NDT Plus (2010) 3: 265–268
doi: 10.1093/ndtplus/sfq015
Advance Access publication 28 February 2010

NDT PLUS
Nephrology Dialysis Transplantation

Case Report

Spontaneaous perinephric haemorrhage and acute renal failure in pregnancy following cocaine intoxication

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Abstract

Cocaine abuse may contribute to the diverse forms of renal injury. We report a case of a pregnant woman who developed a large subcapsular renal haematoma after cocaine intoxication at 18-week gestation. She stabilized on conservative management and presented again at 29-week gestation with pre-eclampsia, acute renal failure and fetal demise. She required caesarean section delivery and intensive antihypertensive therapy to control severe pre-eclampsia associated with cocaine intoxication. This case is unique in that it is the first report of cocaine intoxication in pregnancy complicated by subcapsular haemorrhage. We discuss the possible mechanisms for the occurrence of this complication.

Keywords: acute renal failure; cocaine abuse; pre-eclampsia; subcapsular haemorrhage

Introduction

Spontaneous subcapsular or perinephric haemorrhage is a relatively uncommon but diagnostically challenging condition. In the evaluation of this condition, the differential diagnosis includes renal tumours, vascular disorders and pyelonephritis. While computed tomography would readily identify tumours, the vascular disorders may pose greater diagnostic challenges. The major vascular causes of perinephric haematoma include polyarteritis nodosa, renal aneurysm, arteriovenous malformation, Wegener's granulomatosis, renal infarction and pre-eclampsia.

In this report, we present a case of spontaneous perinephric haemorrhage in pregnancy associated with cocaine intoxication. The patient was managed conservatively, with clinical improvement until she left the hospital against medical advice. She returned 10 weeks later with acute renal failure, pre-eclampsia, fetal demise and cocaine intoxication. We discuss the presentation, the diagnosis and the conservative management of this syndrome and its relationship to cocaine intoxication in pregnancy.

Case report

A 36-year-old African American woman at 19 weeks of gestation was admitted through the emergency room due to a severe right lower quadrant pain radiating to her back. She denied fever, vaginal bleeding, or bowel or urinary symptoms. Her medical history was significant for hypertension. Her obstetric and gynaecologic history included four normal-term vaginal deliveries and a caesarean section delivery at 24 weeks due to placental abruption with perinatal death. She denied any trauma but had a 10-pack-year smoking history as well as marijuana and cocaine use. She conceded to have used crack cocaine several times on the day of presentation.

On physical exam, she was acutely ill and pale. Her blood pressure was 182/107 mmHg with a pulse of 83/min which increased to 102/min on standing. She had tenderness to palpation of her right flank and periumbilical region, with no rebound. Her abdomen was distended with the uterine fundus felt just below the umbilicus, compatible with 19-week gestation. No uterine contractions were noted, and the fetal heart rate was 144 beats per minute. The cervix was closed, and there was no evidence of vaginal bleeding or rupture of membranes.

Laboratory studies showed a haemoglobin level of 6.7 g/dL (67 g/L), a white blood cell count of 10.1 × 10^3/μL (10^9/L) and a platelet count of 184 × 10^3/μL (10^9/L). The prothrombin time (PT) was 10.8 s [international normalized ratio (INR) 0.97], with partial thromboplastin time (PTT) of 27 s. The serum creatinine level was 1.0 mg/dL [88 μmol/L; estimated glomerular filtration rate (GFR) 91.7 mL/min/1.73 m^2]. The blood urea nitrogen was 6 mg/dL (2.14 mmol/L), and the urine sediment showed 3+ blood, 2+ protein and 30–50 red blood cells per high-power field. Serum uric acid was 6 mg/dL. The lactate dehydrogenase level (LDH) was 161 IU/mL. The urine drug screen was positive for cocaine metabolite. Urine culture was negative. A renal ultrasound showed normal-sized kidneys with a prominent echogenic material of 3–4-cm thickness surrounding the right kidney without hydronephrosis, tumour or calculi (Figure 1). A pelvic ul-

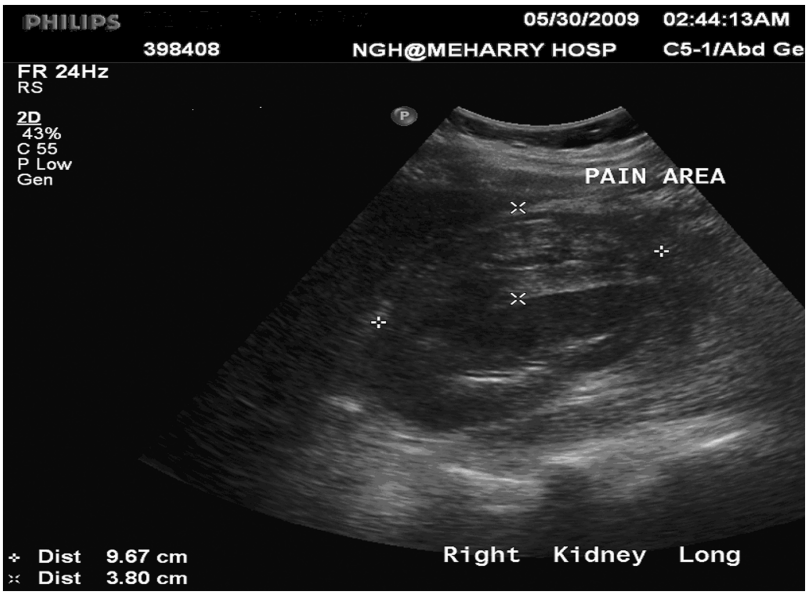

Fig. 1. Ultrasound showing a large perinephric haematoma measuring about 9.6 × 3.8 cm on the anterior–superior aspect of the right kidney.

trasound confirmed the presence of a single viable intrauterine gestation. A computed tomography (CT) scan done to better delineate the lesion showed a large complex retroperitoneal fluid collection surrounding the right kidney extending into the right paracolic gutter and the surrounding portions of the inferior vena cava, duodenum and pancreas (Figure 2).

She was emergently resuscitated with intravenous fluids and transfused two units of packed red cells with improvement on her haemoglobin level to 9.1 g/dL (91 g/L). Her hypertension was controlled with intravenous hydralazine and oral amlodipine. Because of improvement in her pain control, stable haemodynamics and good fetal heart tones, a conservative approach was recommended. The patient

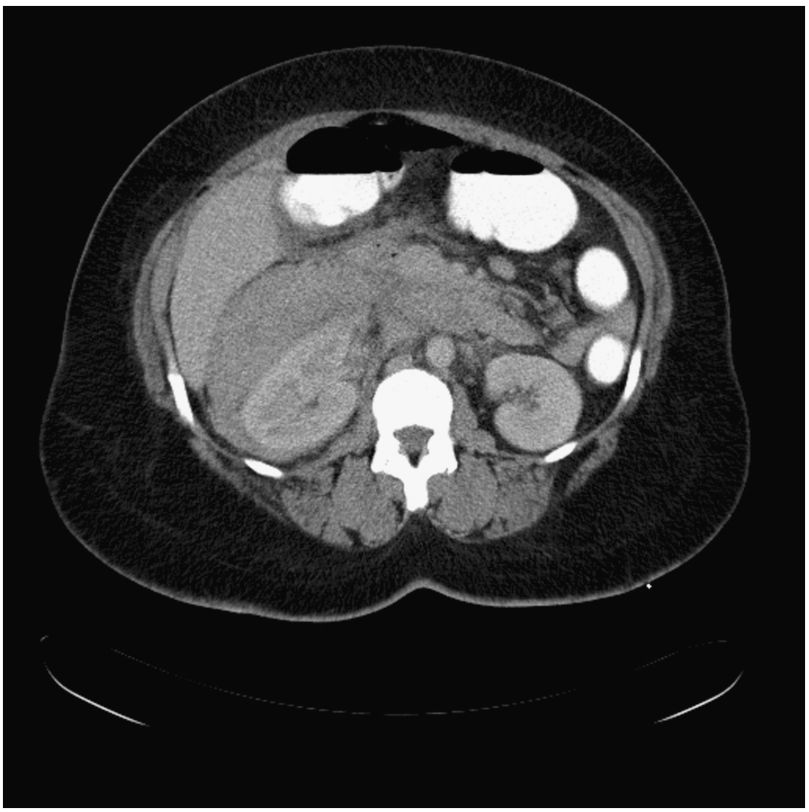

Fig. 2. CT scan showing a large perinephric haematoma encapsulating the right kidney with retroperitoneal extension to the pancreatic bed.

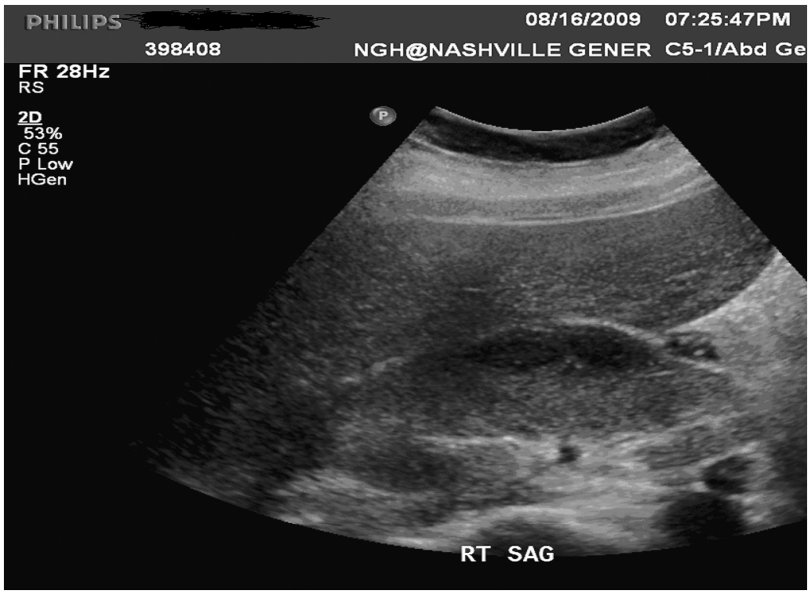

Fig. 3. Ultrasound at 29-week gestation showing a significant interval reduction in size of haematoma around the right kidney.

Table 1. Laboratory findings at 18- and 29-week gestation

Test	19th week	29th week
Haemoglobin (g/dL)	6.7	11
Platelets	241	52
Aspartate aminotransferase (IU/L)	22	26
Alanine aminotransferase (IU/L)	21	23
LDH (IU/L)	161	730
Serum creatinine (mg/dL)	1.0	1.7
Estimated GFR		
Blood urea nitrogen (mg/dL)	6	14
Albumin (g/dL)	2.9	2.3
24-h urine protein (mg/dL)	665	1231
Urine red blood cells		
Urine culture	Negative	Not done
PT (s)	10.8	9.2
INR	0.97	0.84
PTT (s)	27	24
Uric acid (mg/dL)	6.0	9.4
Urine drug screen	Positive for cocaine	Positive for cocaine

made a clinical improvement indicated by an adequate pain control and an improved blood pressure control as well as a stable haemoglobin level. However, she signed out of hospital against medical advice on the fourth day of admission.

She again presented at 29-week gestation through the emergency department complaining of abdominal pain, decreased fetal movement and blurred vision. Her blood pressure was markedly elevated at 223/133 mmHg. Her urinalysis was again significant for microscopic haematuria (10–15 red blood cells per high-power field), 2+ proteinuria and a positive urine drug screen for cocaine. Her serum creatinine level was increased to 1.8 mg/dL (158.4 μmol/L; estimated GFR 37.6 mL/min/1.73 m^2). Her uric acid level had risen to 9.4 mg/dL. A repeat renal ultrasound (Figure 3) showed a smaller right perinephric fluid collection consistent with a resolving haematoma. Because of her presentation with severe pre-eclampsia, intravenous magnesium sulphate and hydralazine were given, and she had urgent delivery of a non-viable fetus by caesarean section. A bilateral tubal ligation was simultaneously performed. At the time of her discharge home after 5 days of admission, she remained clinically stable, her blood pressure was 135/85 mmHg and her serum creatinine level decreased to 1.0 mg/dL (88 μmol/L) (Table l).

Discussion

The syndrome of spontaneous subcapsular renal bleeding with dissection of blood into the subcapsular and/or perinephric space is a rare, life-threatening condition that is usually caused by renal tumours, vascular disorder, pyelonephritis or pre-eclampsia [1,2]. It was first described by Wunderlich in 1856 [3].

Our patient presented initially with spontaneous perinephric haemorrhage and hypertensive crisis in pregnancy in association with cocaine intoxication. Because of the high morbidity and potential mortality associated with this condition, nephrectomy may sometimes be recommended for uncontrollable haemorrhage or if a tumour is identified. However, a conservative strategy, with follow-up radiologic imaging, has been tried by some with good outcome [4–8]. This patient had been stabilized on a conservative approach before she left the hospital against medical advice. On her readmission at the 29th week of gestation, she had a picture of severe pre-eclampsia with hypertensive crisis, blurry vision, epigastric pain and acute renal failure again with cocaine intoxication. This mandated the urgent caesarean section delivery of the dead fetus. The repeat renal ultrasound confirmed the interval reduction in size of haematoma. She showed the common features of this syndrome including acute flank pain, worsening hypertension and proteinuria [1].

The cause of acute renal failure (ARF) on her second presentation is unclear. It may be due to severe pre-eclampsia as two other cases of this syndrome and ARF in patients with severe pre-eclampsia have been reported. Interestingly, cocaine use has also been associated with pre-eclampsia [9,10]. The rapid improvement of renal function after the caesarean delivery and the achievement of good blood pressure control support that pre-eclampsia was more likely the cause of ARF. In three other reports of this syndrome, ARF was also observed, and renal function improved with a conservative management [4,6,8]. Though the precise cause of the spontaneous perinephric haemorrhage in our patient is unclear, the temporal relationship between heavy cocaine use and her presentation supports a causal rather than a casual relationship. There was no evidence of a renal tumour, vasculitis or coagulopathy. We and others reviewed the numerous nephrotoxic effects of cocaine abuse about a decade ago [11]. How cocaine might induce perinephric haemorrhage/haematoma is unclear, but several mechanisms may be involved including malignant hypertension, inflammation and deranged platelet function. In other cases of this syndrome associated with pre-eclampsia, severe hypertension was proposed to play a role in pathogenesis of spontaneous perinephric haemorrhage [5,12]. Furthermore, severe hypertension has been implicated in haemorrhage in other vascular beds like the lungs in both cocaine-abusing patients [13,14]. Cocaine use may also cause perinephric haemorrhage if there is a rupture of the renal capsule. In a case reported recently, spontaneous subcapsular kidney rupture and haemorrhage occurred in a patient after rupture of swallowed intestinal packets of cocaine, with massive absorption in a drug dealer [15]. The patient, in that report, suffered renal infarction. Our patient had no biochemical or radiologic evidence of renal infarction. Spontaneous perinephric haemorrhage may itself cause hypertension. In one case, a hyperreninemic hyperaldosteronism state was shown [16].

In conclusion, the present case shows that cocaine abuse in pregnancy may lead to severe spontaneous perinephric haemorrhage and haematoma, probably due to severe hypertension. If conservative measures achieve haemodynamic stability with cessation of haemorrhage, nephrectomy may be avoided. This syndrome must be entertained in the differential diagnosis of acute abdomen and haematuria in a pregnant patient with severe hypertension. This report also expands the spectrum of renal complications of cocaine abuse to include spontaneous perinephric haemorrhage.

Acknowledgements. We thank Dr. Glenfield Knight and Dr. Richard Desruisseau of the radiology unit of Nashville General Hospital for their assistance with radiologic images.

Conflict of interest statement. M.F. receives research support as a medical director of Dialysis Clinics Incorporated (DCI) Meharry Clinic in Nashville, TN, USA. All the other authors have no conflict of interest to declare.

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Received for publication: 4.2.10; Accepted in revised form: 5.2.10