Acute Lymphoblastic Leukemia Presenting as Bilateral Renal Enlargement in a Child

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Key Words
Lymphoblastic leukemia • Renal masses • Magnetic resonance imaging

Abstract
Objective: To report a case with early presentation of acute lymphoblastic leukemia (ALL) as bilateral renal masses and renal failure. Clinical Presentation and Intervention: A 6-year-old boy was admitted with bilaterally enlarged kidneys and severe renal impairment. Magnetic resonance imaging (MRI) showed bilateral renal enlargement with features suggestive of an infiltrative lesion. Accordingly, bone marrow examination was performed, and diagnosis of ALL was made. The patient developed acute renal failure after initiation of chemotherapy, so he received hemodialysis. His renal function normalized and kidney enlargement regressed. Conclusion: This case demonstrates an unusual early renal involvement in ALL in a child. MRI is a valuable imaging modality in the evaluation of renal masses.

Introduction
Acute lymphoblastic leukemia (ALL) is the most common malignancy in childhood. Clinical presentation reflects bone marrow and extramedullary infiltration by leukemic cells [1]. Many organs are involved, including the kidneys. However, early presentation of ALL as bilateral nephromegaly and renal failure is rather rare [2], and few such cases have been reported in the literature [3–5]. We report a child who presented with bilateral renal masses and renal impairment, and who was proved to have ALL.

Case Report
A 6-year-old Saudi Arabian boy was admitted to the general pediatric ward with a 3-month history of bilaterally enlarged kidneys. He had been complaining of abdominal pain for 3 months, but there was no history of hematuria, oliguria, anorexia, weight loss or night sweats. Apart from a short febrile illness at the start, he had no more febrile episodes thereafter. Recently, he had complained of pain in his right lower limb and he became fatigued easily.

On examination, mild pallor was noted; his blood pressure was 109/67 mm Hg, which was within the normal range for his age. His abdomen was distended, and the kidneys were bilaterally palpable, with smooth surfaces and no tenderness. The liver and spleen were not palpable. There was an enlarged (2 × 2 cm) non-tender right inguinal lymph node and several small cervical and axillary lymph nodes. There was no bony tenderness and other systems were within normal ranges. Initial investigations were as follows. A complete blood count, which was carried out by an automated method, showed a hemoglobin level of 98 g/l, the total white blood cell count was 14 × 10\(^9\)/l, with neutrophils 22% and lymphocytes 68%. The platelet count was 137 × 10\(^9\) and the erythrocyte sedimentation rate was 98 mm/h. Blood urea nitrogen was 14.4 mmol/l, serum creatinine was 234 µmol/l, phosphorus was 2.39 mmol/l, calcium was 2.51 mmol/l, albumin was...
Renal mass is a commonly encountered clinical problem in pediatrics. The differential diagnosis includes hydronephrosis, congenital anomalies and malignancy. Hydronephrosis is ruled out by ultrasound. Symmetrical enlargement of the kidneys with loss of corticomedullary differentiation, as seen by MRI, denotes an infiltrative lesion [6]. Several neoplastic and inflammatory conditions cause infiltrative renal lesions. Among these are renal medullary carcinoma, renal cell sarcoma, epithelial neoplasms, lymphoproliferative diseases and metastatic diseases [6]. Accordingly, blood count was repeated and a peripheral blood film was requested, which pointed to a possible diagnosis of leukemia. This was confirmed by the bone marrow aspiration.

Renal infiltration has been found in 50% of leukemic children at autopsy [7]. Renal involvement is known to occur late in the course of the disease; however, 3–5% have enlarged kidneys at presentation [8], as in this case. Moreover, renal failure is rarely a presenting symptom in patients with leukemia [2]. Derangement of renal function in ALL can be attributed to several factors: direct invasion by leukemic cells [9], urinary tract obstruction, glomerulonephritis due to immunologic reactions or treatment with nephrotoxic antibiotics, radiation nephropathy and antileukemic nephropathy [10]. Tumor lysis syndrome, either prior to chemotherapy (due to large tumor burden) or after initiation of chemotherapy, can cause renal failure. This is manifested as hyperuricemia, hyperphosphatemia, hyperkalemia and hypocalcemia [2]. Renal impairment in our patient can be explained by the massive infiltration of leukemic cells, as evidenced by the size of the kidneys and tumor lysis syndrome with further deterioration in renal function after initiation of chemotherapy.

Treatment of renal failure in such cases necessitates special attention to hydration, alkalinization, electrolyte and metabolic correction, and dialysis support if indicated, together with early initiation of specific antileukemia chemotherapy [9].

The prognostic significance of renal size at presentation in childhood ALL is controversial. Hann et al. [11] related poorer prognosis with increasing renal size. However, Neglia et al. [12] found that kidney size does not affect the outcome, either as a single variable or after adjustment for the known prognostic factors of age, sex and initial white blood cell count.

Fortunately, this patient has made a remarkable recovery as a result of the appropriate management of renal...
failure with hemodialysis and chemotherapy for ALL. His renal function is back to normal, the renal masses are not palpable and the kidneys are smaller in size. He is in hematological remission while continuing maintenance chemotherapy.

**Conclusion**

This case demonstrates an unusual early renal involvement in ALL in a child. Bone marrow examination should be included in the workup when an infiltrative lesion is demonstrated by MRI.

**References**