

# Acute fulminant colonic ischaemia - an unusual complication of constipation

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## Abstract

Mechanical colonic obstruction leading to acute fulminant colonic ischaemia is rare. Faecal impaction causing large bowel obstruction complicated by colonic ischaemia has only been reported once in the literature in 1989 by Senati and Coen. We report such a case encountered in our institution where the patient was treated successfully with an emergency total colectomy.

## INTRODUCTION

Although colonic ischaemia is the most common form of vascular insufficiency of the gastrointestinal tract, acute fulminant colonic ischaemia is extremely rare. In this case report, we present a case where faecal impaction and acute colonic ischaemia proved to be a deadly combination.

### Figure 1

Sagittal section of CT showing severe faecal impaction to sigmoid



### Figure 2

Axial section of the CT showing thickened bowel wall and engorgement of the mesenteric vessels



## PRESENTATION OF CASE

A 69-year-old man with Parkinson's disease, Type II diabetes mellitus and chronic kidney disease presents acutely with a 24-hour history of distension, vomiting and generalised abdominal pain. On presentation, he was haemodynamically unstable with a heart rate of 120 beats per minutes, blood pressure of 90/60, respiratory rate of 30 breaths per minute, oxygen saturation of 94% on room air and a temperature of 38.5 degrees. There were generalised peritonism and harden impacted stools on per rectal examination.

Over the next few hours in emergency, he deteriorated rapidly with worsening acidosis (pH7.2) and increasing

lactate levels of 7.7. Biochemical markers indicated an elevated white cell count of  $52 \times 10^9/L$  and an impaired kidney function with creatinine of 250mmol/L.

**Figure 3**

Intra-operative photograph showing gangrenous hepatic flexure



An urgent non-contrast computed tomography (CT) of the abdomen revealed large bowel obstruction secondary to faecal loading and complicating venous congestion in the sigmoid mesocolon. There was no free intraperitoneal gas nor portal venous gas. Assessment of the vascular supply to the mesentery was not possible due to absent contrast. [See Figure 1 and Figure 2]

**Figure 4**

Resected specimen

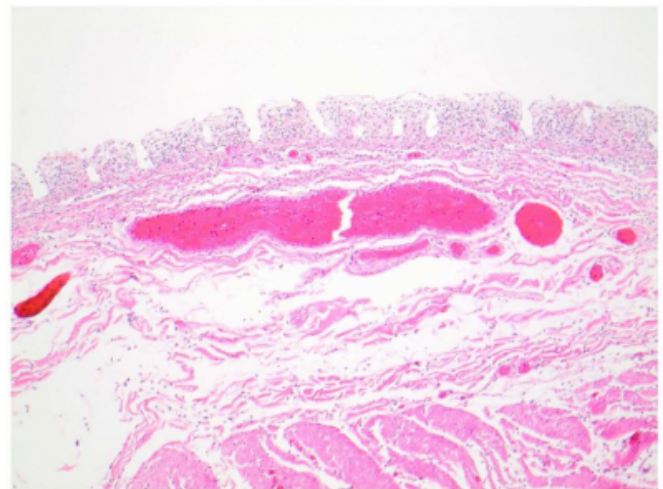


Due to his significant deterioration, he was intubated pre-operatively in the emergency department and was taken immediately to the operating theatre. Intra-operatively, he was found to have pathologically dilated colon with

gangrenous hepatic flexure and ischaemia in the splenic flexure and sigmoid colon. [See Figure 3] Total colectomy and a formation of end-ileostomy was performed and the patient was transferred to Intensive Care unit for post-operative recovery. Histopathological analysis of the resected specimen showed transmural ischaemia with venous congestions in the mesentery. There was no evidence of emboli, malignancy or perforation. [See histological slides]

**Figure 5**

Histological specimen at 40x magnification showing ischaemic changes in the mucosa, loss of colonic epithelium, necrosis and associated inflammation. Muscularis propria remains intact and viable.



**DISCUSSION**

Colonic ischaemia (CI) is the most common form of ischaemic injury to the gastrointestinal tract . 1 Brandt and Boley in a 1992 paper described a spectrum of CI ranging from (1) reversible ischaemic colonopathy, (2) transient IC, (3) chronic ulcerative, (4) ischaemic colonic stricture, (5) colonic gangrene and (6) fulminant universal . 2

Universal fulminant colitis, the most severe variant of CI accounts for 2.5% of all cases and is also referred to as necrotising colitis, gangrenous colitis and colonic infarction . A majority of cases 3 (80-85%) is non-gangrenous and more than 50% of these cases are transient and reversible . 4

Mechanical obstruction causing fulminant CI is a fatal scenario and there are only a few cases reported in the literature. The only reported case of acute fulminant colonic ischaemia secondary to faecal impaction was reported by Senati and Coen back in 19895. Teasdale and Mortensen (1983) reported three cases of acute fulminant colitis secondary to malignancy and one case caused by diverticular stricture6..

Although the acute pathogenesis for CI is not well understood, it is thought to be a culmination of vascular insufficiency and reperfusion injury to the microcirculation of the colon. In this particular case, non-occlusive ischaemia, a consequent of multiple factors such as pathological dilatation of the colon from severe faecal loading, systemic shock ('low-flow states') and sepsis result in irreversible damage to the colon and necrosis. This is evident on the histological specimen.

In a national insurance claims-based survey in United States, the annual incidence of CI is estimated at 17.7 per 100,000 cases. However, this is a gross underestimation as most patients with mild disease do not present for hospitalisations<sup>9</sup>. Large population studies suggest risk factors for CI include being female, advanced age of more than 65 years-old, diabetes, hypertension, levodopa medications and chronic kidney disease. Interestingly, patients who suffer from constipation or taking medications with known side-effect of constipation are at increased risk (2.7 times) of developing CI.<sup>12</sup>

Negative predictive factors for poor prognosis in patients with CI include hypertension, diabetes mellitus, aortic surgery, pre-existing peripheral vascular disease, right-sided colonic involvement and severe clinical deterioration on presentation (for example haemodynamic instability, peritonism, anaemia, hyponatraemia). As well as being a risk factor for CI, chronic kidney disease is an independent factor for increased mortality from CI.<sup>17</sup>

Clinical manifestation of CI is dependent on extent and severity. The most common symptom is abdominal pain (87%) followed by rectal bleeding (84%), diarrhoea (56%) and nausea (30%).<sup>18</sup> Patients with pan-colonic ischaemia or isolated right-sided disease often presents with pain rather than rectal bleeding as seen in this case<sup>19</sup>. The acuity and rapid deterioration of the patient with peritonitis is typical of universal fulminant colitis.<sup>20</sup>

All segment of the colon can become ischaemic but in traditional text and literature, the most commonly affected segment is the left colon (32.6%) followed by the right colon (25.2%) and then the entire colon (7.3%). This is often explained based on the arterial supply to the colon. The term 'watershed areas' in the colon, the splenic flexure (Griffith's point) and sigmoid colon (Sudeck's point) is thought to be prone to ischaemia as these areas are limits of arterial supply to the colon.<sup>22</sup> Segmental ischaemia does not occur very frequent because occlusive ischaemia in

colon is rare. Although the watershed anatomy give excellent explanation as to the involvement of left colon, splenic flexure and sigmoid in a majority of cases, it should be recognised that there are still variability in blood supply and that arterial calcification and tortuosity plays a role in precipitating ischaemia.<sup>23</sup>

Diagnosing CI based purely on history and clinical examination is often difficult and a variety of adjunct tests such as pathology and imaging studies are often needed to confirm and grading the severity of CI. Anaemia, hyponatraemia, hypoalbuminaemia and acidosis are known predictors of severity. Imaging study such as computed tomography (CT) is extremely useful as it provides visualisation of the abdominal viscera and in selected cases, a multi-phasic CT could help identify major arterial occlusion. Most common CT findings to support the diagnosis of CI are engorgement of the mesenteric vessels (79%), symmetric bowel wall thickening (74%), bowel wall oedema or thumb-printing,<sup>25 26 27</sup>. Plain radiographs of the abdomen, ultrasonography (US) and barium studies could theoretically be used to support the diagnosis of CI but there is no radiological signs specific to the CI.

Endoscopic assessment of the colonic mucosa is purported to be the gold standard tool in diagnosing CI but has limited use in the setting of acute peritonitis, gangrene or pneumatosis.<sup>28</sup> Patients with peritonitis and shock will almost always require surgery as illustrated in this case report.

## CONCLUSION

This case report highlights the fatal combination of faecal impaction and acute colonic ischaemia and should serve as a reminder that under-treatment of constipation can carry serious consequences. Although a majority of CI can be treated conservatively, clinicians should be vigilant in assessing for complications relating to CI that would warrant surgical intervention.

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