CASE REPORT

Cocaine-induced splenic rupture

Aysha N. Khan¹, Jesse T. Casaubon²,*, John Paul Regan², and Leonora Monroe²

¹Center for Autoimmune and Musculoskeletal Diseases, The Feinstein Institute for Medical Research, Manhasset, NY, USA and ²Department of Surgery, Wyckoff Heights Medical Center, Brooklyn, NY, USA

*Corresponding address. Department of Surgery, Wyckoff Heights Medical Center, 374 Stockholm Street, Brooklyn, NY 11237, USA. Tel: +1-303-489-3920; Fax: +1-718-456-0284. E-mail: jcasaubon@wyckoffhospital.org

Abstract

Splenic rupture is a rare but serious complication from cocaine abuse. Given the ubiquitous prevalence of abuse and the potential for death from intraperitoneal bleeding, the prompt diagnosis and treatment of cocaine-induced disease including splenic rupture is essential. The management for splenic rupture from traumatic and atraumatic etiology has shifted from emergent laparotomy and splenectomy to non-operative approach with transcatheter splenic artery embolization. We report a 39-year-old male with a significant substance abuse history who presented with atraumatic splenic rupture. He was managed nonoperatively with adjunctive transcatheter splenic artery embolization. His post-procedure course was complicated by an intra-abdominal abscess requiring drainage via interventional radiology guided pigtail catheter placement and intravenous antibiotics. This case report is intended to raise awareness of the potentiating effects of cocaine use in this patient population and highlight questions raised during this patient’s management.

INTRODUCTION

Cocaine is a potent stimulant of the central nervous system which causes vasoconstriction and can damage all organ systems [1]. It blocks presynaptic sympathetic reuptake of noradrenaline (NE), causing accumulation in synaptic clefts. NE induces alpha-adrenergic stimulation and vasoconstriction which is the underlying culprit in organ damage [2]. We herein present a case of cocaine-induced splenic rupture with a review of the literature.

CASE REPORT

A 39-year-old white male with history of cocaine and heroin abuse, presented to the emergency department with chief complaint of left flank pain. He denied recent travel, trauma or sick contacts. He had used cocaine and heroin earlier that day. Physical exam revealed the patient to be stable, alert and oriented, however, diaphoretic. There was no palpable lymphadenopathy. His abdomen was distended and diffusely tender with guarding. There was no palpable hepatosplenomegaly. Laboratory data showed leukocytosis of 15 000 and a hemoglobin and hematocrit of 12.6 g/dL and 38.5%. Contrast enhanced CT of the abdomen and pelvis showed blood extravasating from the superior aspect of the spleen with a large hemoperitoneum (Fig. 1).

The patient then underwent CT angiography with coil embolization of the proximal splenic artery (Fig. 2). The repeat hemoglobin revealed a drop to 6.0 g/dL, but responded to transfusion. His hospital course was complicated by substance withdrawal.

After 10 days of admission patient developed fever and leukocytosis. Repeat CT showed a collection in the left upper quadrant with partially necrotic areas within the spleen (Fig. 3).

The patient then underwent CT guided drainage of the collection which was positive for methicillin-sensitive Staphylococcus aureus (Fig. 4). After this was successfully treated, the patient was discharged.

Received: February 1, 2017. Accepted: February 27, 2017

Published by Oxford University Press and JSCR Publishing Ltd. All rights reserved. © The Author 2017.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (http://creativecommons.org/licenses/by-nc/4.0/), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited. For commercial re-use, please contact journals.permissions@oup.com
DISCUSSION

Splenic rupture is a rare but serious complication from cocaine abuse. Given the ubiquitous prevalence of abuse and the potential for death from intraperitoneal bleeding, the prompt diagnosis and treatment of cocaine-induced disease including splenic rupture is essential.

Cocaine attains high concentrations within the spleen and the associated vasoconstriction has been shown to transiently reduce splenic volume on average by 20% \(^2\). Splenic hemorrhage may occur from arteriolar rupture from accelerated hypertension or from infarction and subsequent hemorrhage following resolution of vasospasm \(^1,3\). The current management for the majority of splenic injury is a non-operative approach with adjunctive transcatheter splenic artery embolization (TSAE) which is effective for non-operative management in 90% of blunt splenic trauma \(^4\).

Two general methods for TSAE of splenic injuries have been advocated. One option is coil embolization of the proximal splenic artery, which decreases arterial pressure in the spleen but allows continued perfusion through collateral arteries. The other method is superselective embolization of the bleeding arterial branch. To arrest the hemorrhage from splenic injury and to minimize infarct due to embolization, it is important to select appropriate method of TSAE on the basis of the features of arterial injuries \(^4-6\). Our patient was managed with coil embolization of the proximal splenic artery and subsequently maintained partial perfusion of splenic tissue.

A study conducted over an 11-year period reports that minor complications of fever, left-sided pleural effusions, and coil migration occur in 34% of patients while major complications of splenic abscess, infarction, cyst, and contrast induced renal insufficiency occur in 14% of patients who undergo TSAE. Of the patients in the study, ¾ of patients with major complications had undergone distal embolization, defined as distal to the main splenic artery trunk \(^7\). During the post-procedure course, our patient was noted to have minor complications of fever and left-sided pleural effusion as well as a major complication of intra-abdominal abscess.

It is generally recommended that patients who undergo emergent splenectomy receive pneumococcal, meningococcal and H. Influenzae (Hib) vaccinations 2 weeks postoperatively, however, the guidelines are unclear regarding post-TSAE patients \(^8\). 99.2% of active trauma surgeons immunize their postsplenectomy patients, whereas only 15.4% of surgeons immunize those who undergo splenorrhaphy and 8.4% immunize patients who are managed nonoperatively \(^9\). It has been proposed that the decision to vaccinate be based on splenic function post-TSAE. Based on CT volumetric analysis, coil embolization of the main splenic artery resulted in only a mild degree of splenic volume loss over the long term, with a mean of 15% decrease in volume. Patients that underwent distal TSAE demonstrated a 21% volume reduction while patients with proximal TSAE demonstrated a 4% reduction \(^10\).

Our patient was vaccinated given that post-procedure CT showed the spleen to be partially necrotic with only two islands of well-perfused, preserved spleen depicting >15% decrease in...
splenic volume. The plan was to perform interval splenectomy however he was lost to follow up.

CONFLICT OF INTEREST STATEMENT
None declared.

REFERENCES
1. Shanti CM, Lucas CE. Cocaine and the critical care challenge. Crit Care Med 2003;31:1851–59.
2. Azar F, Brownson E, Dechert T. Cocaine-associated hemo-peritoneum following atraumatic splenic rupture: a case report and literature review. World J Emerg Surg 2013;8:33.
3. Vaghjimal A. Splenic infarction related to cocaine use. Postgrad Med J 1996;72:768.
4. Stassen NA, Bhullar I, Cheng JD, Crandall ML, Friese RS, Guillamondegui OD, et al. Selective nonoperative management of blunt splenic injury: an Eastern Association for the Surgery of Trauma practice management guideline. J Trauma Acute Care Surg 2012;73:S284–300.
5. Hagiwara K, Fukushima H, Murata A, Matsuda H, Shimazaki S. Blunt splenic injury—usefulness of transcatheter arterial embolization in patients with a transient response to fluid resuscitation. Radiology 2005;235:57–64.
6. Gowda NK, D’Souza D, Golzarian J. Partial splenic artery embolization. Endovasc Today 2012;4:74–6.
7. Ekeh AP, Khalaf S, Ilyas S, Kaufman S, Walusimbi M, McCarthy MC. Complications arising from splenic artery embolization: a review of an 11-year experience. Am J Surg 2013;205:250–4.
8. Hussian M, Pomp A. Laparoscopic Splenectomy: Prevention and Management of Laparoendoscopic Surgical Complications. 3rd edn [Internet]. 2011 [cited 2014 Jun 26]. Available from: http://laparoscopy.blogs.com/prevention_management_3/2011/03/laparoscopic-splenectomy.html
9. Tominaga GT, Simon FJ Jr, Dandan IS, Schaffer KB, Kraus JF, Kan M, et al. Immunologic function after splenic embolization, is there a difference? J Trauma 2009;67:289–95.
10. Preece S, Lungren MP, Miller M Jr, Smith TP, Kim CY. Coil embolization of the splenic artery—long-term impact on splenic volume. J Vasc Interv Radiol 2013;24:S135–6.