

Hydronephrosis: case report of a rare cause of the supine hypotensive syndrome

腎盂積水：一個仰臥性低血壓綜合症罕見原因的個案報告

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Hypotension poses a diagnostic challenge to emergency physicians who often have to exclude life-threatening conditions, make correct diagnosis and institute timely treatment. We presented a case of hydronephrosis causing the supine hypotensive syndrome. Management of the supine hypotensive syndrome and the use of emergency bedside ultrasound in evaluating hypotensive patients were discussed. (*Hong Kong j.emerg.med.* 2004;11:226-229)

低血壓往往是急症科醫生診斷的一項挑戰，在排除威脅生命狀況的同時，還需要正確的診斷及著手適時的治療。我們描述一個腎盂積水引致仰臥性低血壓綜合症的個案，並討論其處理方法及緊急床旁超聲波診斷對評估低血壓病者的應用。

Keywords: Emergencies, hypotension, posture, supine position, ultrasonography

關鍵詞：急症、低血壓、姿勢、仰臥式位置、超聲波診斷

Case

A 75-year-old male attended the emergency department (ED) in November 2003 complaining of dysuria, turbid urine and left flank pain for two days. He arrived at the ED on stretcher. At triage, the blood pressure was low (73/55 mmHg on the right arm, 78/48 mmHg on the left arm) and the pulse rate was 87 beats/min. He was afebrile. In view of the low blood pressure, he was transferred to the resuscitation room for further management. In the resuscitation room, airway, breathing and circulation were addressed. He

complained of turbid urine, dysuria and left flank pain for two days. There was no fever, chills or rigor. He had no chest pain, abdominal pain or shortness of breath.

On physical examination, he was not in great distress. He had no pallor. Cardiovascular and respiratory examinations were normal. There was no pulsatile mass in the abdomen and per rectal examination revealed normal stool. Chest X-ray and electrocardiogram were normal. Blood for glucose and haemoglobin were normal.

He was given intravenous fluid challenge. However, his blood pressure was not responding. In view of the persistent hypotension of unknown origin, emergency bedside ultrasonography was performed. Abdominal ultrasound showed that the aorta was normal in size and there was no free intra-peritoneal fluid. However, a huge cystic mass more than 10 cm in diameter was seen at the left flank (Figure 1). While the right kidney was normal, the left kidney could not be identified

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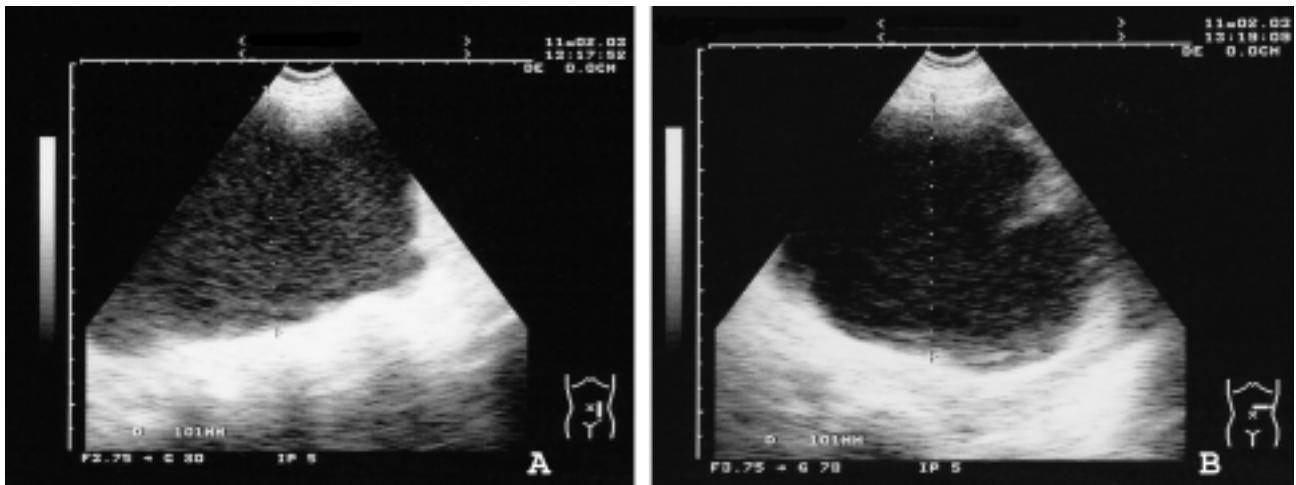


Figure 1. Sagittal scan (A) and axial scan (B) of the left abdomen showing a huge cystic mass of more than 10 cm in diameter.

out of the cystic mass. On scanning of the upper margin of the cyst, it was found to extend to the left renal fossa at the lower border of the spleen. Hydronephrosis was suspected to be the cause of the cystic mass and a KUB was ordered. KUB revealed a left ureteric stone of 5 x 2 cm at the left pelvic brim level. The left psoas shadow was obscured by the huge left flank mass (Figure 2).



Figure 2. KUB showing a 5 x 2 cm left ureteric stone (arrow) at the level of the pelvic brim. A vague huge left flank mass (arrowheads) obscuring the left psoas shadow was compatible with the cystic mass diagnosed by ultrasound.

In view of the huge left hydronephrosis, it was suspected that his hypotension was caused by the supine hypotensive syndrome as seen in the condition in which the vena cava is being compressed by the gravid uterus of a pregnant woman when lying supine. As he was turned to lie on the left lateral decubitus position, his blood pressure immediately rose up to 116/82 mmHg. The patient was stabilised and admitted to the urology ward. He was later discharged uneventfully, with a plan for left nephrectomy in the future.

Discussion

Supine hypotensive syndrome occurs in approximately 11% of pregnant women, especially in late pregnancy.¹ In late pregnancy, the gravid uterus compresses the inferior vena cava (IVC), major pelvic veins and aorta. Patients may develop hypotension and occasionally syncope after assuming the supine position for several minutes. This is the result of the inferior vena cava being compressed between the gravid uterus and the spine with a resultant decrease of preload to the heart. This can also be the case in our patient, with the IVC being compressed, resulting in a decrease of venous return causing the supine hypotensive syndrome. However, as the hydronephrosis was in the left retroperitoneal area, the pressure effect in this case might have been exerted indirectly. After we turned

the patient to the left lateral decubitus position, the patient's blood pressure rose immediately. This maneuver has also been advocated for the treatment of the supine hypotensive syndrome caused by a gravid uterus.²

Reports of the supine hypotensive syndrome in men and non-pregnant women are rare. Epstein et al³ and Kim et al⁴ reported that supine hypotensive syndromes of nonpregnant women were caused by giant ovarian cyst and intrabdominal mass respectively. Schroeder et al⁵ reported a case of supine hypotensive syndrome in a young boy with a large abdominal mass. Most cases presented with supine hypotension during anaesthesia. Two mechanisms were suggested by Schroeder et al.⁵ Firstly, use of anaesthetic drugs may change the vasomotor tone causing vasodilatation. Secondly, general anaesthesia may cause muscle and ligament relaxation that permits a mass to fall back on the large vessels and compressing them against the vertebral column.

Supine hypotensive syndrome caused by hydronephrosis is rare in emergency medicine literature. To our knowledge, this is the first reported case of hydronephrosis as the cause. In our patient, the hydronephrosis was diagnosed readily by bedside ultrasonography. Emergency ultrasound is increasingly being performed by emergency physicians in Hong Kong.⁶ Other than common indications of evaluation for blunt abdominal trauma and detection of intrauterine pregnancy for exclusion of ectopic pregnancy, emergency ultrasonography is also useful for the evaluation of hypotension of unknown origin.⁷⁻⁹ Causes of hypotension like abdominal aortic aneurysm¹⁰ or haemoperitoneum¹¹ can be readily diagnosed by ultrasound. For others, clues can be provided by scanning the heart. Visualisation of a small, hyperkinetic left ventricle suggests hypovolemia, whereas a dilated, hypokinetic left ventricle suggests a primary cardiac cause.⁷⁻⁹ In case of pulmonary embolism with hypotension, echocardiography usually shows acute right ventricular outflow obstruction.^{7,9} Blaiwas et al¹² reported two cases of using emergency room ultrasonography to diagnose cardiac tamponade

as a cause of hypotension. One study showed that emergency physicians can reliably perform focused bedside echocardiography for the detection of pericardial effusions in emergency patients at high risk.¹³

Rose et al described a novel ultrasound approach for the evaluation of undifferentiated hypotensive (UHP) patients.¹⁴ They suggested to use three accepted ED ultrasound applications combined into a single protocol for the evaluation of reversible causes of hypotension: free intraperitoneal fluid evaluation, focused cardiac examination, focused aortic evaluation. A 3.5 MHz transducer is sufficient for all views of the UHP protocol (Figure 3). Firstly, free fluid evaluation is through a single hepatorenal interface view adopted from the F.A.S.T. (focused abdominal sonography in trauma) examination. Secondly, cardiac evaluation is through a single subxiphoid or parasternal view. Finally, the aortic evaluation is a transverse evaluation sweeping from the substernal position down to the bifurcation of the iliac vessels. The underlying principle of the UHP protocol is that if the patient is hypotensive, the conditions covered by the protocol should be readily detectable.¹⁴

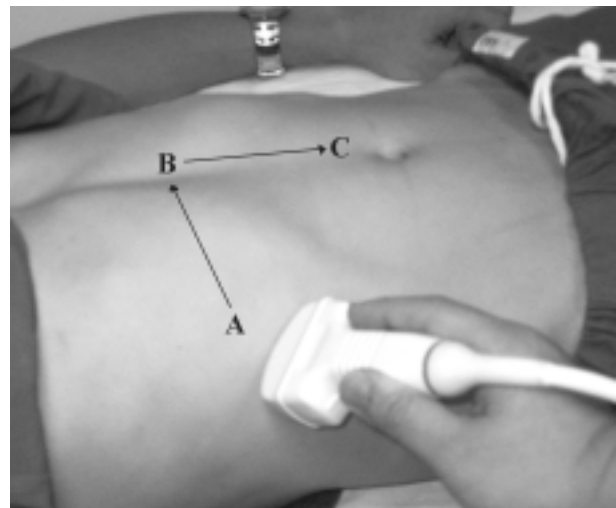


Figure 3. Three standard positions in the UHP ultrasound protocol suggested by Rose et al.¹⁴ A: Hepatorenal view; B: Transverse subxiphoid cardiac view; and C: Transverse aortic view.

Conclusion

We reported a rare case of supine hypotensive syndrome caused by a huge hydronephrosis. Hydronephrosis was readily diagnosed by bedside ultrasound and other life threatening causes were also excluded. Emergency physicians should recognise this potential role of emergency ultrasound for evaluating hypotensive patients in the emergency room.

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