

CASE REPORT

Compensatory renal hypertrophy in reflux nephropathy presenting as hypertensive emergency

Suria Emilia Suhana Othman Tan¹, Siti Dayana Mohamad² and Muhamad Zabidi Ahmad^{1,*}

¹Advanced Medical and Dental Institute, Universiti Sains Malaysia, Kepala Batas, Penang, Malaysia, ²School of Medical Sciences, Universiti Sains Malaysia, Kota Bharu, Kelantan, Malaysia

*Correspondence address. Oncological dan Radiological Sciences Cluster, Advanced Medical and Dental Institute, Universiti Sains Malaysia, Bertam, 13200 Kepala Batas, Penang, Malaysia. Tel: +6045622394; E-mail: zabidiahmad@usm.my

Abstract

Hypertensive emergency in the paediatric population is not uncommon. However, due to its numerous etiologies, care should be taken in determining the approach of management. We report a case of a child who presented with double vision, giddiness and elevated blood pressure. Blood investigations were normal. Renal ultrasound and magnetic resonance imaging of the abdomen were performed which both showed findings suspicious of a large heterogeneous mass at the lower pole of the left kidney with dysplastic right kidney. A final diagnosis of bilateral vesicoureteric reflux with left compensatory hypertrophy was made based upon micturating cystourethrography findings and was later confirmed by 99mTc-dimercaptosuccinic acid (DMSA) study. The objective of this case is to share the importance of the appropriate choice of radiological examinations, not only in achieving an accurate diagnosis but to ensure that unnecessary investigations are avoided.

INTRODUCTION

Hypertensive emergency and vesicoureteric reflux are common among paediatric population. Despite both being a common entity, care should be taken in determining the approach of management. Vesicoureteric reflux commonly presents with symptoms of urinary tract infection. Nonetheless, one must bear in mind that vesicoureteric reflux may also present at a later stage with its associated sequelae, including hypertension. Hypertension in a paediatric age-group has a vast list of aetiologies. Clinical history and physical examination are pivotal in narrowing down the potential diagnosis, thus allowing for appropriate investigations to be carried out. Correct diagnosis is critical as misdiagnosis not only subject patients to unnecessary investigations but possible harmful treatment being put forward. Early diagnosis also allows for appropriate treatment to be initiated, thus preventing complications from occurring.

CASE REPORT

An 8-year-old boy, previously healthy, presented to the emergency department with a 3-day history of double vision and right eye squint with giddiness for 1 month. He denied any history of recent head trauma, fever or headache. On the initial presentation, blood pressure was 186/124 mmHg with a pulse rate of 83 per minute and afebrile. On examination, there was limited right eye movement on the lateral gaze. The rest of the physical examinations were normal. Computed tomography of the brain was normal. Intravenous and oral antihypertensive medications were initiated to control blood pressure. Blood investigations were normal. Special blood investigations that include antinuclear antibody, antistreptolysin O titer, C3, C4, random cortisol, aldosterone and renin level were also normal. Renal ultrasound (Fig. 1) showed a small right kidney with multiple cystic areas and an enlarged lobulated left kidney. Given suspicion for renal

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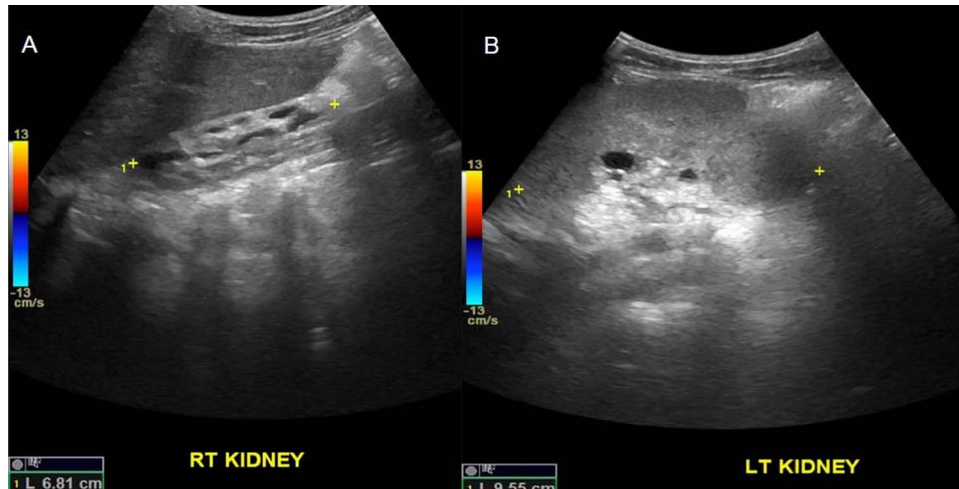


Figure 1: Renal ultrasound showed dysplastic right kidney (A) with lobulated enlarged left kidney (B).

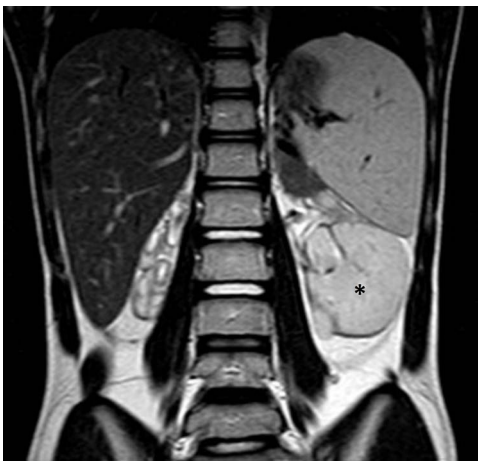


Figure 2: MRI of the abdomen in T2 weighted sequence in coronal view showing dysplastic right kidney with lobulated enlarged left kidney (*).

mass causing the hypertensive emergency episode, magnetic resonance imaging (MRI) of the abdomen was performed. MRI (Fig. 2) revealed a large well-circumscribed lobulated heterogeneous mass at the lower pole of the left kidney with dysplastic right kidney.

Considering suspicious MRI findings of left renal mass, a paediatric radiologist was consulted for a second opinion. Micturating cystourethrography (Fig. 3) was then performed, which revealed right grade 5 vesicoureteric reflux, left upper pole grade 3 vesicoureteric reflux and left lower pole compensatory hypertrophy. Re-evaluation of the MRI images concludes findings of severely hydronephrotic and atrophied right kidney, atrophied upper pole and hypertrophied lower pole of the left kidney. Cystic areas in the right kidney correspond to severe hydronephrosis, while the enlarged lobulated left kidney represents hypertrophied left lower pole. At this stage, overall features were suggestive of chronic vesicoureteric reflux with bilateral reflux nephropathy. ^{99m}Tc-dimercaptosuccinic acid (DMSA) scan (Fig. 4) carried out later has confirmed the diagnosis.

The patient was then managed in an outpatient setting under general paediatric and paediatric nephrology follow-up.



Figure 3: Micturating cystourethrography in the micturating phase showed grade 5 reflux noted into the right renal pelvicalyceal system. Normal configuration of the urinary bladder with no contrast leak. During the micturating phase, grade 3 vesicoureteric reflux was noted on the upper pole of the left renal pelvicalyceal system.

DISCUSSION

Hypertension in children and the adolescent group is not a rare occurrence. There are numerous aetiologies accountable including hyperthyroidism, mineralocorticoid excess from congenital adrenal hyperplasia and aldosterone secreting tumours, pheochromocytoma, renal artery stenosis, renal parenchymal disease, primary hypertension and rheumatologic disorder [1]. For children with confirmed hypertension, the initial investigation would aim to exclude any underlying renal disease. As part of paediatric hypertension work out, renal sonography has been recommended for all paediatric patients with essential hypertension to diagnose parenchymal and renovascular disease [2].

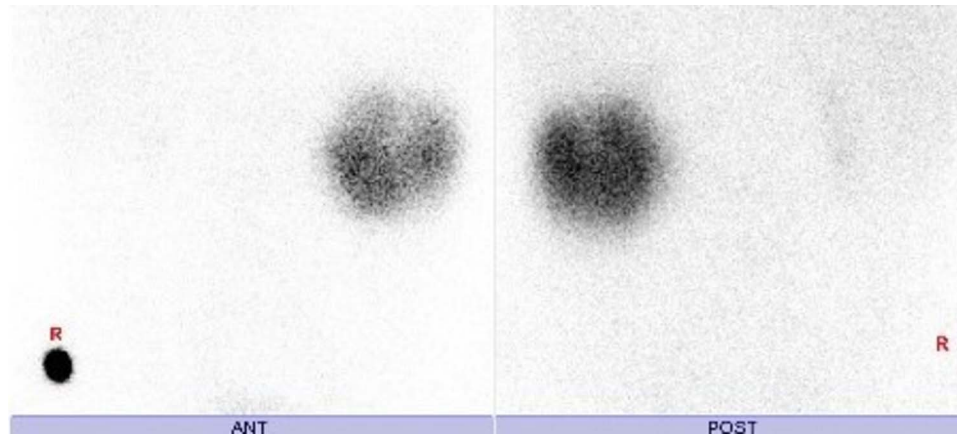


Figure 4: 99mTc-dimercaptosuccinic acid (DMSA) scan showed single functioning hypertrophic left kidney and a non-functioning right kidney. Cortical outline defect at the upper part of the left kidney was likely due atrophic or scarring of the upper pole of left kidney.

Other aetiologies such as Wilms tumour, neuroblastoma and rarely pheochromocytoma are childhood tumours associated with hypertension [3]. In this case study, both the renal ultrasound and abdominal MRI findings revealed enlarged lobulated left kidney, suspicious for a renal mass which could be the cause for hypertension. However, micturating cystourethrography demonstrated otherwise. The overall conclusion drawn from different modalities of ultrasonography, MRI and fluoroscopy confirmed the diagnosis of bilateral vesicoureteric reflux with reflux nephropathy.

Initial suspicion of renal mass in this case is in line with the clinical presentation, given that renal tumours are not uncommon in children, however majority paediatric renal tumour cases are diagnosed before the age of 5 years old [4]. Renal tumours account for nearly 6–7% of paediatric malignancy and about 90% of them are Wilms tumour [4]. The most frequently observed symptoms of nephroblastoma include abdominal mass, abdominal pain, hematuria, fever and hypertension, with treatment includes nephron-sparing surgery or radical nephrectomy [4].

Vesicoureteric reflux is defined as the retrograde flow of urine from the bladder into the upper urinary tract. Increasing use of antenatal ultrasound allows vesicoureteric reflux to be detected during maternal screening and those not detected with antenatal hydronephrosis often diagnosed later as part of urinary tract infection workup [5]. In this case study, contrary to the common presenting symptoms, there was no history of urinary tract infection symptoms. Instead, the initial presentation was due to raised blood pressure.

A review article has described that the ideal radiological approach in cases with urinary tract infection, vesicoureteric reflux and renal scarring may be varied depending on either a conventional bottom-up approach or the top-down approach [6]. The bottom-up approach focuses on the detection of upper and lower urinary tract abnormalities, while the top-down approach focuses on identifying the diagnosis of acute pyelonephritis before proceeding with other investigations. However, it is controversial regarding which approach is better at evaluating the ultimate risk of renal scarring. The primary goal for early diagnosis, appropriate management and follow-up of vesicoureteric reflux and febrile urinary tract infection is to prevent renal scarring [6]. Similar to this case study, two of the possible outcomes of vesicoureteric reflux i.e. reflux nephropathy and hypertension were already present when the patient became symptomatic requiring hospital admission [5]. As in this case, compensatory hypertrophy lower pole of the left kidney is believed to be a consequence of renal scarring due to reflux nephropathy.

Even though most patients with vesicoureteric reflux initially presented with urinary tract infection symptoms, they may also present as a sequela including hypertension. Clinical history and physical examination are pivotal in narrowing down the potential diagnosis, thus allowing for appropriate investigations to be carried out. Appropriate investigations will ensure accurate diagnosis and appropriate treatment to be instituted for the patient.

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None.

CONFLICT OF INTEREST

No conflicts of interest.

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ETHICAL APPROVAL

None required.

CONSENT

Informed consent was obtained from the patient.

GUARANTOR

Muhamad Zabidi Ahmad is the guarantor of this article.

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