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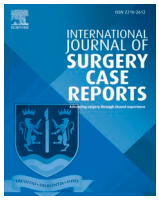

Case series

Outcomes of bowel resection following non-mechanical intestinal obstruction due to mesenteric vein thrombosis in Uganda: A case series

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ABSTRACT

Introduction and importance: Mesenteric venous thrombosis (MVT) is one of the common occlusive causes of compromised bowel perfusion. Contrast-enhanced CT angiography is the diagnostic imaging study of choice for MVT. In-hospital mortality following acute mesenteric infarction is 63 %. Surgical resection may be life saving for patients with peritoneal signs or refractory to conservative management.

Case presentation: We consecutively included records of five patients from Lubaga Hospital with intestinal obstruction who underwent bowel resection following intraoperatively confirmed acute mesenteric ischemia between May 2017 and November 2021. Three of the patients were female. Patients were between 21 and 45 years. One patient had comorbid conditions and an identifiable underlying etiology of polycythemia for MVT. Duration of symptoms ranged from 1 to 11 days. All patients underwent open laparotomy, the length of bowel resection ranged from 77 cm to 600 cm (mean length of 337 cm). Two patients developed short bowel syndrome (SBS) and one patient developed intestinal fistula. There was one in-hospital death due to multi-organ failure.

Clinical discussion: Morbidity and mortality are associated with delay to diagnose the condition. Revascularization is the primary goal, resection of all non-viable regions and preservation of viable bowel. Mortality is commonly related to multi-organ failure. Advanced intensive care and parenteral nutrition have improved survival rates over the years. 2-year and 5-year survival rates have been reported to be 70 % and 50 %.

Conclusion: Good outcomes are still possible for post-operatively optimized patients despite the high mortality and morbidity associated with bowel resection following extensive mesenteric thrombosis.

1. Introduction

Acute mesenteric ischemia (AMI) is the sudden interruption of blood supply to a segment of the small intestine that is insufficient to meet the metabolic demands resulting in compromised bowel perfusion through either non-occlusive (NOMI) or occlusive etiology. It is a rare cause of abdominal emergency with a low overall incidence (0.09–0.2 %). Nonetheless, the mortality rate is high (50–90 %) with a rapid disease progression, leading to intestinal necrosis, intestinal infarction and patient death if untreated owing to its non-specific clinical presentation resulting in delayed diagnosis [1–3]. Mesenteric arterial embolism is the most common cause (50 %), followed by mesenteric arterial thrombosis (15–25 %) and mesenteric venous thrombosis (5–15 %) [4].

Mesenteric venous thrombosis (MVT) is a blood clot that can be acute, subacute or chronic in one or more of the major vessels (superior or inferior mesenteric vein) that drain the gut or the tributaries [5,6]. The incidence of MVT has risen owing to the increased use of abdominal Computed Tomography (CT). MVT accounts for 5 to 15 % of all mesenteric ischemic events and usually involves the superior mesenteric vein (95 %) [7]. Age at presentation varies, depending on underlying pathogenesis, though it is most common in the fifth and sixth decade of life. MVT can either be due to primary or secondary causes. Primary MVT occurs in the absence of any identifiable predisposing factors. Secondary causes of MVT include prothrombotic states (like pregnancy, sickle cell disease, polycythemia vera and oral contraceptive use), venous trauma, intra-abdominal infections and portal hypertension [8].

Majority of the cases present as acute abdomen, though a few present late with features of portal hypertension [6]. Contrast-enhanced CT angiography (CTA) is the diagnostic imaging study of choice for AMI [3]. Despite advances in diagnostic modalities, most cases are identified

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either at laparotomy or autopsy [9]. In-hospital mortality following acute mesenteric infarction has been reported to be 63 % [10].

Treatment varies from conservative measures to surgical resection and revascularization depending on the stage of mesenteric ischemia. An aggressive approach in surgical treatment is advocated with the principle of re-vascularization over bowel resection. Nevertheless, bowel segments with irreversible ischemia and gangrene warrant immediate resection. Massive bowel resection (MBR) implies more than 200 cm (7 ft) of small bowel has been resected [11]. These patients suffer from massive bowel resection syndrome. The 5-year mortality rate is about 30 %, primarily related to short bowel syndrome [12]. It is thus important to raise much needed awareness among clinicians to diagnose AMI timely and manage it promptly.

The patients were managed from Uganda Martyrs Hospital Lubaga, Surgery Department. Lubaga hospital found in Kampala, Uganda, is a private not for profit tertiary level hospital founded by the Catholic Church in 1899, with a bed capacity of 275.

This case series has been reported in line with the PROCESS 2020 criteria [13].

2. Case presentation

From May 2017 to November 2021, all patients with acute mesenteric ischemia, who underwent abdominal surgery were retrospectively reviewed in this case series. We consecutively included patients with intestinal obstruction (IO) who underwent bowel resection following intraoperative confirmed AMI and excluded patients who underwent bowel resection secondary to a mechanical cause.

Data on 5 patients across the time period of 5 years was obtained (Table 1). The parameters included patients' demographics, comorbid diseases, overall survival, type of performed operative procedures, and time interval from symptomatology to surgery as well as laboratory chemistry. Three of the patients were female. All patients were middle aged between 21 and 45 years old (mean age of 21 years). Only one patient had comorbid conditions and an identifiable underlying etiology of polycythemia for MVT (mean Hb of 23.3 g/dl in three consequent full blood counts).

3. Discussion

AMI is a rare but life-threatening clinical entity owing to its non-specific symptomology in the beginning hence diagnosis of AMI is challenging. The duration of symptoms prior to admission to our hospital varied among the patients in this case series from 1 day to 11 days, with a diversity in signs and symptoms. Urgent imaging in case of suspected AMI is of paramount importance [14,15] however none of the patients had previous CTA scan done.

Morbidity and mortality are associated with delay to diagnose the condition. Hence early diagnosis with prompt surgical treatment is key for patient management. In this case series, leukocytosis and delay to surgery were associated with poor outcome, either morbidity (longer hospital stay) or mortality, as reported previously. Old age has also been significantly associated with a higher mortality rate previously. The mortality rate in our case series was 20 % which was in contrast to previous studies with a high in-hospital mortality rate of 60–80 %. The mean age of patients reported in literature has been 74–79 years old which is in contrast to our case series with all patients of young age with the mean of 21 years [16,17].

Immediate antibiotic therapy and anticoagulation are recommended to complement the surgical approach [18]. All patients had received pre-operative antibiotics (Intravenous Ceftriaxone 2 g and Intravenous Metronidazole 500 mg) however none of the patients had systemic intravenous anticoagulation administered prior to surgery.

Once the diagnosis of AMI is confirmed, the choice of therapy is open abdominal surgery. Revascularization is the primary goal, with interventional radiology for very early revascularization or open vascular surgery. Resection of all non-viable regions and preservation of all viable bowel [3,19,20]. All patients underwent open abdominal emergency surgery (types of operation shown in Table 1). Combination of both small and large bowel was found in 1 patient. Overall, intraoperatively verified complete and irreversible ischemia of small bowel was in 4 patients and both small and large bowel in 1 patient leading to complete bowel resection. The length of bowel resection in the 5 patients ranged from 77 cm to 600 cm (mean length of resected bowel: 337 cm) (Fig. 1).

The complications of massive bowel resection include short bowel syndrome (SBS), electrolyte imbalance, intestinal obstruction, intestinal hemorrhage, renal or cardiac dysfunction, intestinal fistula and wound infection. Patients presenting with peritonitis and infarcted bowel have a prolonged and complicated course [21–25]. In this case series, 2 patients developed SBS and 1 patient developed an intestinal fistula.

30-day mortality rate has been found to be 13–15 %. Abu-Daff et al. showed that the 30-day mortality in these patients is strongly linked to colonic involvement and short bowel syndrome. Five-year mortality is primarily related to short bowel syndrome [12]. With progress in intensive care medicine and parenteral nutrition over the years, survival rates have been improving. The 2-year and 5-year survival rates have been reported to be 70 % and 50 % [26]. In this case series only one in-hospital death occurred in the post-operative period on day 5, due to multi-organ failure. After a mean follow-up of 150.5 months (range, 5.5–60 months), 2 patients were alive.

Post operatively well-optimized AMI patients can have good outcomes, however we were limited by the small sample size and this needs to be evaluated in a larger study across other health centers in Uganda.

4. Conclusion

Good outcomes are still possible for post-operatively optimized patients despite the high mortality and morbidity associated with massive bowel resection following extensive mesenteric thrombosis.

Informed consent

Written informed consent was obtained from the patients/legal guardians for publication of this case series. A copy of the written consent is available for review by the Editor-in Chief of this journal on request.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Ethical approval

Not applicable.

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Guarantor

Dr. Okello Michael.

Table 1
Socio-demographics and clinical findings of the patients.

Patient	1	2	3	4	5
Demographics					
Age (years)	45	35	23	30	21
Gender	Male	Female	Female	Female	Male
Comorbidities	Hypertension Transient ischemic attack Polycythemia	–	–	–	–
Clinical findings on admission					
Duration of symptoms (days)	1	1	7	1	9
Symptomatology					
Symptoms	• Diarrhea • Abdominal distension • Abdominal pain	• Abdominal distension • Vomiting • Failure to pass stool but passed flatus	• Abdominal distension • Colicky generalized abdominal pain • Vomiting • Failure to pass stool and flatus	• Colicky generalized abdominal pain • Failure to pass stool but passed flatus	• Abdominal distension • Colicky generalized abdominal pain • Bloody stools • Failure to pass stool and flatus
Signs	• Dehydration • Not pale • Generalized abdominal distension and tenderness • Guarding + rebound tenderness • Reduced bowel sounds	• Not pale • Generalized abdominal distension and tenderness • Guarding + Rebound tenderness • Reduced bowel SOUNDS	• Moderate pallor • Generalized abdominal distension and tenderness • Guarding + rebound tenderness reduced bowel sounds	• Dehydration • Not pale • Generalized abdominal distension and tenderness • Guarding + rebound tenderness	• Dehydration • Generalized abdominal distension and tenderness • Guarding + rebound tenderness Reduced bowel sounds • Wasted
Temperature	36.5 °C	36.0 °C	36.3 °C	36.4 °C	35.5 °C
Blood pressure (mm Hg)	82/40	130/90	101/70	80/60	104/60
Heart rate (beats/min)	118	100	82	120	130
Pulse oximetry at ambient air	95 %	95 %	95 %	98 %	98 %
Laboratory results					
White blood cell count (cells per 10^6/l)	16		25.64	15.0	22.66
Neutrophil (cells per 10^6/l)	12		22.8	9.17	15.74
Hb (g/dl)	23.3g/dl (in three consequent full blood counts)		6.9	17.7	9.0
Sodium (mmol/l)	126		130	139	134
Potassium (mmol/l)	4.8		4.0	3.4	4.9
Urea (mg/dl)	62	105		29	123
Creatinine (mg/dl)	2.0	3.3		0.7	1.6
Erect abdominal x-ray	Multiple air fluid levels	–	Fecal impaction with positive mottling sign	–	–
Provisional diagnosis	• Gastroenteritis • Hypovolemic shock • Adynamic IO	• Partial IO • Gut perforation • Acute appendicitis	• Acute abdomen • IO • R/o gut perforation	• Large bowel obstruction with fecal impaction	• Acute abdomen
Intra-operative findings (Final diagnosis)	Mesenteric crisis due to polycythemia with gangrenous ileum	Superior mesenteric vein thrombosis with gangrenous ileum + jejunum	Superior mesenteric vein thrombosis with gangrenous ileum + jejunum	Adynamic ileus due to non-mechanical ischemic bowel with gangrenous ileum	Extensive superior and inferior mesenteric thrombosis with intermittent bowel ischemia
Bowel affected	Ileum	Jejunum + ileum	Jejunum + ileum	Jejunum + ileum	Jejunum, ileum, colon and sigmoid
Surgical intervention (gangrenous bowel resection)	160 cm of ileum on 4th day of admission	55 cm of terminal ileum plus 20 cm distal jejunum on day of admission	540 cm leaving only 60 cm of viable jejunum on 3rd day of admission	310 cm, distal jejunum plus ileum on 2nd day of admission	600 cm of intermittent bowel segments of jejunum, ileum, colon and sigmoid
Type of anastomosis	Ileo-ileo end to end	–	Jejuno-ascending end to side	Jejuno-transverse end to side	–
Type of ostomy	–	Double barrel ileostomy	–	–	Double barrel ileo-colostomy
Length of hospital stay (days)	10	12	38	11	5
In-hospital treatment					
Medical treatment (daily dose)	• Hypertonic saline • Bowel rest	• Bowel rest • Nasogastric decompression	• Bowel rest • Nasogastric decompression	• Bowel rest • Nasogastric decompression	• Bowel rest • Nasogastric decompression • TPN

(*continued on next page*)

Table 1 (*continued*)

Patient	1	2	3	4	5
	• Nasogastric decompression • IV normal saline and Ringer's lactate • IV Ceftriaxone 2 g o.d. • IV Metronidazole 500 mg tds • Subcutaneous Enoxaparin 80 mg immediate post-op • IV Paracetamol 1 g tds • Fentanyl patch 75µg • IV morphine 5 mg PRN	• IV Paracetamol 1 g tds • Fentanyl patch 75 µg • IV morphine 5 mg PRN • IV normal saline and Ringer's lactate • IV Ceftriaxone 2 g o.d. • IV Metronidazole 500 mg tds	• Total parenteral nutrition (TPN) • IV normal saline and Ringer's lactate • IV Ceftriaxone 2 g o.d. • IV Meropenem 1 g tds • IV Metronidazole 500 mg tds • IV Paracetamol 1 g tds • Fentanyl patch 75 µg • IV morphine 5 mg PRN	• TPN • IV normal saline and Ringer's lactate • IV Ceftriaxone 2 g o.d. • IV Metronidazole 500 mg tds • IV Paracetamol 1 g tds • Fentanyl patch 75 µg • IV morphine 5 mg PRN • High protein diet	• Subcutaneous Enoxaparin 80 mg immediate post-op • IV normal saline and Ringer's lactate • IV Ceftriaxone 2 g o.d. • IV Meropenem 1 g tds • IV Metronidazole 500 mg tds • IV Paracetamol 1 g tds • Fentanyl patch 75 µg • IV morphine 5 mg PRN
Outcome	Discharged	Discharged	Discharged	Discharged	Expired
Follow-up	• 3 years 5 months • Alive	• 5 years • Alive	• 167 days • Expired	• 3 years 8 months • Expired	• In-hospital death
Additional comments	• High protein diet • Anti-hypertensive drugs	• High protein diet	• Enterocutaneous fistula 22 days post-op on and off • TPN • High protein diet • Rivaroxaban • Short bowel syndrome • Progressive wasting • Hair loss • Pitting edema	• TPN • High protein diet • Short Bowel Syndrome	• Hyponatremia • Hyperkalemia • Acute kidney injury • Acute liver injury

Fig. 1. Resected ischemic small bowel due to extensive mesenteric vein thrombosis from patient 3.

Research registration number

Not applicable.

Credit authorship contribution statement

Dave Darshit	Conceptualized, wrote the first draft, patient follow up, editing and approved final manuscript.
Sanjanaa Srikant	Wrote the first draft, editing and approved the final manuscript.
Daphne Kibanda	Wrote the first draft, editing and approved the final manuscript.
Okello Michael	Chief surgeon, led and performed all surgeries, reviewed the manuscript, editing, supervision, and final approval of the case series.

Declaration of competing interest

None.

References

[1] M. Duran, E. Pohl, K. Grabitz, H. Schelzig, T. Sagban, F. Simon, The importance of open emergency surgery in the treatment of acute mesenteric ischemia, World J. Emerg.Surg. 10 (1) (2015) 1–6.

[2] F. Kühn, T.S. Schiergens, E. Klar, Acute mesenteric ischemia, Visc.Med. 36 (4) (2020) 256–263.

[3] M. Bala, J. Kashuk, E.E. Moore, Y. Kluger, W. Biffl, C.A. Gomes, et al., Acute mesenteric ischemia: guidelines of the World Society of Emergency Surgery, World J.Emerg.Surg. 12 (1) (2017) 1–11.

[4] D.G. Clair, J.M. Beach, Mesenteric ischemia, N. Engl. J. Med. 374 (10) (2016) 959–968.

[5] C.E. Russell, R.K. Wadhera, G. Piazza, Mesenteric venous thrombosis, Circulation 131 (18) (2015) 1599–1603.

[6] B. Hmoud, A.K. Singal, P.S. Kamath, Mesenteric venous thrombosis, J.Clin.Exp. Hepatol. 4 (3) (2014) 257–263.

[7] S. Kumar, M.G. Sarr, P.S. Kamath, Mesenteric venous thrombosis, N. Engl. J. Med. 345 (23) (2001) 1683–1688.

[8] E. Sulger, H.S. Dhaliwal, A. Goyal, L. Gonzalez, Mesenteric venous thrombosis, in: StatPearls [Internet], 2021.

[9] S.S. Lee, H.K. Ha, S.H. Park, E.K. Choi, A.Y. Kim, J.C. Kim, et al., Usefulness of computed tomography in differentiating transmural infarction from nontransmural ischemia of the small intestine in patients with acute mesenteric venous thrombosis, J. Comput. Assist. Tomogr. 32 (5) (2008) 730–737.

[10] F. Adaba, A. Askari, J. Dastur, A. Patel, S.M. Gabe, C.J. Vaizey, et al., Mortality after acute primary mesenteric infarction: a systematic review and meta-analysis of observational studies, Color. Dis. 17 (7) (2015) 566–577.

[11] L.D. Gibson, R. Carter, D.B. Hinshaw, Segmental reversal of small intestine after massive bowel resection: successful case with follow-up examination, JAMA 182 (9) (1962) 952–954.

[12] J. Schalamon, J.M. Mayr, M.E. Höllwarth, Mortality and economics in short bowel syndrome, Best Pract. Res. Clin. Gastroenterol. 17 (6) (2003) 931–942.

[13] R.A. Agha, C. Sohrabi, G. Mathew, T. Franchi, A. Kerwan, N. O'Neill, et al., The PROCESS 2020 guideline: updating consensus preferred reporting of CasE series in surgery (PROCESS) guidelines, Int. J. Surg. 84 (2020) 231–235.

[14] J.M. Kärkkäinen, S. Acosta, Acute mesenteric ischemia (part I)–incidence, etiologies, and how to improve early diagnosis, Best Pract. Res. Clin. Gastroenterol. 31 (1) (2017) 15–25.

[15] J. Menke, Diagnostic accuracy of multidetector CT in acute mesenteric ischemia: systematic review and meta-analysis, Radiology 256 (1) (2010) 93–101.

[16] R. Sumbal, M.M.A. Baig, A. Sumbal, Predictors of mortality in acute mesenteric ischemia: a systematic review and meta-analysis, J. Surg. Res. 275 (2022) 72–86.

[17] V. Martini, A.-K. Lederer, J. Fink, S. Chikhladze, S. Utzolino, S. Fichtner-Feigl, et al., Clinical characteristics and outcome of patients with acute mesenteric ischemia: a retrospective cohort analysis, Langenbeck's Arch. Surg. 1–8 (2022).

[18] J. Tilsed, A. Casamassima, H. Kurihara, D. Mariani, I. Martínez, J. Pereira, et al., ESTES guidelines: acute mesenteric ischaemia, Eur. J. Trauma Emerg. Surg. 42 (2) (2016) 253–270.

[19] J.T. Blauw, T. Bulut, G.S. Oderich, B.R. Geelkerken, D.M.I.S. Group, Mesenteric vascular treatment 2016: from open surgical repair to endovascular revascularization, Best Pract.Res.Clin.Gastroenterol. 31 (1) (2017) 75–84.

[20] Y. Zhao, H. Yin, C. Yao, J. Deng, M. Wang, Z. Li, et al., Management of acute mesenteric ischemia: a critical review and treatment algorithm, Vasc. Endovasc. Surg. 50 (3) (2016) 183–192.
[21] F.-F. Chen, X.-N. Ye, H.-T. Jiang, G.-X. Zhu, S.-L. Miao, G.-F. Yu, et al., Role of frailty and comorbidity status in predicting morbidity and mortality in patients with acute mesenteric ischemia, Ann. Vasc. Surg. 67 (2020) 105–114.
[22] S. Yang, Y. Zhao, J. Chen, Q. Ni, X. Guo, X. Huang, et al., Clinical features and outcomes of patients with acute mesenteric ischemia and concomitant colon ischemia: a retrospective cohort study, J. Surg. Res. 233 (2019) 231–239.
[23] S.-L. Miao, X.-N. Ye, T.-T. Lin, Y.-H. Qiu, J.-Y. Huang, X.-W. Zheng, et al., The psoas muscle density as a predictor of postoperative complications and 30-day mortality for acute mesenteric ischemia patients, Abdom.Radiol. (2020) 1–10.
[24] M. Jagielski, J. Piątkowski, M. Jackowski, Challenges encountered during the treatment of acute mesenteric ischemia, Gastroenterol. Res. Pract. 2020 (2020).
[25] A. Zientara, A.-R. Domenghino, I. Schwegler, H. Bruijnen, A. Schnider, M. Weber, et al., Interdisciplinary approach in emergency revascularization and treatment for acute mesenteric ischemia, BMC Surg. 21 (1) (2021) 1–7.
[26] J. Klempnauer, F. Grothues, H. Bektas, R. Pichlmayr, Long-term results after surgery for acute mesenteric ischemia, Surgery 121 (3) (1997) 239–243.