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Incidental Neonatal Adrenal Hemorrhage: A Case Report

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Abstract | **Case Report**

Background: Neonatal adrenal hemorrhage is an uncommon condition, with an estimated incidence of 1.7–2.1 per 1,000 live births [1]. It is most often related to perinatal stress, hypoxia, or trauma. Clinical manifestations are variable and may include jaundice, anemia, or abdominal mass; however, many cases remain clinically silent and are detected incidentally [2,3]. ***Case Presentation:*** We describe a male neonate admitted to the neonatal intensive care unit (NICU) for respiratory distress. On the second day of life, he developed jaundice, and infectious screening was positive. On day 7, an abdominal ultrasound performed for suspected urinary tract infection revealed a right suprarenal mass. Further evaluation with CT and MRI confirmed the diagnosis of adrenal hemorrhage, with interval decrease in size on follow-up MRI. The infant remained clinically stable and was managed conservatively with serial ultrasound follow-up. ***Conclusion:*** This case emphasizes the role of multimodal imaging in the diagnosis and follow-up of neonatal adrenal hemorrhage. Recognition of typical imaging features, together with monitoring of lesion regression, prevents misdiagnosis and avoids unnecessary intervention.

Keywords: Neonate; Adrenal hemorrhage; Ultrasound; MRI; Incidental finding.

INTRODUCTION

Neonatal adrenal hemorrhage (NAH) is an uncommon but recognized entity, with a reported incidence of 1.7–2.1 per 1,000 live births [1]. The neonatal adrenal gland is proportionally large and highly vascularized, predisposing it to venous congestion and hemorrhage under conditions of perinatal stress [4,5].

Risk factors include perinatal asphyxia, sepsis, coagulation disorders, and traumatic delivery [2,6]. Clinical manifestations vary from jaundice, anemia, or abdominal mass to adrenal insufficiency in bilateral cases [3,7]. Importantly, many neonates remain asymptomatic, and with increasing use of ultrasound, incidental discovery has become more frequent [8,11].

The primary diagnostic challenge is differentiation from congenital adrenal tumors, particularly neuroblastoma, which may mimic hemorrhage but requires a different management strategy [9,10].

We present the case of a male neonate with a right adrenal hemorrhage, incidentally discovered during ultrasound performed for suspected urinary tract infection.

CASE PRESENTATION

A male neonate was born at 40 weeks of gestation by spontaneous vaginal delivery. He was admitted to the NICU immediately after birth for respiratory distress. On the second day of life, he developed jaundice, and infectious screening was positive.

On day 7 of life, an abdominal ultrasound performed for suspected urinary tract infection revealed a heterogeneous, predominantly hypoechoic right suprarenal mass, measuring 5.3 × 3.6 cm, with no internal vascularity on Doppler, consistent with a hemorrhagic process. **(Figure 1)**

MRI confirmed a right suprarenal collection, stable to slightly reduced in size (40 × 35 × 24 mm), well-defined and non-septated, with heterogeneous signal (hyperintense on T2, hypointense on T1, restricted diffusion) and no post-contrast enhancement. Partial resorption of the associated pararenal component was noted, and the right adrenal gland remained non-visualized. **(figure 2)**

Across modalities, the lesion showed interval change consistent with resolving hemorrhage.

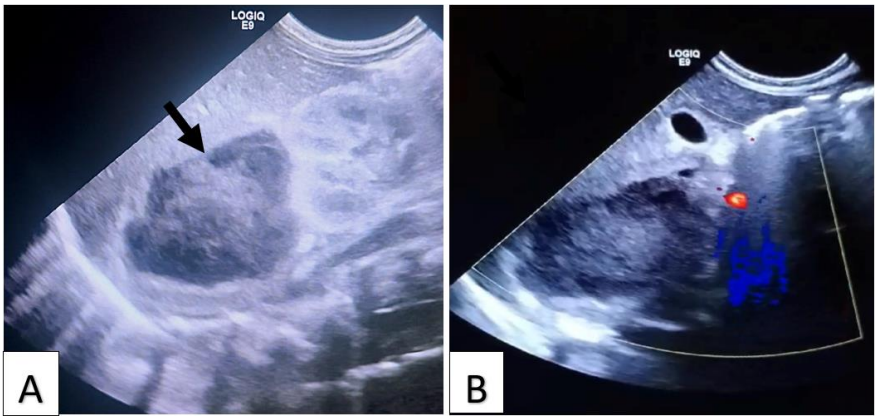

Figure 1. Ultrasound of the abdomen demonstrating a heterogeneous right suprarenal mass, predominantly hypoechoic with internal echoes (A) with no internal vascularity on Doppler (B), consistent with adrenal hemorrhage

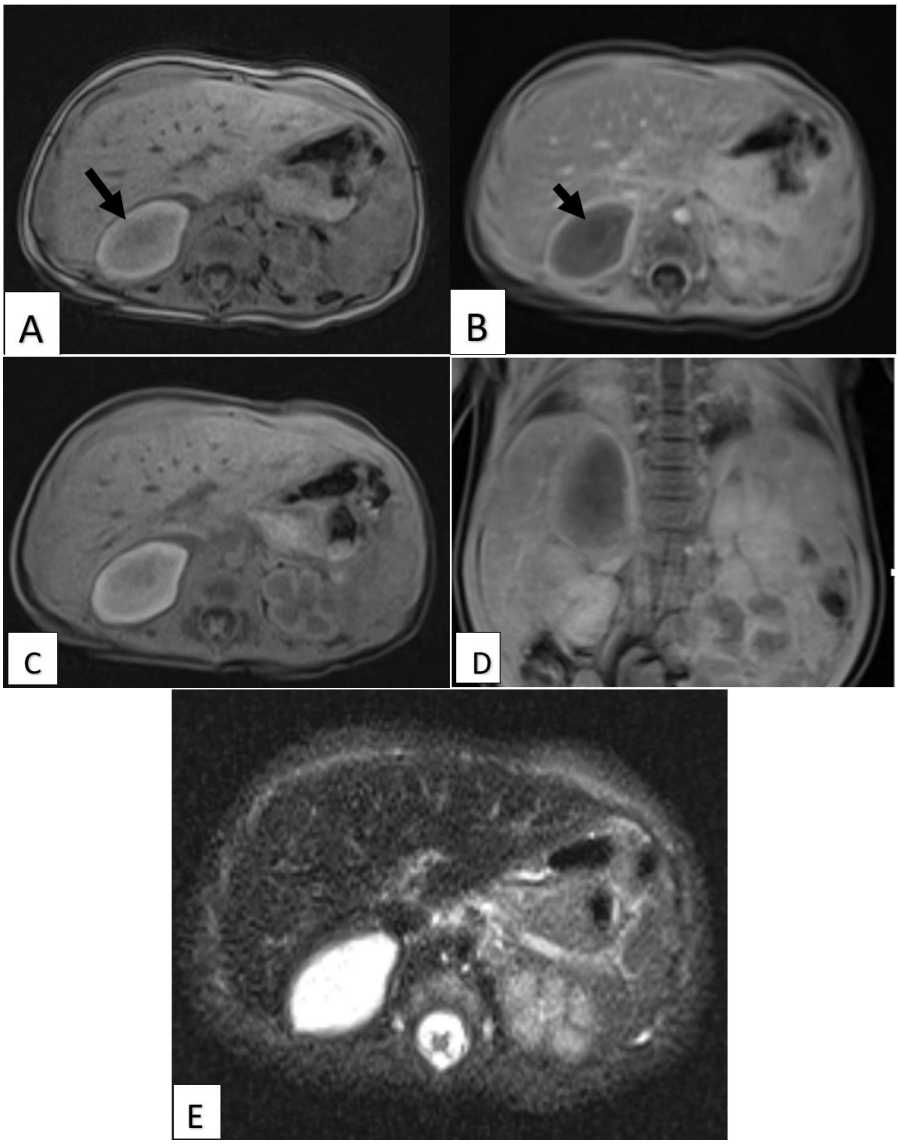

Figure 2. MRI of the abdomen showing a right suprarenal hemorrhagic collection: (A) axial T1-weighted image before contrast demonstrating heterogeneous hypersignal, (B) axial T1-weighted image after gadolinium injection without significant internal enhancement, (C) axial T1-weighted fat-saturated image before contrast better depicting the intrinsic T1 hypersignal of blood, (D) coronal T2-weighted HASTE image showing heterogeneous hyperintensity of the lesion, and (E) axial diffusion-weighted image (b1000) demonstrating marked hyperintensity with corresponding ADC restriction

DISCUSSION

Neonatal adrenal hemorrhage (NAH) is a rare but well-documented condition, with an incidence estimated between 1.7 and 2.1 per 1,000 live births [1,2]. Its occurrence is explained by the distinctive anatomical and physiological characteristics of the neonatal adrenal gland: it is proportionally 10 to 20 times larger than the adult gland, highly vascularized, and drains into a single central vein. These features predispose it to venous congestion and bleeding, particularly in situations of perinatal stress, hypoxia, birth trauma, or systemic infection [4,5].

CLINICAL ASPECTS

The clinical presentation of NAH is highly variable and often nonspecific. Depending on the volume of bleeding and whether it is unilateral or bilateral, neonates may present with abdominal distension, palpable mass, jaundice, anemia, or, more rarely, acute adrenal insufficiency [3,6,7]. In many cases, however, the condition remains silent and is discovered incidentally during imaging performed for another reason. Bilateral hemorrhage, though less common, is clinically more significant because of the risk of adrenal insufficiency, which can manifest with vomiting, electrolyte imbalance, and hemodynamic instability [6]. In our case, the neonate presented with respiratory distress, jaundice, and evidence of sepsis, but the adrenal hemorrhage was discovered fortuitously during an ultrasound for suspected urinary tract infection.

Imaging characteristics

Ultrasound is the diagnostic modality of choice in neonates because it is non-invasive, widely available, and free from ionizing radiation. NAH typically appears as a suprarenal mass with heterogeneous echogenicity, initially more echogenic in the acute phase, and progressively becoming hypoechoic or cystic as the clot undergoes liquefaction [3,8]. Absence of Doppler vascularity is a crucial sign supporting the diagnosis of hemorrhage rather than a vascularized tumor.

CT scan is rarely required but may be used in cases of diagnostic uncertainty. It demonstrates a non-enhancing heterogeneous mass, sometimes containing spontaneously hyperdense areas reflecting acute blood [9]. In our case, CT confirmed the presence of a right suprarenal collection, hypodense with areas of higher spontaneous density and without enhancement, typical of a hematoma.

MRI is particularly valuable when differentiation from congenital adrenal tumors is needed. Its superior tissue characterization allows recognition of blood products at different stages of degradation: T1 hyperintensity in the subacute stage, variable T2 signal, and absence of post-contrast enhancement [10]. Sequential imaging is especially informative, as NAH demonstrates progressive size reduction and eventual resolution. In our patient, MRI documented interval reduction in size compared to CT, consolidating the diagnosis.

Differential diagnosis

The principal differential diagnosis is congenital adrenal neuroblastoma, which is the most frequent adrenal tumor in neonates [9]. Unlike hemorrhage, neuroblastoma tends to persist or enlarge on follow-up imaging, shows internal vascularity on Doppler, and often demonstrates calcifications or enhancement after contrast injection [10]. Moreover, neuroblastoma may be associated with systemic symptoms, elevated urinary catecholamines, or positive scintigraphy with metaiodobenzylguanidine (MIBG). In contrast, adrenal hemorrhage is self-limiting and shows gradual regression. Thus, serial imaging is critical to confirm the natural history and avoid unnecessary interventions.

Management and prognosis

Management of NAH is conservative in almost all cases. Serial ultrasound examinations at 2–3 weeks and again at 2–3 months are recommended to ensure progressive resolution of the lesion [8,11]. Most hematomas disappear completely within a few months, sometimes leaving small peripheral calcifications. Endocrine assessment is warranted in bilateral cases or in the presence of clinical features of adrenal insufficiency, while unilateral asymptomatic hemorrhage, such as in our case, generally requires only imaging surveillance [6].

The prognosis of unilateral NAH is excellent, with complete resolution and no long-term sequelae in the majority of patients. Awareness of this entity and its imaging features is essential to prevent misdiagnosis, particularly confusion with neuroblastoma, which could lead to unnecessary surgery or invasive investigations. In our patient, conservative management with scheduled ultrasound follow-up was adopted, in line with published recommendations, and the outcome was favorable [11].

CONCLUSION

Neonatal adrenal hemorrhage is a rare but clinically significant diagnosis, often discovered incidentally during imaging performed for unrelated indications. Ultrasound remains the cornerstone for both diagnosis and follow-up, while CT and MRI provide complementary information and help to characterize the lesion more precisely. Recognition of the typical imaging features, combined with documentation of progressive regression over time, is essential to avoid misdiagnosis with other suprarenal pathologies such as neuroblastoma.

Management is generally conservative, with scheduled ultrasound follow-up serving as the standard approach. Most unilateral cases resolve spontaneously and carry an excellent prognosis. Thus, awareness of this

entity, its imaging spectrum, and its natural history is crucial for ensuring accurate diagnosis and avoiding unnecessary interventions.

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