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Adrenocortical carcinoma in a pediatric patient with Li-Fraumeni-like Syndrome: an endemic condition in southern Brazil

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CASE PRESENTATION

A 12-year-old patient with a known germline *TP53*-R337H mutation and family history of early adrenocortical carcinoma (ACC) was admitted to the hospital with abdominal pain and distention. Physical examination revealed cushingoid facies, high blood pressure, and high pulse rate. Laboratory tests showed high serum cortisol and suppressed plasma adrenocorticotropic hormone.

Abdominal ultrasound and computed tomography (CT) revealed a heterogeneous mass in the right adrenal gland measuring 13.5 × 10.4 × 9.4 cm and containing calcifications (Figures 1 and 2). The tumor extended via an intrahepatic segment of the inferior vena cava directly into the right atrium (Figure 2).

Histological analysis of the adrenal mass demonstrated a tissue with high mitotic rate, atypical mitotic figures, necrosis, and diffuse proliferation of large polygonal and eosinophilic neoplastic cells, related to ACC (Figure 3). The patient deteriorated despite chemotherapy and died in a few months.

DISCUSSION

Adrenocortical malignancies are very rare, with a peak incidence in patients between 40 and 50 years old. These lesions are even rarer in children, among which they are typically associated with two genetic syndromes: Beckwith-Wiedemann syndrome and Li-Fraumeni syndrome (LFS)[1].

In southern Brazil, the incidence of ACC in children is 2.9-4.2 cases per million children per year, while the global incidence is approximately 0.2-0.3 cases per million per year. This difference is related to a specific germline *TP53* mutation (R337H), a low penetrance mutation that shows distinct phenotypes in different families and has been reported to be associated with ACC in children and with other forms of cancer in the LFS spectrum. The estimated prevalence of this mutation in the southern Brazil's population is 1:300 individuals, while in Europe and North America it is 1:2,000-1:5,000 people[2].

The LFS spectrum is related to a mutation in the TP53 tumor suppressor gene that shows an autosomal dominant inheritance pattern. It is associated with the diagnosis of various neoplasms at young age, such as ACC, breast cancer, central nervous system tumors, osteosarcomas, and soft-tissue sarcomas[1]. A study conducted in southern Brazil showed that 25% of pediatric patients with tumors related to the LFS spectrum fulfill clinical criteria for these syndromes[1].

Genetic tests have become more advanced and available, which has lead to higher diagnosis rates of genetic syndromes that increase the predisposition to neoplasms. Imaging tests such as abdominal ultrasound, whole-body and brain magnetic resonance imaging can be useful for screening and for early diagnosis, with an impact on treatment and prognosis, and also for avoiding radiation exposure related to CT. We recommend guidelines useful for diagnosis and follow-up of patients with LFS, such as the ones written by the European Reference Network (ERN) on Genetic Tumor Risk Syndromes (GENTURIS)[3] and by the American Association for Cancer Research (AACR) modified Toronto protocol[4]. In conclusion, we highlight that every child with ACC, especially in the endemic area of Brazil, should be investigated for LFS, in order to receive proper genetic counseling for themselves and for their families.

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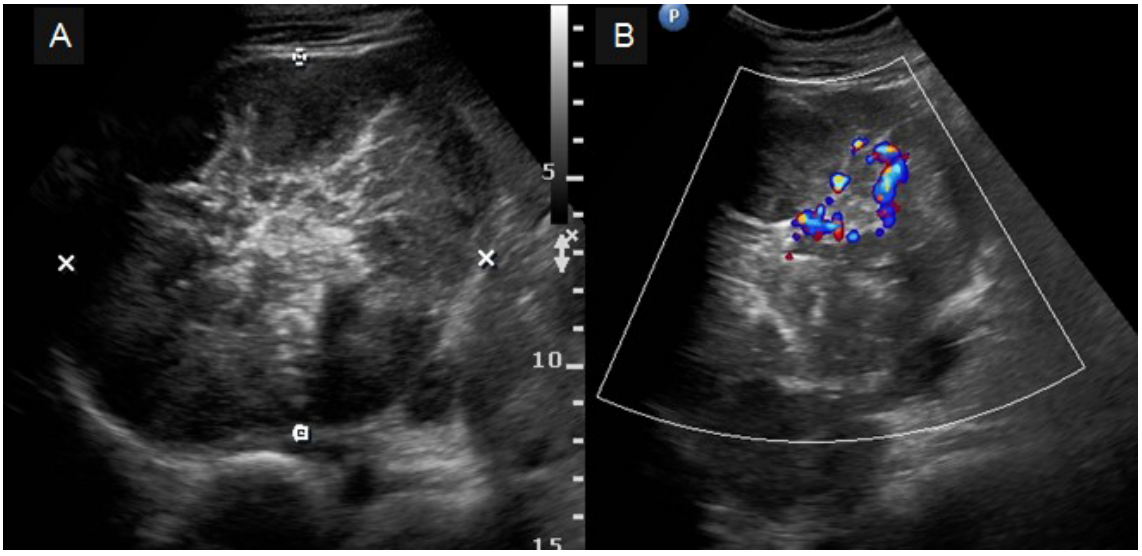

Figure 1: Abdominal ultrasound. A: Heterogeneous right adrenal mass with hyperechoic contents and calcifications; B: Color Doppler analysis shows central blood flow in the lesion.

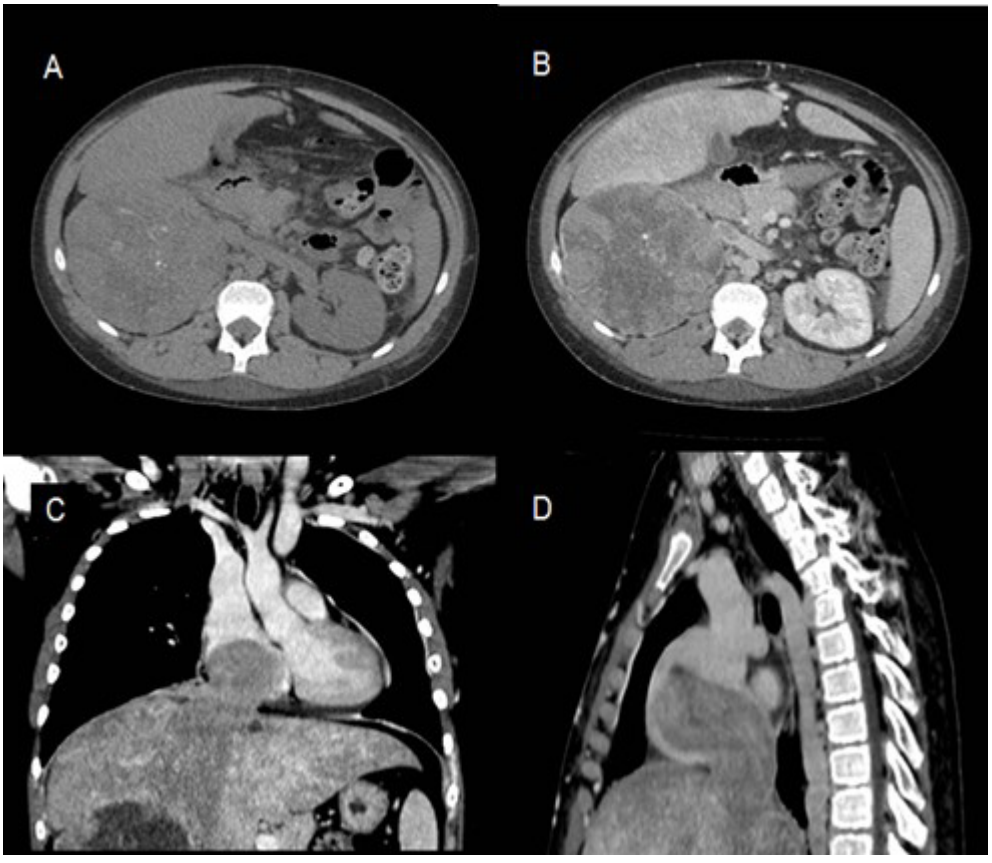

Figure 2: Abdominal computed tomography (CT). A: Axial unenhanced CT shows a large right adrenal mass with internal calcification; B: Axial portal venous phase CT shows regions of non-enhancing tissue consistent with necrosis and tumor extending into the inferior vena cava; C: Coronal CT; D: sagittal CT show the tumor extending into the intrahepatic segment of inferior vena cava and right atrium.

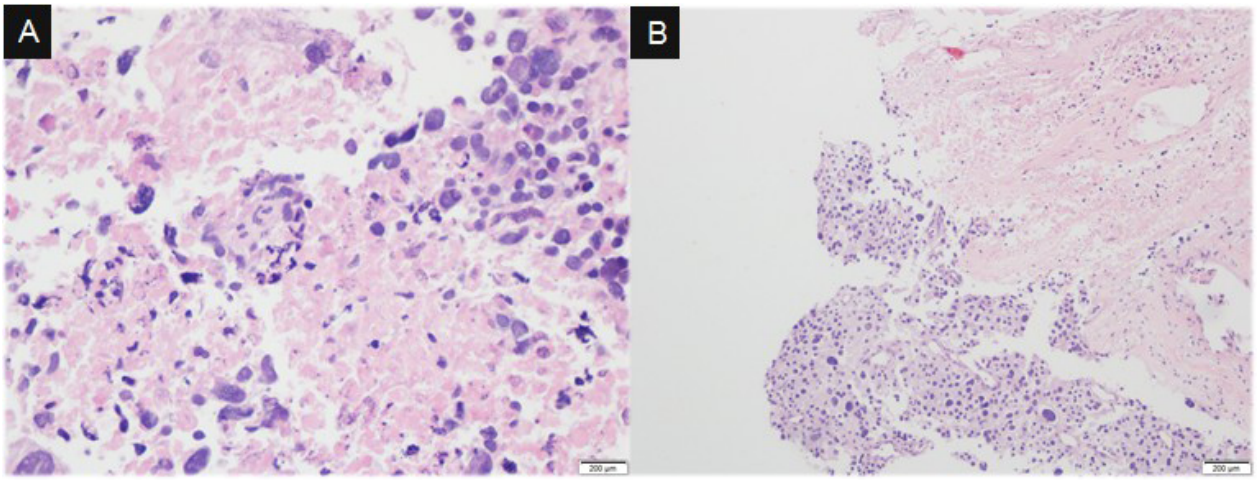

Figure 3: (A) and (B) Hematoxylin and eosin stain (H&E) stain. The tumor cells have a high mitotic rate, atypical mitotic figures, necrosis, and a diffuse proliferation of large polygonal and eosinophilic neoplastic cells, related to adrenocortical carcinoma.

References

1. Lalli E, Figueiredo BC. Pediatric adrenocortical tumors: what they can tell us on adrenal development and comparison with adult adrenal tumors. *Front Endocrinol*. 2015;6:23.

2. Custódio G, Komechen H, Figueiredo FRO, Fachin ND, Pianovski MAD, Figueiredo BC. Molecular epidemiology of adrenocortical tumors in southern Brazil. *Mol Cell Endocrinol*. 2012;351(1):44-51.

3. Frebourg T, Lagercrantz SB, Oliveira C, Magenheim R, Evans DG; European Reference Network GENTURIS. Guidelines for the Li-Fraumeni and heritable TP53-related cancer syndromes. *Eur J Hum Genet*. 2020;28(10):1379-86.

4. Kratz CP, Achatz MI, Brugières L, Frebourg T, Garber JE, Greer MLC, et al. Cancer screening recommendations for individuals with Li-Fraumeni syndrome. *Clin Cancer Res*. 2017;23(11):e38-45.

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