PD treatment.

History of present illness

Ten months previously, the patient was diagnosed with chronic kidney disease. Her kidney disease progressed gradually.

History of past illness

The patient reported that she had suffered from thrombocytopenia for more than 10 years. As she refused bone marrow biopsy, the cause was unknown. She received conservative therapy because she had no obvious bleeding tendency. Her platelet level was maintained at approximately $70 \times 10^9/L$.

Personal and family history

Her last menstrual period was on June 29, 2019, 10 d before PDC insertion.

Physical examination

The patient's temperature was 36.5°C, her heart rate was 86 bpm, respiratory rate was 15 breaths per minute, blood pressure was 133/98 mmHg, and oxygen saturation in room air was 99%. The patient had slight bilateral symmetrical dorsal pitting edema of the feet. No other positive signs were found on physical examination.

Laboratory examination

Blood analysis showed that hemoglobin was 88 g/L, the platelet count was 74×10^9 /L, serum creatinine was 803.3 mmol/L, and the glomerular filtration rate was 5.1 mL/min. Urinalysis was 2+ in both protein and occult blood. Both Liver function and blood coagulation tests were normal.

Imaging examination

Color Doppler showed bilateral kidney atrophy.

FINAL DIAGNOSIS

A Tenckhoff catheter was surgically placed on July 10, 2019, and after successful insertion, the patient received routine hemostatic therapy with etamsylate injection. On the third postoperative day, we initiated PD fluid for abdominal flushing and found that it was pink, with 2520×10^6 erythrocytes/L in the rinse solution. Because the bleeding was slight, we did not administer any specific treatment. The patient was started on automated PD on the fourth postoperative day. The drainage liquid was still pink, the erythrocyte number rose to 12460×10^6 /L, the hemoglobin dropped from 88 g/L to 74 g/L, and the platelet count was 74×10^9 /L. We considered that this may have been caused by small-vessel hemorrhaging in the abdominal cavity, and administered intravenous hemagglutinate to strengthen the hemostatic treatment and continued the PD. The color of the drainage fluid did not change significantly. On the sixth postoperative day, the patient began to complain of dizziness and fatigue, and the color of the drainage liquid became bright red. The erythrocyte number in the rinse solution increased to 53900×10^6 /L, the hemoglobin dropped to 69 g/L, the platelet count was 77×10^9 /L, fibrinogen degradation products were 66.27 µg/mL and D-dimer was > 20 µg/mL. We considered that this may have been caused by active small-vessel hemorrhaging and acquired coagulation dysfunction in the abdominal omentum. We administered 200 mL fresh frozen plasma, 1.5 units of red blood cells, and 50 U cryoprecipitate. After treatment, the patient's symptoms were improved and the color of the dialysis solution gradually became pale. The erythrocyte number in the rinse solution dropped to 240×10^6 /L, the hemoglobin level increased to 72 g/L, the platelet count was 51×10^9 /L, and disseminated intravascular coagulation improved. On the tenth postoperative day, the color of the PD fluid suddenly became dark red. Microscopic examination found that the erythrocyte number of the rinse solution had reached the upper limit of detection, the hemoglobin dropped to 57 g/L, and the platelet count was 49×10^9 /L. After multidisciplinary consultation with the departments of gastrointestinal surgery, interventional medicine, and hematology we considered that this was caused by active small-vessel hemorrhage in the abdominal omentum and aggravated bleeding. As an exploratory laparotomy might not find the source of the bleeding and might cause new damage, we continued intravenous infusion of hemostatic drugs and blood products. Despite treatment, the abdominal bleeding was not relieved, and the hemoglobin level was reduced to 51 g/L. An abdominal CT ([Supplementary Figure 1](#)) revealed abdominal effusion and a high-density shadow in the abdominal cavity. After another multidisciplinary consultation, we suspected a new hemorrhage had occurred.

TREATMENT

Angiography of the abdominal aorta, right superior epigastric artery, right internal thoracic artery, and mesenteric artery did not find any bleeding sites. A laparotomy found that the bleeding volume was approximately 500 mL and removed an approximately 500 g blood clot. After careful exploration, the laparotomy found that the corpus luteum had ruptured on the right side and that a left ovarian blood body had formed ([Figure 1](#)). The gynecologist repaired the ovary and performed a bilateral oophoroplasty.

OUTCOME AND FOLLOW-UP

After the operation, the bleeding stopped. The patient was temporarily transferred for hemodialysis and resumed PD after half a month. Her condition improved, and she

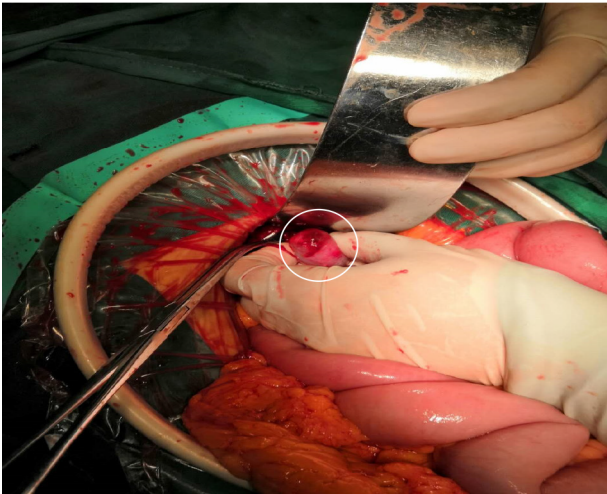


Figure 1 A right luteal rupture and hemorrhage found during exploratory laparotomy.

was discharged 14 d after the laparotomy.

DISCUSSION

There are many complications of PDC insertion. Bleeding is one of the most common complications, and estimates of the incidence of bleeding events range from 0% to 7.5% because of different study criteria, with PDC insertion performed by open surgery[1-6]. Abdominal hemorrhage after PDC insertion is a potentially serious complication, but the incidence shortly after PDC insertion has not been clearly reported.

In uremia patients, platelet function is defective[7], with enhanced platelet apoptosis [8] that leads to platelet dysfunction. In addition, coagulation disorders in uremia patients caused by dysfunction of clotting factors II, VII, IX, and X leads to bleeding tendency. In this case, the patient developed an abdominal hemorrhage shortly after PDC insertion, but the bleeding volume was low. The main reasons were considered to be related to surgical injury and uremia-related coagulation dysfunction. The patient's abdominal hemorrhage improved with conservative medical treatment for a time, but she experienced a sudden exacerbation of abdominal hemorrhage that did not respond to treatment. The bleeding was difficult to control and no bleeding site was found by angiography. An exploratory laparotomy found that the cause of the second abdominal hemorrhage was luteal rupture.

Luteal cyst rupture is a cause of hemorrhage and is not uncommon in women of childbearing age. Massive hemorrhage may lead to circulation failure or even death [9]. A number of factors can lead to luteal rupture, such as spontaneous luteal rupture caused by increased intraluminal pressure[10], abnormal coagulation function caused by excess anticoagulant activity, lack of coagulation factors[10-13], increased external force during sexual intercourse, strenuous exercise, and increased intraperitoneal pressure from forced stools and coughing. There have also been reports of luteal rupture during pregnancy[14]. Luteal rupture has also been reported in patients with thrombocytopenia[15,16]. There has been a report of primary malfunction of a PDC as a cause of encasement in a hemorrhagic corpus luteum[17]. However, there have been no reports of luteal rupture during the induction of PD shortly after PDC insertion. We speculated that the cause of the luteal rupture in the patient was related to coagulation dysfunction and uremic thrombocytopenia itself. PD fluid perfusion might have also increased abdominal pressure. Hemorrhage from a luteal rupture occurring after PDC insertion is sometimes difficult to distinguish from hemorrhage caused by surgical injury. Fortunately, a timely exploratory laparotomy was performed, and the cause of the abdominal hemorrhage was finally determined. It is necessary to carefully observe the clinical symptoms and signs and the color of the abdominal drainage fluid after PDC insertion and to monitor changes in the blood hemoglobin and red blood cell count of the abdominal flushing fluid. If an abdominal hemorrhage is difficult to control, some rare causes should be considered, especially in women of childbearing age, such as luteal rupture, endometriosis[18], and ruptured ectopic pregnancy[19].

CONCLUSION

In conclusion, massive abdominal hemorrhage after PDC insertion is a rare and serious complication. Some rare causes as well as common causes such as surgical injury should be excluded. It is very important to understand the indications for exploratory laparotomy if progressive massive abdominal hemorrhage occurs after PDC insertion and conventional treatment is ineffective.

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