



Case report

A case report of transmural rectosigmoid ischemia in an elderly patient

Mehran Ebrahimi^a, Akram Arabi^{a,*}, Shahriar Dabiri^b, Seyed Ali Razavinasab^c,
Abbas Pour Pasandi^c, Ali Zeidabadi^c

^a Department of General Surgery, Kerman University of Medical Sciences, Kerman, Iran

^b Pathology and Stem Cells Research Center, Kerman University of Medical Sciences, Kerman, Iran

^c Sirjan School of Medical Sciences, Sirjan, Iran

ARTICLE INFO

Keywords:

Rectal ischemia

CT scan

Colonoscopy

Surgical resection

Case report

ABSTRACT

Introduction and importance: While acute colonic ischemia is frequently observed in the elderly, rectal ischemia is a rare occurrence. We presented a case of transmural rectosigmoid ischemia in a patient who had not undergone any significant interventions and had no underlying diseases. Conservative treatment methods were unsuccessful, and surgical resection was necessary to prevent the development of gangrene or sepsis.

Case presentation: Upon arrival at our health center, a 69-year-old man reported experiencing left lower quadrant pain and rectorrhagia. The CT scan revealed thickening in the sigmoid and rectum. Subsequent colonoscopy revealed circumferential ulcers, severe edema, erythema, discoloration, and ulcerative mucosa in both the rectum and sigmoid. Due to persistent severe rectorrhagia and worsening pathologic parameters, another colonoscopy was performed three days later.

Clinical discussion: Initially, conservative treatments were administered, but as the tenderness worsened, surgical exploration of the abdomen was necessary. During the procedure, a large ischemia from the sigmoid to the rectal dentate line was observed, and the lesion was resected. A stapler was then inserted into the rectum, followed by the use of the Hartman pouch method to deviate the tract. Finally, colectomy, sigmoidectomy, and rectal resection were performed.

Conclusion: Due to the worsening pathological condition of our patient, surgical resection was necessary. It is important to note that rectosigmoid ischemia, although rare, can develop without a known underlying cause. Therefore, it is crucial to consider and evaluate potential causes beyond the most common ones. Furthermore, any pain or rectorrhagia should be assessed immediately.

1. Introduction

Rectal ischemia, specifically rectosigmoid ischemia, refers to a condition characterized by insufficient blood supply to the rectum and sigmoid colon. It occurs when the blood vessels that supply these areas become narrowed or blocked, leading to reduced oxygen and nutrient delivery to the affected tissues. The condition can be acute or chronic and is typically associated with various underlying causes. The exact incidence of rectosigmoid ischemia is not well-defined in the medical literature. However, it is considered a relatively rare condition. The incidence may vary depending on the specific population being studied and the presence of risk factors. It is more commonly seen in older individuals and those with underlying cardiovascular diseases [1,2]. It can be acute or chronic and is associated with various underlying causes, including atherosclerosis, thromboembolism, vasculitis, low-flow states,

colonic obstruction, and radiation therapy. Atherosclerosis: Atherosclerosis, a condition characterized by the buildup of plaque in the arteries, is a significant cause of rectosigmoid ischemia. Plaque formation can lead to the narrowing or blockage of the blood vessels supplying the rectum and sigmoid colon, compromising blood flow. Thromboembolism: Rectosigmoid ischemia can also result from the formation of blood clots (thrombi) in the arteries supplying the rectum and sigmoid colon or their embolization from elsewhere in the body. Thromboembolism can occur due to conditions such as atrial fibrillation, deep vein thrombosis, or cardiac disorders. Vasculitis: Certain inflammatory conditions, such as vasculitis, can cause inflammation and damage to the blood vessels supplying the rectosigmoid region. This can lead to ischemia by reducing blood flow. Low-flow states: Conditions that cause reduced blood flow throughout the body, such as hypotension, shock, or congestive heart failure, can also contribute to rectosigmoid ischemia.

* Corresponding author.

E-mail address: dr.akram.arabi@gmail.com (A. Arabi).

<https://doi.org/10.1016/j.ijscr.2023.108372>

Received 21 April 2023; Received in revised form 22 May 2023; Accepted 26 May 2023

Available online 30 May 2023

2210-2612/© 2023 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Insufficient perfusion to the rectal and sigmoid tissues can occur in these situations. Colonic obstruction: Complete or partial obstruction of the colon, which can occur due to conditions like colorectal cancer or volvulus, can lead to ischemia in the rectosigmoid region. The obstruction restricts blood flow, causing tissue damage. Radiation therapy: In some cases, rectosigmoid ischemia can develop as a complication of pelvic radiation therapy. Radiation can lead to the formation of fibrosis and scarring in the blood vessels, resulting in compromised blood supply [3–6].

Treatment options depend on the severity of the condition and may involve medications, surgical interventions, or lifestyle modifications. The management of rectosigmoid ischemia depends on the underlying cause and the severity of the condition. Acute cases of rectosigmoid ischemia often require urgent intervention to restore blood flow and prevent tissue damage. Treatment options may include medications to dissolve blood clots, surgical procedures to remove obstructions or repair damaged blood vessels, or angioplasty to widen narrowed blood vessels. In chronic cases, the management focuses on treating the underlying cause and improving blood flow to the affected area. Lifestyle modifications such as smoking cessation, regular exercise, and a healthy diet can help reduce the risk of atherosclerosis and improve cardiovascular health. Medications like antiplatelet agents and anticoagulants may be prescribed to prevent blood clots and reduce the risk of thromboembolism. In cases where radiation therapy is the cause of rectosigmoid ischemia, management may involve stopping or modifying the radiation treatment and providing supportive care to promote healing [1,7–10].

Complications of rectosigmoid ischemia can be severe and may include tissue necrosis, perforation of the colon, and sepsis. These complications can lead to the need for surgery and may result in long-term rectal dysfunction. Patients who have undergone surgical interventions for rectosigmoid ischemia may also be at increased risk of complications such as bleeding, infection, and anastomotic leakage [2,10–12]. The prognosis of rectosigmoid ischemia depends on the severity of the condition, the underlying cause, and the timely management of the condition. Acute cases of rectosigmoid ischemia can be life-threatening and require immediate medical intervention. Chronic cases may result in long-term complications and functional impairment. With prompt diagnosis and appropriate management, however, many patients can recover and maintain good rectal function [13–15].

CT scan is crucial in diagnosing rectosigmoid ischemia, as it can help rule out other differential diagnoses and aid in making a definitive decision. However, colonoscopy is more accurate and necessary to establish a definite diagnosis [16]. The treatment approach for rectosigmoid ischemia can range from conservative to surgical, depending on the severity of the injury [5,7]. In this case report, we presented a patient with transmural rectosigmoid ischemia who had not undergone any significant interventions and had no underlying diseases prior to symptom onset. Conservative management was unsuccessful, and surgical resection was performed to prevent gangrene or sepsis development. This case report has been reported in line with the SCARE criteria 2020 [15].

2. Case presentation

The 69-year-old man patient complained of left lower quadrant pain and rectorrhagia. The patient did not mention any specific disease like inflammatory bowel disease (IBD) or colon cancer. He did not report any specific diseases such as inflammatory bowel disease (IBD) or colon cancer, nor did he mention any inherited or familial conditions. A CT scan revealed an increase in the thickness of the sigmoid and rectum (Fig. 1). To investigate the source of pain and due to a preliminary diagnosis of ulcerative colitis, a colonoscopy was performed, which revealed circumferential ulcers, severe edema, erythema, discoloration, and ulcerative mucosa in both the rectum and sigmoid. Due to severe rectorrhagia, a second colonoscopy was conducted three days later,

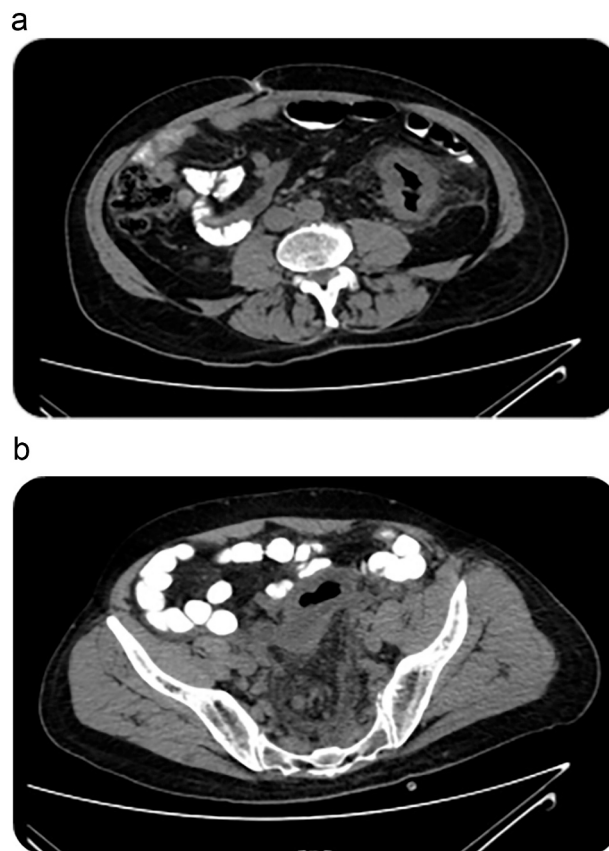


Fig. 1. Wall thickening and haziness of mesenteric fat of sigmoid (a) and rectum (b).

revealing no improvement in the patient's condition and deterioration of pathologic parameters. The second colonoscopy reported an area of continuous ulcerative mucosa with bleeding and severe stenosis in the sigmoid, which prevented the scope from passing. However, the left and right colons, as well as the transverse colon, were found to be normal and intact.

At first, we started conservative treatments, and as the tenderness was progressing, the abdomen was explored surgically, during which large ischemia from the sigmoid to the rectal dentate line was noticed. We resected the lesion and then placed a stapler into the rectum. Then the Hartman pouch method was used to deviate the tract, and finally colectomy, sigmoidectomy and rectal resection were performed.

After surgery, a biopsy was performed, which revealed mucosal ulceration and exudative inflammatory changes in the submucosa. The presence of neutrophil infiltration and a few histiocytes indicated acute inflammation. Additionally, leukocytoclastic vasculitis and angiomatoid proliferation of various vessels were observed. Prominent fibroplasia with young collagenous bundles was also noted. These changes were found to extend from the mucosa to the submucosa, muscular layer, and even the serosa fat tissue, as shown in (Fig. 2).

The patient was followed for one year after discharge, and no new lesion was seen. The only finding during this period was prostate cancer (grade 2), so transurethral resection of the prostate (TURP) was conducted.

3. Discussion

Colon ischemia has an annual incidence rate of 7.2 to 16.3 cases per 100,000 persons and is considered as the third most common cause of lower gastrointestinal bleeding [17–19]. Generally, females seem to be more affected [16]. Most patients present with abdominal pain (87 %),

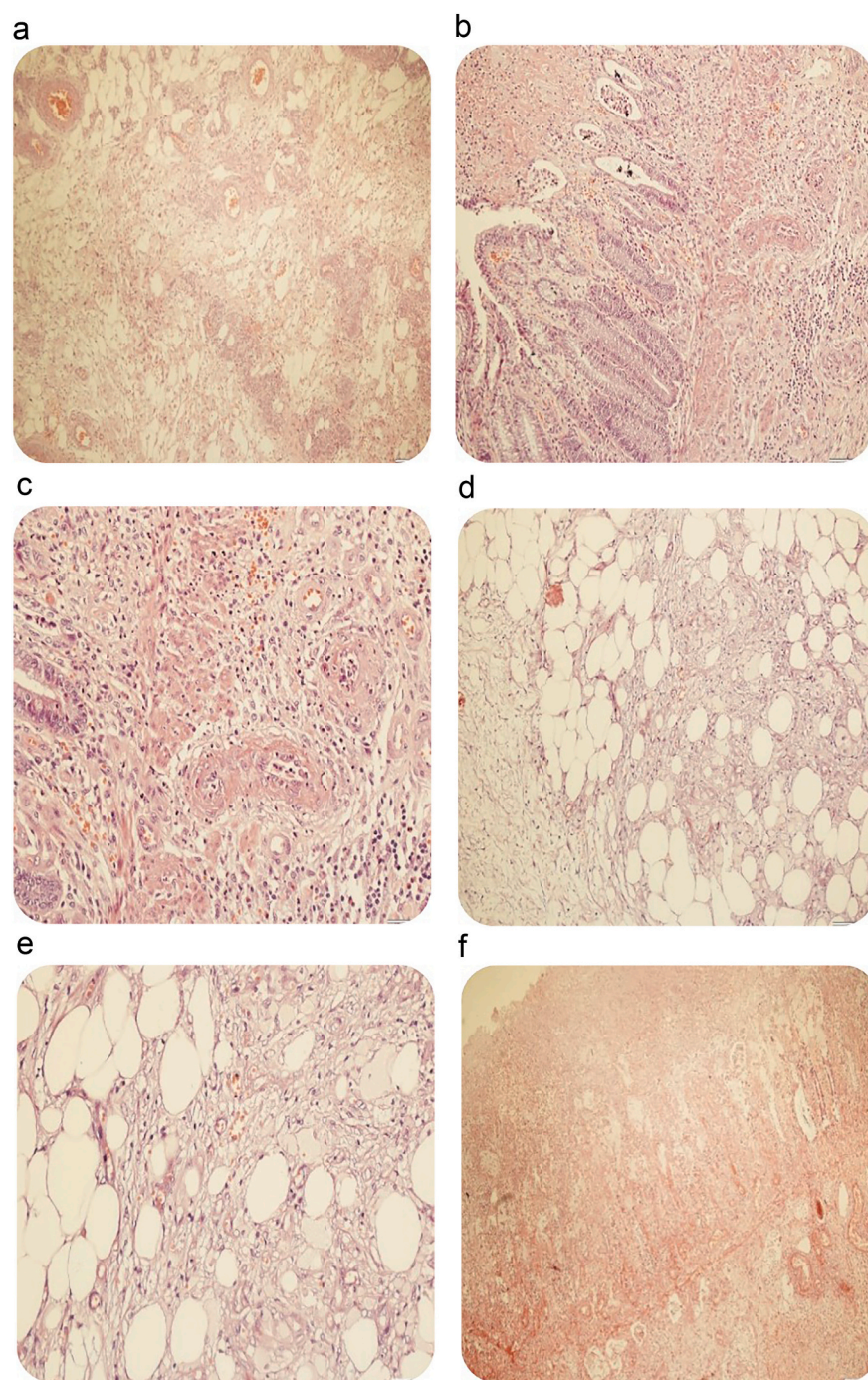


Fig. 2. (a): Benign proliferation of variable sized vessels in edematous fibrotic stroma with occasional thrombus formation within few of them, (b): proliferation of the variable sized vessels in submucosa (Mucosa showed viable to necrotic surface epithelial cells and glands), (c): high power view (magnification) of (b), (d and e): angiomatoid proliferations of vessels in fibrotic stroma extending deep to the serosa fat, and (f): surface mucosal ulceration along with acute exudative inflammatory reaction between necrotic epithelial cells of the surface epithelia.

rectal bleeding (84 %), diarrhea (56 %) and nausea (30 %) [20].

The lower gastrointestinal system is supplied by superior (SMA) and inferior (IMA) mesenteric arteries, and hemorrhoid branches feed the rectum. Because of their blood supplement patterns, hepatic and spleen flexure and the sigmoid are more prone to ischemia [21], but when it comes to the rectum, the story is different. The rectum is supplied collaterally by superior, middle, and inferior rectal arteries which are the ramifications of the IMA, internal iliac artery, and internal pudendal artery, respectively. Thus, we expect a lower rate of ischemia in the rectum [22,23].

Despite these, some factors may lead to the development or deterioration of rectal ischemia. Vascular occlusion is the most common etiology, especially in patients with a history of atherosclerosis or hyper coagulation. Nelson et al. reported six cases of rectal ischemia, of which

three were due to the occlusion of the collateral blood supply of the rectum. The recent report also stated aortic surgery is a prominent risk factor for rectal ischemia. Sharif et al. also confirmed rectal ischemia in 53 % of those who underwent aortoiliac surgery [23]. These two studies highlight the role of surgery as a potential underlying cause of rectal ischemia. Additionally, age is considered to be a culprit in 90 % of acute ischemic colitis cases in people over 60 years old. Moreover, bowel diseases such as IBD, irritable bowel syndrome (IBS), and longstanding constipation can be risk factors for rectal ischemia [16,24]. The absence of an underlying disease or specific vascular disorder known to the patient distinguishes the patient as a case report.

The new corona virus which has been spreading everywhere since 2019 can be also a potential cause of bowel ischemia, especially in the rectum. Cienfuegos et al. has reported three cases of gastrointestinal

ischemia due to COVID-19. The pathophysiology is suggested to be due to the high expression of ACE2 receptors in the gastrointestinal tract. Also, the systemic inflammatory response syndrome (SIRS) and a hypercoagulable state can be other potential mechanisms [25,26]. Radiation-induced ischemia can also be seen following the radiation therapy of pelvic organs such as the prostate, cervix, uterus, bladder, and rectum [27].

Our patient faced acute intramural ischemia of the rectum; meanwhile, he did not mention any history of bowel diseases, surgical operations, or radiation therapy. The compression induced by adjacent tumors in the pelvic region, especially in patients with prostate cancer, can also be a cause for this phenomenon [28]. This hypothesis is based on a deep understanding of the anatomy of the region and can match our patient to some extent as he was diagnosed with prostate cancer one year after follow-up. This is; however, debatable as the tumor was at its early stages and was successfully resected through TURP.

Ultrasonography, radiography, and serological examinations can be used as diagnostic tools, but a CT scan has been declared to be the first choice for the diagnosis of rectal ischemia. In the CT scan, rectosigmoid wall thickening was seen in our patient. Overall, a CT scan can be used to determine the severity and exact location of the injury [16,29,30]. Also, MR angiography can be used to evaluate any suspected arteriovenous IMA malformation [31]. However, when the process doesn't deliver conclusive results, or the diagnosis is not established, colonoscopy can help to find precise answers [16].

It is noteworthy that the extent of the injury may be more pronounced in the mucosal than the serosal surface. In pathological examination, neutrophil infiltration, altered rectal vasculature, and mucosal edema may be seen [24,31,32].

To date, the most common method of treating rectosigmoid ischemia involves conservative remedies such as bowel rest, removing underlying causes, administering intravenous fluids, monitoring the patient's hemodynamic status, and using broad-spectrum antibiotics. However, if the patient is unstable or a CT scan indicates intramural ischemia, surgery may be a viable option to manage the condition [4,7].

4. Conclusion

Due to the worsening pathological condition of our patient, surgical resection was performed. It is important to note that rectosigmoid ischemia, although rare, can develop without a known underlying cause. Therefore, it is crucial to consider and evaluate potential causes beyond the commonly known ones. Additionally, any pain or rectal bleeding should be promptly assessed.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Ethical approval

Ethical approval for this study was provided by the Ethics Committee of Sirjan School of Medical Sciences, Sirjan, Iran [Ethics No. IR.SIRUMS.REC.1400.034].

Funding

Not applicable.

Author contribution

All authors contributed to the study conception and design. **Mehran Ebrahimi**: Visualization, writing original draft/review, editing and

supervision. **Akram Arabi**: Conceptualization, Methodology, Software, Writing- Reviewing and Editing. **Shahriar Dabiri**: Formal analysis, methodology, investigation and writing original draft preparation. **Seyed Ali Razavi nasab**: Investigation/writing original draft, formal analysis, data collection and methodology. **Abbas Pour Pasandi**: Material preparation, data collection and analysis. **Ali Zeidabadi**: Methodology, writing, review and editing. All authors read and approved the final manuscript.

Guarantor

Akram Arabi.

Research registration number

Not applicable.

Provenance and peer review

Not commissioned, externally peer reviewed.

Declaration of competing interest

The authors of this article declare that they have no conflict of interests.

References

- [1] A. Maimone, A. De Ceglie, P.D. Siersema, T.H. Baron, M. Conio, Colon ischemia: a comprehensive review, *Clinics Res. Hepatol. Gastroenterol.* 45 (2021), 101592.
- [2] C.-C. Gau, L.-L. Lin, C.-Y. Wu, J.-L. Huang, Stercoral colitis in a patient with pediatric-onset systemic lupus erythematosus: case analysis and review of the literature, *Front. Pediatr.* 9 (2021), 760517.
- [3] F. Iacobellis, D. Narese, D. Berritto, A. Brillantino, M. Di Serafino, S. Guerrini, R. Grassi, M. Scaglione, M.A. Mazzei, L. Romano, Large bowel ischemia/infarction: how to recognize it and make differential diagnosis? A review, *Diagnostics* 11 (2021) 998.
- [4] K. Gnanapandithan, P. Feuerstadt, Mesenteric ischemia, *Curr. Gastroenterol. Rep.* 22 (2020) 1–12.
- [5] R. Navas-Campo, L. Moreno-Caballero, A.E. Casajús, D.I. Munoz, Acute mesenteric ischemia: a review of the main imaging techniques and signs, *Radiología (English Edition)* 62 (2020) 336–348.
- [6] S. Srisajjakul, P. Prapaisilp, S. Bangchokdee, Comprehensive review of acute small bowel ischemia: CT imaging findings, pearls, and pitfalls, *Emerg. Radiol.* 29 (2022) 531–544.
- [7] A. Hung, T. Calderbank, M.A. Samaan, A.A. Plumb, G. Webster, Ischaemic colitis: practical challenges and evidence-based recommendations for management, *Front. Gastroenterol.* 12 (2021) 44–52.
- [8] E. Botteri, G.C. Pattacini, A. Giordano, F. Ratti, Acute abdomen and acute abdominal conditions, in: *Primary Management in General, Vascular and Thoracic Surgery: A Practical Approach*, Springer, 2022, pp. 153–174.
- [9] M. Ahmed, Ischemic bowel disease in 2021, *World J. Gastroenterol.* 27 (2021) 4746.
- [10] R.N. Treffalls, D.P. Stonko, R.R. DeMartino, J.J. Morrison, Acute management of mesenteric emergencies (ischemia and aneurysms): tailoring the solution to the problem, in: *Seminars in Vascular Surgery*, Elsevier, 2023.
- [11] K. Hanley, H. Wittenberg, D. Gurjala, M.H. Safir, E.H. Chen, Caring for transgender patients: complications of gender-affirming genital surgeries, *Ann. Emerg. Med.* 78 (2021) 409–415.
- [12] M.G. Biebel, M.S. Gross, R. Munarriz, Review of ischemic and non-ischemic priapism, *Curr. Urol. Rep.* 23 (2022) 143–153.
- [13] P.J. Okada, B. Hicks, Neonatal surgical emergencies, *Clin. Pediatr. Emerg. Med.* 3 (2002) 3–13.
- [14] L.I. Sakkas, T. Simopoulou, D. Daoussis, S.-N. Lioussis, S. Potamianos, Intestinal involvement in systemic sclerosis: a clinical review, *Dig. Dis. Sci.* 63 (2018) 834–844.
- [15] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, A. Kerwan, A. Thoma, A.J. Beamish, A. Noureldin, A. Rao, B. Vasudevan, The SCARE 2020 guideline: updating consensus surgical CAsE REport (SCARE) guidelines, *Int. J. Surg.* 84 (2020) 226–230.
- [16] A. Oglat, E.M. Quigley, Colonic ischemia: usual and unusual presentations and their management, *Curr. Opin. Gastroenterol.* 33 (2017) 34–40.
- [17] S. Yadav, M. Dave, J. Edakkanambeth Varayil, W.S. Harmsen, W.J. Tremaine, A. R. Zinsmeister, S.R. Sweetser, L.J. Melton 3rd, W.J. Sandborn, E.V. Loftus Jr., A population-based study of incidence, risk factors, clinical spectrum, and outcomes of ischemic colitis, *Clin. Gastroenterol. Hepatol.* 13 (2015), 731–738. e731–736; quiz e741.

- [18] S. Lucak, Irritable bowel syndrome and ischemic colitis: evidence supporting the increased use of alosetron, *Ther. Adv. Gastroenterol.* 5 (2012) 215–218.
- [19] C. Gayer, A. Chino, C. Lucas, S. Tokioka, T. Yamasaki, D.A. Edelman, C. Sugawa, Acute lower gastrointestinal bleeding in 1,112 patients admitted to an urban emergency medical center, *Surgery* 146 (2009) 600–606 (discussion 606–607).
- [20] G.F. Longstreth, J.F. Yao, Epidemiology, clinical features, high-risk factors, and outcome of acute large bowel ischemia, *Clin. Gastroenterol. Hepatol.* 7 (2009) 1075–1080.e1071–1072; quiz 1023.
- [21] T.C. Bower, Ischemic colitis, *Surg. Clin. North Am.* 73 (1993) 1037–1053.
- [22] K.J. Fortinsky, F. Quereshy, S. Serra, F. Habal, Ischemic proctitis presenting as rectal pain and bloody diarrhea with no apparent cause, *ACG Case Rep. J.* 4 (2017), e88.
- [23] S. Sharif, M. Hyser, Ischemic proctitis: case series and literature review, *Am. Surg.* 72 (2006) 1241–1247.
- [24] R.L. Nelson, S. Briley, J.J. Schuler, H. Abcarian, Acute ischemic proctitis, *Dis. Colon Rectum* 35 (1992) 375–380.
- [25] A. Ana, A. Víctor Valentí, J. Carlos Sánchez, R. Fernando Martínez, M.-C. Pablo, A. C. Javier, R. Fernando, Research Square, (2021).
- [26] F. Bianco, A.J. Ranieri, G. Paterniti, F. Pata, G. Gallo, Acute intestinal ischemia in a patient with COVID-19, *Tech. Coloproctol.* 24 (2020) 1217–1218.
- [27] L. Tabaja, S.M. Sidani, Management of radiation proctitis, *Dig. Dis. Sci.* 63 (2018) 2180–2188.
- [28] R. Trasolini, T. Misra, E.J. Cheng, An atypical cause of an already rare condition-isolated rectal ischemic proctitis: 1602, *Off. J. Am. Coll. Gastroenterol.* ACG 113 (2018) S920–S921.
- [29] K. Azimuddin, T. Raphaeli, Acute ischemic gangrene of the rectum: report of 3 cases and review of literature, *Int. J. Surg. Case Rep.* 4 (2013) 1120–1123.
- [30] K. Eyvaz, H.E. Sıkar, M. Gökçeimam, H.F. Küçük, N. Kurt, A rare cause of acute abdomen: isolated necrosis of the cecum, *Türk. J. Surg.* (2018) 1–3.
- [31] B. Seeliger, V. Agnus, P. Mascagni, M. Barberio, F. Longo, A. Lapergola, D. Mutter, A.S. Klymchenko, M. Chand, J. Marescaux, M. Diana, Simultaneous computer-assisted assessment of mucosal and serosal perfusion in a model of segmental colonic ischemia, *Surg. Endosc.* 34 (2020) 4818–4827.
- [32] F. Faraji-Khiavi, H. Jalilian, S. Heydari, R. Sadeghi, M. Saduqi, S.A. Razavinasab, M. Heidari-Jamebozorgi, Utilization of health services among the elderly in Iran during the COVID-19 outbreak: a cross-sectional study, *Health Sci. Rep.* 5 (2022), e839.