A fatal case of amphetamine induced ischaemic colitis

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ABSTRACT

Amphetamine induced ischaemic colitis is an exceedingly rare presentation of amphetamine toxicity. The cases reported in the literature have described mild or transient disease. We present a fatal case of ischaemic colitis induced by amphetamine use in a 44-year-old woman who presented in extremis after a cardiac arrest en route to the emergency department. A short history of headache, abdominal pain, vomiting and agitation preceded her admission. Imaging revealed changes consistent with ischaemic colitis. Emergency laparotomy revealed widespread colonic necrosis necessitating a subtotal colectomy. Despite aggressive resuscitation and inotropic support from arrival, the patient deteriorated intraoperatively and died in the immediate postoperative period. Histology showed arterial type ischaemia/reperfusion injury of the area supplied by the superior mesenteric artery. The patient's serum amphetamine level was 0.52mg/l (peak therapeutic levels <0.2mg/l). The postmortem examination concluded that amphetamines were the likely cause of the vasospasm, leading to profound colonic ischaemia.

KEYWORDS

Ischaemic Colitis – Amphetamines

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Amphetamine and amphetamine type stimulant (ATS) use is increasing globally. While amphetamine toxicity usually presents with cardiac, neurological or psychiatric symptoms, amphetamine use can affect numerous other tissues. Ischaemic colitis as a result of amphetamine use is rare and cases reported in the literature have usually settled with conservative management.^{1–4} We report a fatal case of colonic ischaemia in order to bring this important complication of recreational drug use to the attention of physicians and to highlight the importance of considering recreational drug use when assessing the acute abdomen, especially in younger patients.

Case history

A 44-year-old woman presented to our emergency department in extremis having suffered cardiac arrest in the ambulance en route. Her past medical history was significant only for a transient ischaemic attack during a previous pregnancy. The patient's family reported that she used amphetamines on a regular basis. Her relatives described a one-day history of headache, neck pain, abdominal pain, vomiting and increasing agitation. Spontaneous circulation was established following cardiopulmonary resuscitation for a total of nine minutes, and the patient was intubated and ventilated before transfer to the intensive care unit. On examination, the abdomen was tense and distended. Two

previous low abdominal wounds were noted. Serial clinical reviews suggested progression of the abdominal distension.

Arterial blood gas on arrival revealed a profound metabolic acidosis with a pH of 6.6 and lactate of 18.7mmol/l. Other haematological values included a haemoglobin level of 140g/l, a white cell count of $46.6 \times 10^9/l$ and a normal platelet count. Amylase was significantly raised at 1,062u/l, as were calcium and magnesium. Computed tomography (CT) of the head, thorax and abdomen was performed as soon as clinically safe. CT of the head was normal. CT of the abdomen revealed small and large bowel dilation with enhancement of small bowel loops and thrombosed superior mesenteric and portal veins. In addition, there was a fleck of air in the pulmonary trunk, concerning for a small air embolus. The CT also showed changes consistent with haemorrhagic ascites, suggesting an ischaemic bowel. Stool samples taken at admission did not reveal any cause of infective colitis on subsequent evaluation by the microbiologists.

On the intensive care unit, the patient received inotropes, antibiotics and aggressive fluid resuscitation. Despite biochemical indices initially improving, she subsequently developed coagulopathy. On the basis of the CT, a decision was made to proceed to an emergency laparotomy. The operation started 11 hours after presentation owing to the large amount of clinical optimisation required. Findings at laparotomy showed a grossly dilated and necrotic colon and

terminal ileum with an obvious cut-off in the terminal ileum. The remainder of the small bowel was hypoperfused but viable.

A subtotal colectomy was performed with division of the macroscopically healthy terminal ileum and rectosigmoid junction. The patient required increasing inotropic support and despite best medical treatment of the coagulopathy, she continued to bleed from the dissection planes. A decision was made to pack the abdomen and close it using the ABThera™ (KCI, Gatwick, UK) wound management system, with a view to perform a further laparotomy and abdominal closure once clinical status allowed. Unfortunately, the patient deteriorated and had a further cardiac arrest in the immediate recovery period, which demonstrated only a transient response to treatment. She died subsequently with her family in attendance.

Histological findings demonstrated acute arterial type ischemia/reperfusion injury to the area supplied by the superior mesenteric artery. There was no evidence of vasculitis, atherosclerotic disease or perforation. A postmortem examination was performed and included toxicology reports on the premortem blood samples. Amphetamine levels were 0.52mg/l, more than double the peak therapeutic levels of <0.2mg/l. Cannabinoids were also isolated. The pathologist concluded that amphetamines were the most probable causative agent of the vasospasm. It is likely that the toxic effects of ischaemic colitis were the drivers of the systemic response, which ultimately led to the patient's death.

Discussion

ATS use is increasing worldwide. There are many physiological effects but patients commonly present with cardiac, neurological, psychiatric and respiratory symptoms. Large gastrointestinal ulcers have been demonstrated as a result of methamphetamine use; however, cases of ischaemic colitis due to ATSs are exceedingly rare. Of the four cases reported in the literature, three resolved with conservative management and the fourth required a right hemicolectomy.¹⁻⁴ To our knowledge, this case represents the most severe case of ischaemic colitis caused by amphetamine use and the first fatality. In keeping with the other reported cases, our patient was under 50 years old, reinforcing amphetamine induced ischaemic colitis as a diagnosis to consider in people in this age group presenting with ischaemic colitis.

Amphetamines and ATSs are indirect agonists at dopamine, noradrenaline and serotonin receptors, and cause a multitude of subjective and physiological effects in a dose dependent manner.⁵ Increased catecholamine levels have numerous effects on the cardiovascular system including hypertension, tachycardia, vasoconstriction, vasospasm and accelerated coronary artery disease. These can lead to amphetamine induced myocardial infarctions and cerebrovascular accidents. Amphetamine related gastrointestinal ischaemia is thought to be a result of alpha-adrenergic receptor induced splanchnic vasoconstriction, the same as the more widely reported cocaine induced ischaemic colitis. Cocaine has also been shown to cause vasoconstriction through altered endothelial calcium transport, which can cause primary thrombosis and has a direct toxic action on gastrointestinal mucosa although these have not been demonstrated with amphetamines to date. Simultaneous use of other drugs including alcohol and opioids ('speedballing') can increase the effects of ATS induced toxicity.

A variety of investigations for ischaemic bowel have been advocated in the literature including ultrasonography, endoscopy, CT and angiography. In our case, CT was vital as it confirmed the diagnosis and helped to exclude acute pancreatitis, a pathology for which surgery would not typically be indicated early in the course of the disease.

Conclusions

We have presented a case of fatal ischaemic colitis as a result of amphetamine use. With the growing use of ATSs and the increasing emergence of legal highs, it is important for physicians to be aware of this condition, and the need for urgent investigation and management, particularly in younger patients.

References

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