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Case Report

An Uncommon Cause of Neonatal Hypertension

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ABSTRACT

***Background*:** Adrenal hematoma is a very rare acquired cause of neonatal hypertension. In this study, we report a case of neonatal hypertension associated with adrenal hematoma. A male neonate was immediately transferred to our neonatal intensive care unit after delivery due to meconium aspiration. He needed to be on mechanical ventilation support. During his hospital stay, hospital records showed normal blood pressure. However, 15 days after discharge, he was diagnosed with hypertension and was admitted to our Nephrology Division. Except for irritability, physical examination was normal. Blood pressure was normal, while right renal agenesis, grade two dilatation in the collective system of the left kidney, a round heterogeneous cyst (measuring 46×28 mm), and adrenal hematoma with no blood flow in the left suprarenal region were detected by ultrasound. Renal scintigraphy showed right renal agenesis, prolonged retention of the injected material in the left kidney, and a mass on the left kidney. Antihypertensive therapy was initiated for the neonate and the adrenal hematoma was checked weekly. The mass gradually shrank and his blood pressure readings returned to normal for his age.

***Conclusion*:** Neonates with hypertension and history of birth complications should be evaluated for adrenal hematoma to determine the reasons for hypertension.

Keywords: Adrenal hematoma, Hypertension, Newborn, Suprarenal mass

Introduction

Neonatal hypertension can cause serious complications such as cardiorespiratory failure, cerebral distress, and renal dysfunction. The incidence rate of neonatal hypertension varies depending on the clinical setting; however, it is exceedingly uncommon with an incidence rate of 0.2-3% (1). Several causes (congenital or acquired) of hypertension were identified, the most common of which are umbilical artery, catheter-associated thromboembolism, chronic lung disease, and renal parenchymal disease (2, 3).

Suprarenal mass is a relatively uncommon clinical pediatric problem (4). Suprarenal masses usually prove to be congenital neuroblastomas or benign lesions such as adrenal hemorrhage. In addition, adrenal hematoma with renal artery compression is a rare acquired cause of neonatal hypertension (5). In this study, we present a case of neonatal hypertension associated with adrenal hematoma.

Case Presentation

A male neonate, weighing 3880 g, was delivered by prolonged normal spontaneous vaginal delivery at 38 weeks gestation. The pregnancy was uneventful and there was no family history of chronic diseases. The neonate was promptly transferred to our neonatal intensive care unit (NICU) due to meconium aspiration and respiratory depression. He was hospitalized for ten days while being under mechanical ventilation and being tested regularly.

Pneumothorax and pulmonary infection were developed; accordingly, chest tube insertion and antibiotherapy were conducted. Abdomen ultrasonography (USG) demonstrated agenesis of the right kidney, and while in NICU, his blood pressure was in normal range. After discharge, physical examination indicated hypertension; thus, amlodipine treatment was initiated. Abdominal USG revealed a mass with regular shape in the left renal region, and his hypertension could not be managed. Therefore, he was referred to our Pediatric Nephrology Department.

He was admitted to the department at 30 days of age. The assessments indicated the following results: pulse rate of 130 pps, respiratory rate of 60 breaths/min, body temperature 36°C, systemic blood pressure 150/90 mmHg, weight of 4300 g, and height of 59 cm. Physical examination showed

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pale general appearance, hyperactivity, and irritability, while other system examinations demonstrated no features.

Blood routine examinations demonstrated hemoglobin 12.3 gr/dl, white blood cell count of 12460/mm^3, and platelet count of 540000/mm^3. The results of biochemistry and thyroid function tests as well as urine analysis were normal. Abdominal USG revealed right renal agenesis and grade two dilatation in the collective system of the left kidney; moreover, antero-posterior diameter of the left renal pelvis was 7 mm.

USG demonstrated a round heterogeneous cystic suprarenal mass (adrenal hematoma; 46×28 mm in diameter) in the left suprarenal region with no blood flow (Figure 1). Nonetheless, computerized tomography angiography showed no features. Renal scintigraphy revealed right renal agenesis, prolonged retention of the injected material in the left kidney, and a mass on the upper pole of the left kidney. Echocardiography and renal Doppler USG were normal. Urine was collected for 24 hours, showing normal metanephrine, normetanephrine, and vanilmandelicacide levels. In addition, plasma levels of catecholamins, rennin, and aldesteron were normal. All the evaluations of hypertension were normal, except for abdominal USG and renal scintigraphy, which demonstrated a round heterogeneous cystic suprarenal mass (adrenal hematoma; 46×28 mm in diameter) in the left suprarenal region with no blood flow, right renal agenesis, prolonged retention of the injected material in the left kidney, and a mass on the upper pole of left kidney.

The neonate received amlodipine at a minimum dose for a week when he was admitted to our department, but his blood pressure was rather above the percentiles according to age and height; therefore, the dose of amlodipine was increased gradually. We still could not manage hypertension; accordingly, enalapril was added to the treatment at a minimal dose.

Serum potassium and creatinine levels elevated and blood pressure was still above the percentiles. A beta-blocker (propranolol) was administered as a third drug, and its dose was increased to 1.6 mg/kg/d. Using USG, we checked the adrenal hematoma on a weekly basis and found that the diameter of the mass had gradually shrunk to 20×17 mm. Concurrently, blood pressure decreased to normal range; therefore, beta-blocker was stopped and enalapril dose was lowered. The patient was discharged at 24th day of the hospital stay with enalapril. At the first visit after discharge, his blood pressure as well as routine blood and urine parameters was normal, and the diameter of the adrenal hematoma was 16×13 mm.

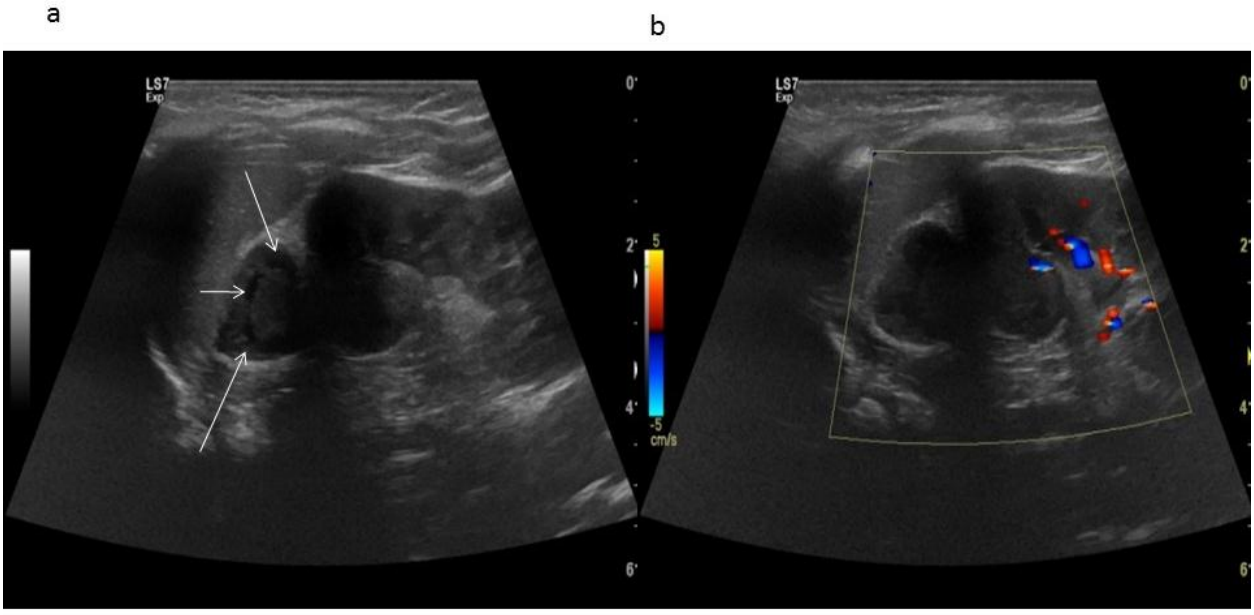

Figure 1. Ultrasonographıc ımages of the mass

Discussion

Neonatal hypertension is a rare disease causing life-threatening complications such as congestive heart failure and cardiogenic shock. Renal dysfunction and hypertensive retinopathy were also described in severely hypertensive neonates (6). The incidence rate of hypertension in the neonatal period seems to range between 0.2% and 3% (7). Treatment consists of identifying and correcting any curable causes of hypertension, and when indicated, pharmacologic therapy should be initiated to lower blood pressure.

There are several potential causes for hypertension including congenital malformations and acquired disease state. Masses in or near the kidneys, mechanical compression of one or both renal arteries by tumors, hydronephrotic kidneys, or other abdominal masses such as adrenal hemorrhage might lead to hypertension, as well (1-6, 8).

Suprarenal mass is a relatively uncommon clinical problem in newborns, but the wide application of abdominal USG increased its detection rate. However, neuroblastoma and Wilms tumors are prevalent neonatal malignancies, which can be ascribed to adrenal hemorrhage or hematoma (4). Differential diagnosis of adrenal hemorrhage and benign lesions is of utmost importance, as conservative therapy is suitable for adrenal hemorrhage while the latter one requires surgical intervention and chemotherapy; the two conditions can be distinguished by USG and computerize tomography. In USG, adrenal hematoma is a round cystic lesion with no blood flow, which is mostly observed on the right.

In our patient, the characteristics of the lesion were similar to the definitions, but it was on the left side. Serial ultrasound imaging may help differentiate a hemorrhage from neuroblastoma (9). Adrenal hemorrhage generally decreases in size and changes in appearance from being solid to cystic within one week, whereas changes in neuroblastoma occur more gradually over several weeks (10). In our study, USG demonstrated shrinkage of the lesion in one month.

Adrenal hemorrhage is also a relatively uncommon clinical problem of the neonatal period. The incidence of this condition varies from approximately 1.7 per 1000 of autopsied neonates to approximately 3% of the infants undergoing abdominal USG (11).

The etiology of adrenal hemorrhage is still unclear; however, birth trauma attributed to delivery complications, asphyxia, septicemia, and bleeding diathesis are the possible causes of adrenal hemorrhage. Its clinical presentation varies from asymptomatic minimal bleeding to fulminant hemorrhage and adrenal insufficiency. Furthermore, hypertension is reported as a possible mechanism of adrenal hemorrhage. Another mechanism as reported by Akuzawa et al., may be direct stimulation of the adrenal medulla to release catecholamines by humeral factors derived from hematoma (12).

Additionally, Schmidt et al. reported a case sustaining post-traumatic hypertension with adrenal hematoma. They proposed that elevated intra-adrenal pressure secondary to hematoma may cause partial ischemic necrosis in the gland and can induce reactive hyperplasia with periodic excessive secretion of catecholamines (13). The other possible mechanisms might be transient compression of the kidney, renal artery, and obstruction of the renal collective system as reported by Sirota et al. (8).

In the study by Sirota et al., renal scan showed a mass in the right suprarenal area, which was identified as adrenal hematoma by USG. The mass caused prolonged retention of the injected material in the right kidney, consistent with the obstructed outflow from the renal collecting system. Gradual shrinkage of the suprarenal mass was associated with relief of the renal obstruction and hypertension.

In our patient, history of birth complications and NICU stay were the possible causes of adrenal hematoma. On the second week of the life, serious hypertension was observed. The other evaluations for hypertension were normal, except for a suprarenal mass (adrenal hematoma) in the left kidney, grade two dilatation in the left renal collective system, and prolonged excretion of the injected material in the renal scintigraphic scan. Therefore, gradual shrinkage of the suprarenal mass and transient compression of the left kidney is considered as the possible mechanisms of hypertension management in our case.

Conclusion

Suprarenal mass, especially adrenal hematomas, should be considered in hypertensive newborns with history of delivery complications if the other evaluations are normal.

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