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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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Concealed mesenteric ischemia after total knee arthroplasty: A case report

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Abstract

BACKGROUND

In critical care medicine, mesenteric ischemia (MI) is a life-threatening disease that can be present in both critically ill patients and those undergoing major surgery. For the first time, we report a case of concealed MI with a long course after knee arthroplasty.

CASE SUMMARY

A male patient underwent left total knee arthroplasty for gouty arthritis and developed a persistent fever and persistently high levels of serum infection markers after surgery. He was considered to have a periprosthetic site infection and treated with antibiotics and colchicine, periprosthetic debridement was performed, and the spacer was replaced, but no improvement was seen. At 54 d after arthroplasty, the patient developed gastrointestinal symptoms of nausea and vomiting, abdominal distention, and subsequently, cloudiness of consciousness, and hypotensive shock. Finally, the patient was diagnosed with ascending colonic mesentery ischemia with necrosis after laparotomy, which improved after right hemicolectomy.

CONCLUSION

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Concealed MI without gastrointestinal symptoms after major surgery is rare and easily misdiagnosed. Orthopedic surgeons need to be aware of this complication.

Key Words: Concealed mesenteric ischemia; Total knee arthroplasty; Complication; Case report

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Core Tip: We describe for the first time a case of concealed mesenteric ischemia (MI), a type of MI that lacks gastrointestinal signs and symptoms with fever as the only early symptom, which makes early diagnosis extremely difficult. MI often has a poor prognosis, and orthopedic surgeons must be aware of MI as a possible complication after total knee arthroplasty so that early diagnosis and intervention can be made for such concealed MI.

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INTRODUCTION

Mesenteric ischemia (MI) is not uncommon in clinical practice and can be considered either acute or chronic[1]. Chronic MI, characterized by repeated transient blood flow disturbances in the intestine, is often associated with atherosclerotic disease[2]. Acute MI is usually caused by arterial or venous thromboembolism blocking the blood supply and needs to be considered when signs such as severe abdominal pain, nausea, and vomiting with elevated levels of inflammatory markers occur after major surgery [3]. Acute MI progresses rapidly and is associated with a mortality rate of 50% to 70% [4]. We report a case of concealed MI after total knee replacement with a course different from those of acute and chronic MI; fever was the only early symptom, making early diagnosis and intervention extremely difficult.

CASE PRESENTATION

Chief complaints

A 56-year-old male patient presented to our orthopedic outpatient clinic with swelling and pain in both knees with limited range of motion for more than 6 mo.

History of present illness

Six months ago, the patient presented with swelling and pain in both knees, especially in the left knee. The pain worsened over the past 6 mo, he was unable to stand and walk, and his activities were limited.

History of past illness

The patient had a history of gout for more than 10 years and hypertension for more than 20 years. The patient underwent heart valve replacement 9 years ago and took oral warfarin 1.875 mg once daily after surgery (coagulation was never monitored during treatment with the drug). He had a history of gastrointestinal bleeding. He denied having other major medical illnesses, such as diabetes, coronary heart disease, and kidney disease, and a history of infectious diseases, such as hepatitis and tuberculosis.

Physical examination

The patient had swelling and deformities in both knees, pressure pain around both knees, an elevated skin temperature, limited range of motion in both knees, and

multiple swollen gout stones visible on both hands and both feet.

Laboratory examinations

The patient's blood uric acid level was 503 $\mu\text{mol/L}$. The international normalized ratio was 5.75.

Imaging examinations

The patient's X-ray examination showed gouty arthritis in both knees (Figure 1).

The first knee surgery

After multidisciplinary consultation, the patient underwent left-sided total knee arthroplasty because of relatively severe symptoms to regulate coagulation and renal insufficiency. Postoperative coagulation indicators showed that fibrinogen was 4.81 g/L, activated partial thromboplastin time was 43.7 s, and D-dimer was 4.7 mg/L FEU. The postoperative radiographs (Figure 2) showed good prosthesis alignment and good force lines in the lower extremities, and antibiotics anti-infection and low-molecular-weight heparin anticoagulation treatment were given postoperatively.

On the third day after surgery, the patient developed recurrent hyperthermia with a maximum temperature of 38.6 °C. The dressing on the surgical incision was dry and clean, there was no obvious bleeding or oozing from the incision, and the levels of blood flow and sensation in the left lower limb were normal. The procalcitonin, white blood cell (WBC), and C-reactive protein levels were consistently elevated, and the patient was considered to have a surgical site infection. He received anti-infection treatment for 48 d, during which the antibiotics were escalated several times and the patient was given anti-inflammatory treatment and pain relief, but there was still recurrent fever and elevated levels of inflammatory indexes.

The second knee surgery

The patient was considered to have a periprosthetic infection based on the recurrent elevated temperature and inflammatory indicator levels. We then performed a necrosectomy of the left knee joint, replaced the spacer, and performed vacuum sealing drainage. Intraoperatively, a large amount of white discharge and uric acid crystals were found in the knee joint, but no necrotic tissue or pus was observed. Three days later, the patient had a sudden onset of chest tightness and shortness of breath, nausea, and vomiting, with a temperature of 39 °C. Then the patient began to experience confusion, abdominal distention, and erratic reflux. Later, the patient developed hypotension with shock. The abdominal physical examination showed significant pressure pain in the right upper abdomen but not in the left abdomen.

The first abdominal surgery

Abdominal computed tomography (CT) showed intestinal emphysema with fluid planes and exudative changes (Figure 3A). The patient was considered to have an abdominal infection with possible intestinal necrosis and obstruction, so we immediately performed laparotomy, abdominal flushing and drainage, and terminal ileostomy. During the surgery, we found approximately 200 mL of yellowish turbid exudative ascites in the abdominal cavity, localized thickening and edema in the ascending colon, and obvious distension and dilatation in the transverse sigmoid colon. The patient was transferred to the intensive care unit (ICU) after surgery, and after fluid resuscitation, anti-infection treatment, and other symptomatic treatments, his condition improved, and his vital signs stabilized.

Twenty-eight days later, the patient developed persistent right-sided abdominal pain, fever, and bloody exudate from the stoma, followed by bloody stools. The CT examination of the patient's abdomen showed thickening of the wall of the ascending colon with multiple exudative changes around it and possible local hematoma (Figure 3B). He was transferred to the ICU again and was treated with anti-infection treatment, fluid resuscitation, and coagulation correction. The symptoms did not improve, the fever and abdominal pain were recurrent, and the inflammatory indexes did not decrease, so after his family provided permission, laparotomy was performed again due to aggravated infection.

The second abdominal surgery

Forty-two days after the first abdominal surgery, we performed laparotomy, intestinal adhesion release, and right hemicolectomy. Intraoperatively, we found congested and edematous thickening of the ascending colon, hemorrhagic exudation of the prerenal fascia, inflammatory changes in the intestinal wall mucosa, and significant local

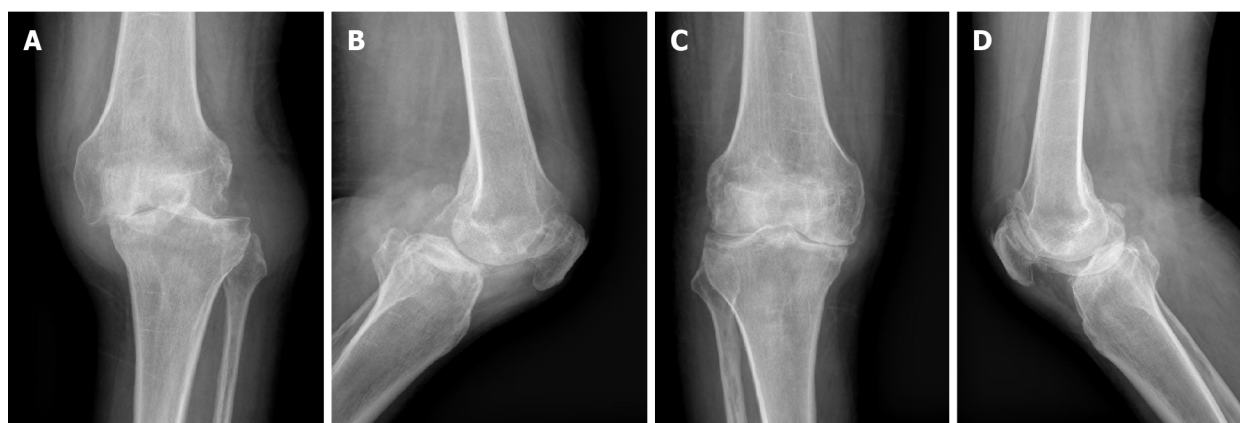


Figure 1 Preoperative X-ray images. A and B: Left knee front and lateral radiographs; C and D: Right knee front and lateral radiographs.



Figure 2 Postoperative front and lateral X-ray images of the left knee. A: Front X-ray image of the left knee; B: Lateral X-ray image of the left knee.



Figure 3 Abdominal computed tomography. A: The initial abdominal computed tomography (CT) showed ascending colon emphysema with fluid planes and exudative changes; B: The second abdominal CT showed thickening of the wall of the ascending colon with multiple exudative changes around it and possible local hematoma.

intestinal adhesions; right hemicolectomy was performed, and a pathological examination was performed. The patient was diagnosed with ascending colon mesenteric ischemic necrosis with infection, and the pathological findings were consistent with colonic mesenteric ischemic changes (Figure 4).

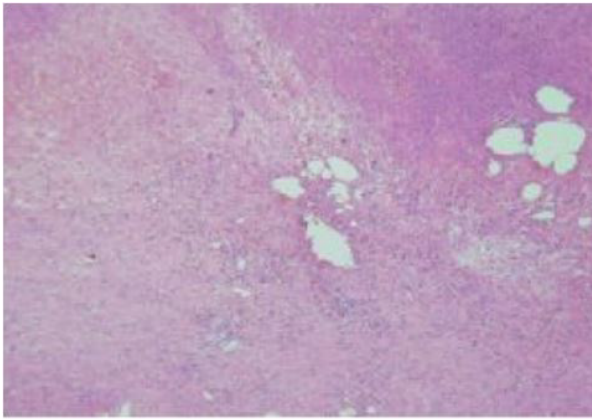


Figure 4 The pathology of the right hemicolectomy specimen showed mucosal surface erosion, inflammatory exudation, and necrosis of the intestinal canal, and the surrounding intestinal wall and mesentery were vasodilated and congested, consistent with ischemic changes of the colon.

FINAL DIAGNOSIS

The patient was diagnosed with MI after total knee arthroplasty.

TREATMENT

After total knee arthroplasty for gouty arthritis, the patient underwent knee debridement again with replacement spacers and drainage because prosthesis infection was suspected. The patient underwent laparotomy two times after developing gastrointestinal symptoms and underwent a right hemicolectomy during the final laparotomy.

OUTCOME AND FOLLOW-UP

After the second abdominal surgery with symptomatic treatment, such as anti-infection and rehydration treatment, the patient's mesenteric ischemic symptoms disappeared, the gastrointestinal function returned to normal, and the patient was eventually discharged from the hospital. The patient returned to the hospital 3 mo after discharge for ileostomy closure.

DISCUSSION

Since early intervention is crucial for the prognosis of MI, MI needs to be diagnosed early, which can be challenging[5]. When MI is suspected to exist, it can usually be diagnosed on the basis of gastrointestinal signs and symptoms combined with ischemic changes such as exudate and thickening of the intestinal wall on abdominal and bowel CT scans or direct vascular computed tomography angiography (CTA) scans in response to vascular blood flow[6,7]. It is also important to note that other diseases such as appendicitis, gastroduodenal perforation, and acute pancreatitis still need to be ruled out when MI is complicated by acute abdominal conditions such as vomiting of coffee-like contents, bloody stools, or signs of peritoneal irritation. However, in MI cases without gastrointestinal symptoms after major orthopedic surgery, such as that described in this study after total knee replacement, it is difficult to diagnose MI on the basis of only signs of fever and elevated levels of infection markers; these signs are often attributed to prosthetic infection, which is often of utmost concern to orthopedic surgeons postoperatively. When anti-infective treatment is administered for a long period and considered ineffective, it is clear that the period for early intervention has been missed, leading to the development of terminal bowel necrosis. The prognosis after intestinal necrosis is extremely poor, with a high mortality rate[8], but fortunately, with timely surgery and aggressive anti-infective

and fluid resuscitation treatment, the patient avoided a worse outcome.

We also did not perform angiography or vascular CTA, and the mechanism of MI in this patient is not clear. We speculate that postoperative thrombosis formed but probably did not involve the macrovascular and major arteries, such as the superior mesenteric artery, because thrombosis in these locations causes ischemic symptoms that are often acute and severe, such as intense spasmodic abdominal pain[3]. Although venous MI is associated with a lower mortality rate than arterial MI, more than one-third of patients require interventions other than anticoagulation[9]. Although it was difficult to make a clear diagnosis in the early stage, the inflammatory response caused by intestinal dysfunction, intestinal infection, and intestinal bacterial translocation still existed, leading to the elevation of infection index levels. We used antibiotics, anticoagulation, and symptomatic support treatment to treat the disease in the early stage, which perhaps suppressed the infection and delayed the development of the disease to a certain extent. At a later stage, gastrointestinal symptoms developed rapidly in the postoperative period, probably due to further aggravation of MI by the hypercoagulable state and possible thrombosis caused by the second knee surgery.

This rare type of concealed MI progresses slowly with an early symptom of fever only, unlike acute mesenteric ischemia and chronic mesenteric ischemia, where abdominal pain is the initial symptom[10], and it is worth thinking about how to make an early diagnosis. In this case, the patient's only early sign was fever. Considering that the patient had a history of heart valve replacement and abnormal coagulation function, there was a possibility of thromboembolism, and previous studies have shown that an elevated WBC count is a risk factor for MI progression[11,12]. After excluding blood flow disorders in the lower extremities and heart, MI is one of the complications after major surgery that needs to be considered. When patients with coagulation abnormalities present with postoperative fever, abdominal CT should also be performed routinely in the postoperative investigation.

CONCLUSION

In general, MI progresses rapidly and has a poor prognosis. When elevated levels of inflammatory markers such as WBC are present after major orthopedic surgery without obvious signs of infection around the surgical area, this complication needs to be considered promptly, even in the absence of obvious gastrointestinal symptoms so that early intervention can be performed.

REFERENCES

- 1 **Zientara A**, Domenghino AR, Schwegler I, Bruijnen H, Schnider A, Weber M, Gutknecht S, Attigah N. Interdisciplinary approach in emergency revascularization and treatment for acute mesenteric ischemia. *BMC Surg* 2021; **21**: 89 [PMID: 33602217 DOI: 10.1186/s12893-021-01102-9]
- 2 **Clair DG**, Beach JM. Mesenteric Ischemia. *N Engl J Med* 2016; **374**: 959-968 [PMID: 26962730 DOI: 10.1056/NEJMra1503884]
- 3 **Kühn F**, Schiergens TS, Klar E. Acute Mesenteric Ischemia. *Visc Med* 2020; **36**: 256-262 [PMID: 33005650 DOI: 10.1159/000508739]
- 4 **Luther B**, Mamopoulos A, Lehmann C, Klar E. The Ongoing Challenge of Acute Mesenteric Ischemia. *Visc Med* 2018; **34**: 217-223 [PMID: 30140688 DOI: 10.1159/000490318]
- 5 **Selim M**, Alnaimi MI, Alsadah ZY, AlHarbi GA, Nasr M. Different Treatment Modality in the Management of Acute Mesenteric Ischemia. *Cureus* 2021; **13**: e12490 [PMID: 33425558 DOI: 10.7759/cureus.12490]
- 6 **Sinha D**, Kale S, Kunderagi NG, Sharma S. Mesenteric ischemia: a radiologic perspective. *Abdom Radiol (NY)* 2020 [PMID: 33230592 DOI: 10.1007/s00261-020-02867-y]
- 7 **Klar E**, Rahmanian PB, Bucker A, Hauenstein K, Jauch KW, Luther B. Acute mesenteric ischemia: a vascular emergency. *Dtsch Arztebl Int* 2012; **109**: 249-256 [PMID: 22536301 DOI: 10.3238/arztebl.2012.0249]
- 8 **Artamonova ZA**, Namokonov EV. [New laboratory parameters in the diagnosis of acute mesenteric ischemia. *Klin Lab Diagn* 2019; **64**: 490-492 [PMID: 31479605 DOI: 10.18821/0869-2084-2019-64-8-490-492]
- 9 **Feldman ZM**, Wang LJ, Chou EL, Latz CA, Sumpio BJ, Eagleton MJ, Conrad MF. Venous mesenteric ischemia carries high procedural burden and elevated mortality in patients with severe presentation. *J Vasc Surg Venous Lymphat Disord* 2021 [PMID: 33741519 DOI: 10.1016/j.jvsv.2021.03.002]
- 10 **Strait A**, Gasper W, Dhaliwal G. The Resolution of Abdominal Pain: an Ominous Sign of Mesenteric Ischemia. *J Gen Intern Med* 2021; **36**: 216-219 [PMID: 33150528 DOI: 10.1007/s11366-021-02867-y]

- 10.1007/s11606-020-06313-z]
- 11 **Zhao H**, Meng Y, Zhang P, Zhang Q, Wang F, Li Y. Predictors and risk factors for intestinal necrosis in patients with mesenteric ischemia. *Ann Transl Med* 2021; **9**: 337 [PMID: 33708964 DOI: 10.21037/atm-20-8154]
 - 12 **Derikx JP**, Schellekens DH, Acosta S. Serological markers for human intestinal ischemia: A systematic review. *Best Pract Res Clin Gastroenterol* 2017; **31**: 69-74 [PMID: 28395790 DOI: 10.1016/j.bpg.2017.01.004]



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