

Life threatening abdominal complications following cocaine abuse

Cocaine (an alkaloid extracted from the *Erythroxylon coca* plant) is used orally, intranasally, intravenously or smoked as crack (the free-base form of cocaine). A recent survey from the Department of Health in the UK shows that the use of cocaine has increased considerably over the last 10 years.¹ It is estimated that 344 000 people abuse cocaine and 17 000 people abuse crack every month in the UK.

The common pathologies associated with cocaine and crack abuse include nasal septal perforation and necrosis, cardiovascular and respiratory problems and complications which arise as a result of intravenous injection of the drug including cellulitis, abscesses, arterial and venous thrombosis and infections such as hepatitis and human immunodeficiency virus. Cerebral events in patients following drug abuse include seizures, intra-cranial haemorrhage and strokes secondary to vasospasm. In this editorial we discuss some of the common complications of cocaine abuse that are well known by physicians but concentrate on the relatively uncommon, but life threatening, gastrointestinal complications which present to surgeons.

One of the most common symptoms in patients taking cocaine is chest pain.² The differential diagnosis in these patients includes arrhythmias, acute coronary syndromes, myocardial infarction, pneumothorax and pneumomediastinitis. Patients also present with symptoms and signs of cardiomyopathy, myocarditis, endocarditis and cardiogenic pulmonary oedema. Myocardial infarction in patients can be difficult to diagnose because of abnormal electrocardiograms in a high proportion of patients without chest pain who regularly take cocaine. This is further confounded by raised cardiac enzymes in such patients, when they may not necessarily have had a myocardial infarction. The treatment of myocardial infarction in this group of patients is similar to standard treatment protocols but also employs other drugs such as benzodiazepines and avoidance of certain drugs especially beta-blockers and possibly calcium channel blockers. Thrombolysis is not of proven benefit.

Respiratory problems include cough, haemoptysis which may be due to pulmonary haemorrhage, mild dyspnoea and severe acute problems such as pneumothorax, pneumomediastinum, non-cardiogenic pulmonary oedema, i.e. 'crack lung' (severe chest pain, breathing problems and pyrexia that may lead to respiratory failure) have also been described.³ The latter are reasons for admission with patients needing medical or intensive care treatment.

Pneumothorax in patients who continue to abuse crack may be recurrent and these patients eventually end up needing a thoracotomy. Smoking of crack also leads to deterioration of underlying chest conditions such as asthma and bronchitis. The treatment of non-cardiogenic pulmonary oedema is diuretics, oxygen and mechanical ventilation as needed.

Gastrointestinal complications of cocaine abuse are uncommon compared to the complication discussed above. They are relatively well documented in the American literature, due to the higher incidence of drug abuse in the USA. However, experience with this drug in the UK is limited; therefore heightened awareness of its complication is paramount, in the light of the increasing abuse of cocaine.

The actual incidence of gastrointestinal complication is not known worldwide but in one series from the USA, 50 patients with juxtapyloric perforation were treated in a hospital over a period of 4 years.⁴ This series only reported gastroduodenal perforation and it is not known how many other patients were admitted with other gastrointestinal complication from drug abuse. The number of cases reported from the UK is very limited, although the authors have recently encountered two cases of gastrointestinal perforation secondary to cocaine abuse within a few weeks. It is likely to increase as the number of cocaine abusers goes up.

Following intake of the drug, abusers develop abdominal pain and tenderness. There may also be associated nausea, vomiting and bloody diarrhoea. The onset of symptoms may be within an hour following drug abuse but the presentation may be delayed by up to 48 hours. The diagnosis of an acute abdomen may be difficult and requires a high index of clinical suspicion, especially as there may be no abnormal findings on imaging investigation such as free intra-peritoneal air.⁵ The abdominal complication of cocaine and crack differ slightly and these are discussed separately.

Cocaine abuse can cause mesenteric ischaemia and gangrene, which result in small and large bowel perforation as well as intra-peritoneal haemorrhage.⁶⁻⁸ The distal ileum is most commonly affected, but there are reports of gangrene involving almost any part of the small bowel. The common underlying pathophysiological mechanism is cocaine-induced arterial vasospasm or vasoconstriction leading to intestinal ischaemia with mucosal and transmural necrosis.⁹ An alternative mechanism of cocaine-induced injury is mesenteric vascular thrombosis caused by direct aggregation of platelets with the subsequent release of vasoactive mediators. This is a chronic process afflicting young patients who present with abdominal pain aggravated by food and weight loss—the classical symptoms of mesenteric angina. In these patients the diagnosis can be made pre-operatively by angiography.

The usual management of small or large bowel gangrene or perforation is by resection and primary anastomosis.⁹

Large bowel perforation can also be managed by bowel resection (Hartmann's procedure).¹⁰ However, if the colonic perforation is small, it may be treated with simple closure and a defunctioning stoma (authors personal experience). Patients with mesenteric angina are treated with standard two-vessel bypass typically from the supra-coeliac aorta to the coeliac and superior mesenteric arteries, respectively. The Inferior mesenteric artery may be reimplanted at the same time if occluded at its origin.⁹ The mortality associated with gastrointestinal complications can be as high as 21% especially in the presence of gangrenous bowel.⁵

Following crack abuse, the usual cause of an acute abdomen is a pre-pyloric or a duodenal perforation.^{4,11} In addition, crack can cause similar problems to those encountered with cocaine abuse such as gangrenous bowel and perforation.¹² However, crack abuse is more likely to cause an upper gastrointestinal perforation, which is uncommon with cocaine abuse. Crack abuse also causes ischaemic colitis, which presents with abdominal pain and bloody diarrhoea.¹³ The pathophysiology of crack induced gastrointestinal injury is similar to that of cocaine, namely vasoconstriction. It is not clear why crack abuse preferentially causes upper gastrointestinal perforation rather than bowel gangrene or perforation. One possible explanation is the documented effects on gastric motility and increased intragastric pressure associated with the smoking of crack, which may in part be due to increased air swallowing and breath holding.⁴

The management of gastroduodenal perforation is by standard closure of the perforation, (which is usually 3–5 mm in diameter). Patients should be tested for *Helicobacter pylori* either by per-operative biopsy or, subsequently, because of the high incidence of the infection in these patients.⁴ Ischaemic colitis is diagnosed on colonoscopy and usually settles without surgery, but a few cases will progress to peritonitis necessitating surgical intervention.¹³

In view of the increasing abuse of cocaine and crack in this country, it is important that doctors should be aware of their abdominal complications especially mesenteric ischaemia and gastroduodenal perforation, which primarily affects

younger age groups. These conditions should always be considered in patients with a history of cocaine abuse who present with abdominal pain in order to avoid delay in diagnosis and treatment.

Alok Tiwari

Mohammed Moghal

Luke Meleagros

Department of Surgery, North Middlesex University Hospital,
London N18 1QX, UK

Correspondence to: Mr Luke Meleagros MD FRCS, Consultant Surgeon

E-mail: luke.meleagros@nmh.nhs.uk

REFERENCES

- 1 Drug misuse declared: findings from the 2003/4 British crime survey. *Home Office Stat Bull* May 2005
- 2 Pozner CN, Levine M, Zane R. The cardiovascular effects of cocaine. *J Emerg Med* 2005;**29**:173–8
- 3 Haim DY, Lippmann ML, Goldberg SK, Walkenstein MD. The pulmonary complication of crack cocaine: a comprehensive review. *Chest* 1995;**107**:233–40
- 4 Feliciano DV, Ojukwu JC, Rozycki GS, *et al*. The epidemic of cocaine-related juxtapyloric perforations: with a comment on the importance of testing for *Helicobacter pylori*. *Ann Surg* 1999;**229**:801–4
- 5 Kram HB, Hardin E, Clark SR, Shoemaker WC. Perforated ulcers related to smoking 'crack' cocaine. *Am Surg* 1992;**58**:293–4
- 6 Sudhakar CB Al-Hakeem M, Macarthur JD Sumpio BE. Mesenteric ischemia secondary to cocaine abuse: case reports and literature review. *Am J Gastroenterol* 1997;**92**:1053–4
- 7 Endress C, Kling GA. Cocaine-induced small-bowel perforation. *AJR Am J Roentgenol* 1990; **154**:1346–7
- 8 Bellows CF and Raafat AM. The surgical abdomen associated with cocaine abuse. *J Emerg Med* 2002;**23**:383–6
- 9 Hoang MP, Lee EL, Anand A. Histologic spectrum of arterial and arteriolar lesions in acute and chronic cocaine-induced mesenteric ischemia: report of three cases and literature review. *Am J Surg Pathol* 1998;**22**:1404–10
- 10 Brown DN, Rosenholtz MJ, Marshall JB. Ischemic colitis related to cocaine abuse. *Am J Gastroenterol* 1994;**89**:1558–61
- 11 Sharma R, Organ CH, Jr, Hirvela ER, Henderson VJ. Clinical observation of the temporal association between crack cocaine and duodenal ulcer perforation. *Am J Surg* 1997;**174**:629–32
- 12 Muniz AE, Evans T. Acute gastrointestinal manifestations associated with use of crack. *Am J Emerg Med* 2001;**19**:61–3
- 13 Linder JD, Monkemuller KE, Rajman I, Johnson L, Lazenby AJ, Wilcox CM. Cocaine-associated ischemic colitis. *South Med J* 2000; **93**:909–13