

CLINICAL NOTE

Bowel ischaemia and cocaine consumption; case study and review of the literature

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ABSTRACT

Background: Amongst others, cocaine consumption has a detrimental effect in the vascular supply to the mesenteric area causing abdominal ischemic changes. Early recognition of these changes and adequate treatment are essential to avoid serious complications and possible death of the patient from sepsis.

Case report: In this case study, the subject is a 40-years-old gentleman presenting with acute abdominal pain due to multiple ischemic changes in both small bowel and sigmoid loops. The patient required emergency surgical intervention consisting of bowel resection and anastomosis. The pathologic analysis of the segment showed transmural necrosis and necrotizing phlebitis caused by the ingestion of drugs or toxic agents. The patient later confirmed the habitual consumption of cocaine.

Discussion: The increase in cocaine consumption and other recreational toxins substituted from erythroyilon coca alkaloids amongst young people have generated a large number of admissions to Hospital Accident and Emergency Departments with patients complaining of acute abdominal pain. In many of these cases, surgical intervention is required and in some cases patients will sadly die without a proper diagnosis. Some of the most common effects of cocaine and its compounds includes; hollow viscus perforation, gastro-intestinal bleed, and other vascular problems such as enteritis and ischemic colitis. It appears clear that there is a great need for an advance history taking of these patients and their habit to cocaine and other drugs together with a urine test for drug screening. These together with a suspicion of a non-occlusive ischemic bowel caused by the effects of cocaine in young adults with no cardiac risk factors

will guide clinicians and establish, and plan the correct treatment for these categories of patients.

Key words: Cocaine use related bowel injuries. Adverse effects of cocaine. Mesenteric vascular occlusion.

CASE REPORT

This case study is based on a 40 years old male who arrived in Accident and Emergency Department (A&E) complaining of abdominal pain. The patient had a previous medical history of hypertension and taking beta blockers. He is a heavy smoker and has been taking opioid analgesics for the last three years for repeated episodes of ureterolithiasis. He reported abdominal pain for two days complicated with diarrhoea without pathological products and abdominal distension. On arrival to A&E he was conscious but with a considerable degree of anxiety and dehydration. On examination he presented generalized abdominal distention, peritoneal irritation, especially in the hypogastric and right iliac fosse. Blood results showed acute abnormal parameters. An Axial Computerised Tomogram (CAT) showed bunching of intestinal loops with some fluid collection around them at right ileac fosse level, secondary to a possible appendicular process (Fig. 1). Given the diagnosis, the patient was taken to theatres for emergency surgical exploration with findings of generalized intestinal dilatation and normal cecal appendix. Findings also included two pale segments in jejunum and sigmoid with enlarged walls. In the Ilium we found damaged loops forming a ball with areas of microperforation and enlarged and congestive mesoileum. Resection of the affected ileum with primary anastomosis was performed. Various tests were carried out such as; serology blood tests, autoimmune test for lupus, Behcet syndrome, coagulopathy and stool sample for *Clostridium difficile*. All these came back negative. Sample histology excluded the presence of inflammatory bowel disease and confirmed hemorrhagic necrosis with

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evidence of ischaemia and necrotizing phlebitis (Fig. 2). The final diagnosis was ischemic enteritis caused by drugs or toxics and excluded vasculitis or veno-occlusive disease. During the clinical interrogation, the patient admitted he had used cocaine for several days prior to his admission. Also a psychiatric valuation confirmed opioids deprivation syndrome. Due to deterioration, a second laparotomy was performed with medium jejunum ischemic loop resection. The sigmoid remained pale and with parietal enlargement but no signs of ischaemia or perforation. Histology of the tissues was not different to previous one. The presentation of *Candida* septicemia from the surgical wound complicated the case. Also a fistula formation appeared in the mid-

dle part of the laparotomy with minimal losses. A barium enema revealed a complex fistula with double trace, from the jejunal anastomosis towards the sigmoid and traveling to the skin (Fig. 3). Once the infection improved and the fistula discharged became occasional, the patient was discharged from hospital. Prior to discharge, a colonoscopy showed ulceration and chronic inflammation at rectosigmoid level. Currently the patient is enjoying good health, with normal intestinal function and he has now stopped using cocaine, opioids or any other recreational drugs.

DISCUSSION

The rate of the illicit use of cocaine for recreational purposes reached 7 % amongst the population in United States in 2003 (1). This percentage has progressively increased with the traffic of crack or low cost cocaine based drug.

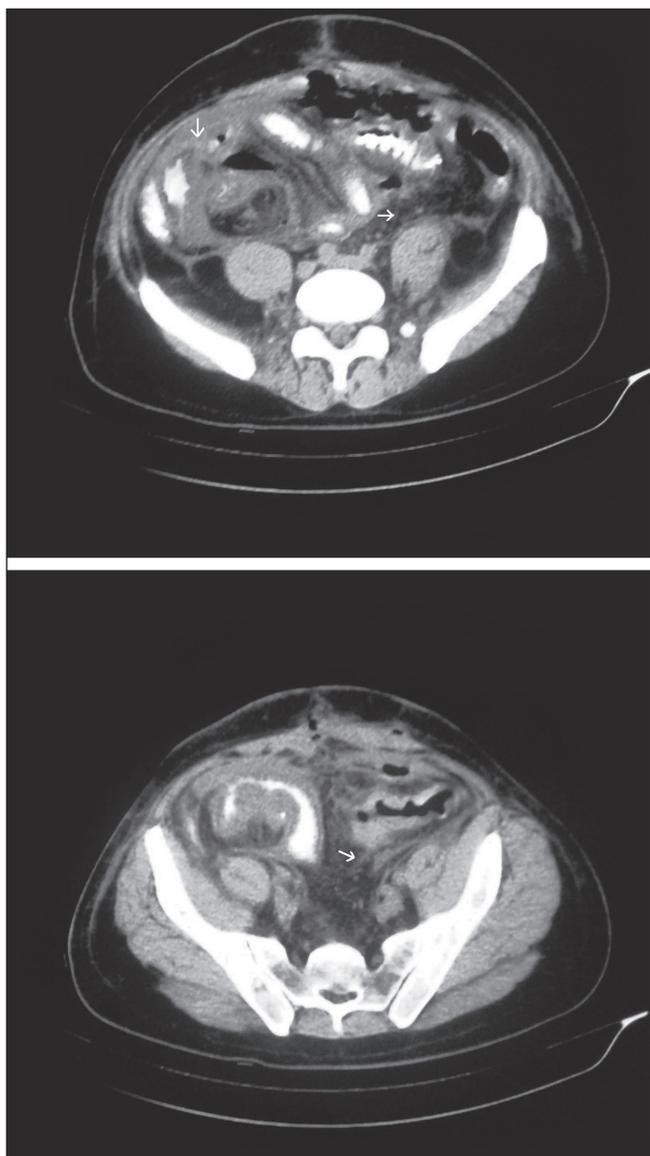


Fig. 1. CAT scan: Dilated ileal loops with enlarge walls, mesenteric fat inflammation, sigmoid and pericecal collections. No vascular calcifications.

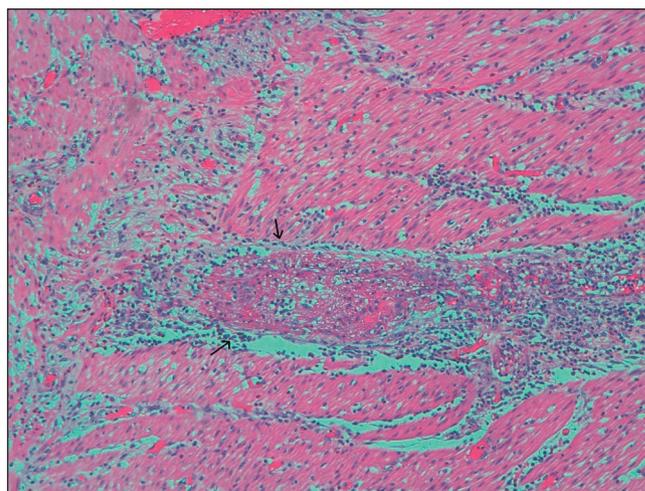


Fig. 2. Pathologic anatomy: Intestinal muscular layer with intestinal mesenteric necrotizing phlebitis of vessel with haemorrhagic necrosis and peripheral congestive reaction.

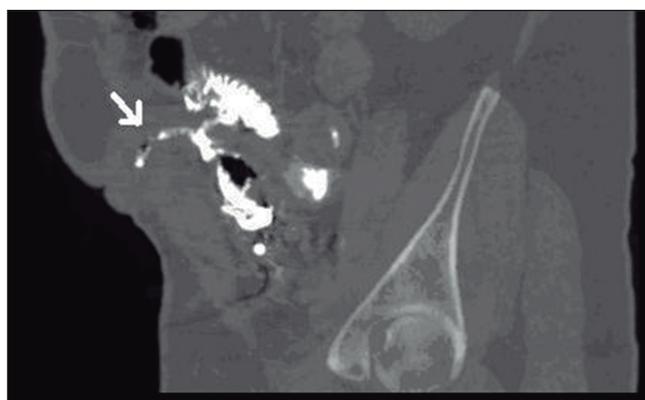


Fig. 3. Opaque enema showing Y shape fistula from sigmoid towards jejunal loop and abdominal wall.

This phenomenon generated high number of emergency admissions to hospital with patients suffering with acute digestive problems. Similar rates were found in our country where cocaine is the second most use recreational drug after cannabis amongst the young population (8.8 % in 2011 have tried cocaine least once) (2). An analysis of the use of cocaine by gender in the last year revealed that this habit is more common in men than in women between 15 to 34 years of age. One interesting fact is that amongst people using cocaine, 86.2 % consider their health to be very good, despite the fact that in 2010 cocaine was the most common cause of drug related admission to the emergency services in Spain.

It is for this reason that alongside the increment in cocaine consumption we find an increment in organic injuries at all levels arriving daily to our Accident and Emergency (A&E) departments. These patients, just like the one in our case study, are usually adult males younger than 50 years old arriving to A&E with acute or sub-acute complications at any level of the anatomy but mostly; cardiac, cerebral, abdominal, renal, respiratory, cutaneous necrosis, abortions and rhabdomyolysis. All of these complications are produced by the adverse effect of drugs on the vascular endothelium. In many cases, and with patients without a previous medical history of mental health or behavioural problems, the consumption of cocaine may not be reported or admitted in the initial interview and it may be missed or unnoticed unless the clinician suspects this is the case. In this case a drug screening test may confirm the suspicion. Cocaine has a medium half-life of one and a half hours and just over three in chronic consumption. Cocaine metabolites take up to seven and a half hours to leave the system from the time of consumption.

At the level of the digestive system and regardless the frequency of consumption and route (inhaled, smoked, intravenous, oral or intranasal) it has been proved that cocaine causes a series of complications requiring early intervention. This symptomatology usually appears between 1 and 48 hours of consumption (3) and includes; bowel perforation, gastrointestinal bleed, bowel infarcts, bowel ischaemia and ischemic colitis. Another complication worth mentioning is the "body packer" syndrome which presents with bowel obstruction. The toxic effect of the drug if absorbed (0.6-3 % of cases) can produce any of the complications mentioned before and often follows a significant detrimental effect on the cardiovascular and neurological system requiring early and intensive intervention.

Juxta-pyloric and duodenal perforations are the most common digestive complications produced by cocaine consumption. This is most common in young males with drug abuse habit and without previous history of ulcerative pathology. The perforations are caused by the local ischemic effect of the drug in the mucosa and the subsequent parietal necrosis secondary to the potent vasoconstriction effect induced by the drug on the noradrenergic

receptors (4). Other physio-pathological mechanisms include gastroduodenal motility decrease, an increase on or air ingestion with subsequent intra-gastric and intra-abdominal pressure, platelets aggregation and vascular thrombosis and vaso-spasm. These injuries may not be related to previous peptic pathologies, therefore the surgical intervention required for these perforations may be sufficient to resolve the problem. Antacids and antiH2 inhibitors should also be considered. Also in recent years the literature describes the synergism between perforations and the detection of *H. pylori* (5). Also frequent are the digestive hemorrhagic complications (less frequent than cerebral hemorrhage) especially forms of hematochezia or rectorrhagia produced by damage in the intestinal capillary endothelium and an increase in blood pressure induced by cocaine usage. There is also the effect on the aggregation of platelets observed "in vitro". Equally it has been described in some cases of spontaneous hemoperitoneum without bleeding origin and attributed to straining in vomiting when cocaine is introduced intravenously (6). Other less common effects of cocaine includes retroperitoneal fibrosis, enteritis, pseudomembranous colitis and bowel infarcts.

Finally there is evidence of a direct correlation between cocaine consumption and mesenteric ischaemia as a form of intestinal ischaemia or ischemic colitis, being the second one more common. Searching the literature, the author of this article has not found any cases of mixed ischaemia as described with the subject for this case study. The thirty something cases reflected in the literature review (the incident rates are probably higher with a certain degree of misdiagnosis) have allowed for the creation of a terminology describing this cases as enteropathy or cocainic ischaemic enteritis, defining a ischaemia non-occlusive and reversible produced by cocaine at intestine level (7). As in other cases of perforation, the fundamental mechanism of action is based in a powerful vasoconstriction induced by cocaine as a result of the inhibition of noradrenaline reuptake at the presynaptic level. This produces noradrenaline levels to increase in the postsynaptic membrane. Other vasoconstricting effects have been attributed to the drug mediated by the calcium channels in the endothelium membranes, as well as interference in the platelets aggregation process, producing an increase of aggregations and resulting in arterioles thrombus. This phenomenon combined with vasoconstriction is more commonly associated with the chronic consumption of the drug. Based on these mechanisms, Hoang et al. distinguish to clinical ways or histological of the disease. On the one hand acute enteritis or colitis where, like in this case study, the vasospasm mechanism predominates resulting in a patched enlargement of the mucosa which can be coated with a fibrinopurulent plaque and with signs of necrosis and ulcerated areas, submucous oedema, inflammatory infiltrates, and fibrin deposits in venules and capillaries. On the second hand, those chronic ways in which an intimal hyperplasia is created

in the arterioles with formation of fibrin thrombus in the submucosa and resulting in total occlusion of these with recanalization phenomenon present (8).

The intestinal compromise is usually segmentary, affecting small vessels and with a wide range of clinical severity and histology. The concomitant consumption of tobacco, old age, arteriosclerosis, and hypertension are more commonly associated with gangrenous forms of the disease and especially colics (9). The most common areas of ischaemia are the ileum, splenic and recto-sigmoid flexures of the colon. The clinical presentation is usually abdominal pain with peritoneal irritation. This could also be accompanied by vomiting and melaena. The degree of multiorgan failure is determined by the severity of the ischaemia, its spread and developing time. Acute presentations of the disease are common, as well as a lack of abnormal results on the initial blood tests. Early recognition and treatment is often enough to resolve the problem, and consequently severe cases could happen as a result of misdiagnosis.

A CAT scan is often the preferred test for diagnosing and shows the extent of the enteritis with possible finding of enhancement of the mucosa due to venous congestion, free fluid and significant loops dilatation if an ileus has been established. In cases with arterial occlusions, the mucosa may initially be difficult to capture. For this reason, it is advisable to perform the CAT scan on these patients (10). When the colon is affected a colonoscopy is advised, provided there are no signs of abdominal distention or perforation. In this instance the mucosa may appear pale with pneumatosis intestinalis. An angiography would be of no use in these acute cases as it does not show damage to small vessels. However an angiography could be considered in chronic processes where intestinal arteries thrombosis is evident (11). The initial treatment involves haemodynamic stability, adequate fluid resuscitation and strong analgesia to combat the possible associated effects of cocaine consumption (12). It is also very advisable to perform a CAT scan with intravenous contrast once renal function has been corrected or optimised. The CAT scan is a valuable test which findings may help clinicians adopt a conservative approach when there is no necrosis (pneumatosis, pneumoperitoneum, portal gas) or perforation, as it could have been considered with the subject on this case study previous to the second intervention. A publication in 2005 demonstrates the success of conservative measures in 14 out of 18 cases of cocaine related colitis (13). However, this opinion was not shared with other authors who opted for intestinal resections in more than 50 % cases (14). Surgical intervention is indicated in advance cases where a CAT scan showed complications or patients present with abdominal sepsis refractory to initial treatment. There is not enough evidence in the literature for the contraindication of primary anastomosis against derivative stomas. However the effect on the vascularity in the intestinal stumps in resected pieces encourages the future formation of fistulas. This complication appeared in

the subject for this case study. These fistulas could travel towards the skin or other affected loops. With rates of morbidity and mortality far from negligible attributed to reischemia or generalized ischaemia, it is not clear in the bibliography if these types of ischaemia are any worse than mesenteric ischaemias associates with other aetiologies. A recent study showed some evidence that cocaine was an independent risk factor which increases mortality when comparing cases of cocaine related ischaemic colitis with other type of colitis (15).

In conclusion, the author of this article would like to highlight the need for further research into cocaine consumption amongst the population and the importance of requesting a detection test for those, usually young patients, with no cardiovascular risk factors presenting to the emergency services with acute abdominal pain and with a clinical suspicion of bowel ischaemia. It would be beneficial for these patients to carry out an intravenous contrast CAT or colonoscopy if appropriate and depending on patient's tolerance. By doing this, clinicians would be able to determine cases where early surgery is not justified due to lack of sufficient evidence and medical treatment and close monitoring is established instead.

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