HYPERURICEMIA AND RENAL FAILURE AS PRESENTATION IN A CASE OF ACUTE LYMPHOBLASTIC LEUKAEMIA

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Abstract

Renal failure as the initial presenting manifestation of acute lymphoblastic leukaemia (ALL) is uncommon. In acute leukaemia, commonly occurring renal complications are due to treatmentrelated side effects such as tumour lysis syndrome, use of nephrotoxic drugs and sepsis. [1]

Here, we are presenting an interesting case of 40 years old lady with non-oliguric acute kidney injury (AKI) of no apparent cause and vague abdominal pain. Investigations revealed anaemia, thrombocytopenia with mild leucocytosis & few abnormal lymphoid cells on peripheral blood smear, deranged renal functions with high uric acid level.Subsequently bone marrow biopsies & Immunophenotyping revealed diagnosis of Tcell ALL.

Keywords: Acute renal failure, hyperuricemia, leukemia

Introduction

Renal involvement is not uncommon in ALL, but renal failure is rarely a presenting symptom in ALL. Renal involvement can present as renal enlargement due to leukemic infiltrates or as renal failure due to uric acid nephropathy. However, other causes such as nephrotoxic drugs, infections, renovascular disease,glomerulonephritis and obstructive uropathy can also occur[2]

Infiltration of kidneys by leukaemia cells is common; however, a resultant injury only occurs in about 1% of patients, and renal failure is even more rare [1]

Acute lymphoblastic leukaemia (ALL) is the second most common acute leukaemia in adults. The incidence of ALL follows a bimodal distribution, with the first peak occurring in childhood and a second peak occurring around the age of 50[3].In adults, 75% of cases develop from precursors of the B-cell lineage, with the remainder of cases consisting of malignant T-cell precursors .

Case report

40-year-old female visited at tertiary care centre with complaints of

- Generalised weakness and weight loss since 1 month
- Swelling in both lower limbs since10 days, aggravating on prolonged standing.
- vague abdominal pain off & on for 04 days which was dull aching in nature, localised to lumbar regions.

There was no history of oliguria, facial puffiness, breathlessness, haematuria, frothy urine and burning micturition. There was no other significant relevant history including no other co-morbidities.

Physical examination showed pedal oedema pitting in nature& mild hepatosplenomegaly. she was having high BP (160/100 mmHg in right upper limb in supine position), rest of general and systemic examination was unremarkable.

Investigation revealed haemoglobin 7.6 g/dl, platelets 27,000/mm^3, leukocytes 14,300/mm^3 with 28% neutrophils and 66% lymphocytes, with abnormal lymphoid cells.

Biochemistry revealed serum creatinine 15.5 mg/dl, uric acid 17.2 mg/dl, total protein 8.2 g/dl with albumin 3.2 g/dl, & globulin 5.6 g/dl, aspartate aminotransferase 98 IU/L, alanine aminotransferase 54 IU/L, lactate dehydrogenase 1054 IU/L, calcium 8.9 mg/dL. The serum electrolytes & arterial blood gas analysis were within normal limits.

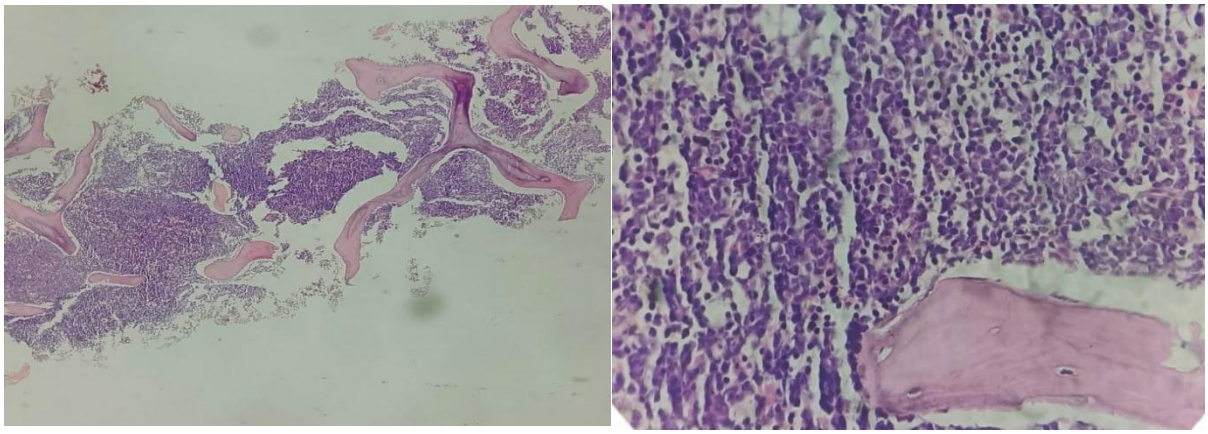
Urine analysis showed proteinuria of $3^{+,}$ occasional R.B. C's& 6-8 pus cells per high power field

Ultrasound of abdomen showed mildly enlarged kidneys and increased cortical echogenicity with the loss of cortico-medullary differentiation without evidence of obstruction in the urinary tract. Mild hepatosplenomegaly was present.

In view of anaemia,leucocytosis, abnormal lymphoid cells in peripheral smear, hyperuricemia & raised LDH the patient was subjected to bone marrow aspiration&biopsy for histopathology and immunophenotyping. Findings included Myeloid: Erythroid ratio 3:1 and 45% infiltration of abnormal Lymphoid like cells. A limited panel of antibodies CD 34, TdT, CD3, CD 20 & CD 10 were used for subtyping of leukaemia.Cell were positive for TdT&CD 3 which showed cytoplasmic& membranous staining.

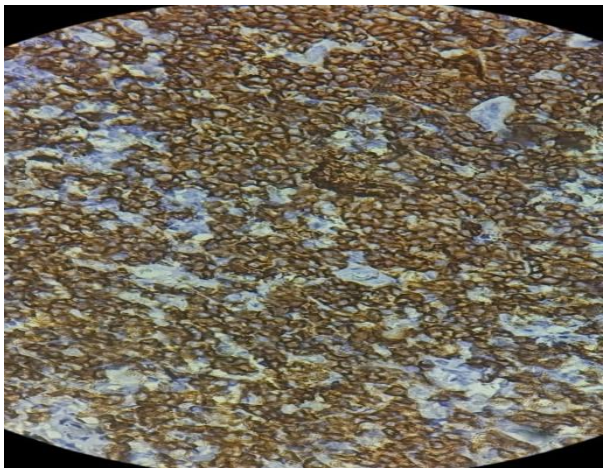
Immune-phenotyping study showed blast cells positive for T-cell linage (CD3+, CD4+, CD10+, CD117+, CD7+, CD5+, and CD8−).

Due to high creatinine haemodialysis was done thrice. Dexamethasone, allopurinol, renal safe antibiotics, and blood products were given. Potassium homeostasis was maintained medically. Serial biochemistry tests were done,Renal parameter were normalized after 5 days.



Bone marrow trephine biopsy (hematoxylin & eosin stain -10x & 45x)

Bony trabeculae & infiltration of the bone marrow with mononuclear round cells having round vesicular nucleus & scant cytoplasm



Immunohistochemistry shows CD 3 positivity in tumour cells

Discussion

Renal injury in ALL is common and can occur through many different mechanisms, such as prerenal acute kidney injury, acute tubular necrosis, renovascular disease, obstruction, glomerulonephritis, and parenchymal infiltration of tumour cells. The most common form of kidney injury in leukaemia is related to prerenal AKI in the setting of volume depletion due to diarrhoea, or anorexia, ATN is also common as either an extension of the disease itself or secondary to a complication commonly seen in the disease process such as sepsis[3,4].Glomerular disease like minimal change disease or focal segmental glomerular sclerosis can also be seen.In our case, there was no evidence of infection, dehydration, exposure to nephrotoxic drugs, or obstructive pathology of the urinary tract.

There are two likely explanations for renal injury, first interstitial infiltrations of leukemic blasts that caused vascular stasis but did not cause permanent damage to the nephrons. Typical symptoms associated with kidney infiltration secondary to leukaemia include haematuria, flank pain, frothy urine but it was not present in our patient. Second, tumour lysis syndrome and acute uric acid nephropathy may also have led to ARF. Moreover, an additive effect of these two causes cannot be ruled out.[5]However, renal biopsy was not performed as there was complete and dramatic resolution of renal failure after haemodialysis &normalization of uric acid so it could be due to urate nephropathy

Urate nephropathy as the sole presentation of acute leukaemia without other evidence of malignancy is rare. The reason why some patients develop hyperuricemia in the absence of

significant tumour load still remains unclear. It is presumed that tumours with a high mitotic index may predispose to more spontaneous lysis and cell deaths[6]

Conclusion

In conclusion uric acid estimation should be done in patients of unexplained ARF&haematological malignancy should be suspected if ARF with anaemia or thrombocytopenia or atypical cells in the peripheral blood film present. Bone marrow examination should be performed even when no other objective signs of leukaemia are present and a rare presentation of ALL should be kept in differential diagnosis.

A clinical lesson to be learnt in this case is that one has to search for a cause for unexplained acute kidney injury, before labelling a patient as ARF of unknown aetiology.It is prudent to evaluate the patient thoroughly. In this case the clue for underlying disease came from presence of hyperuricemia, deranged renal functions, high LDH and bilateral mildly enlarged non-cystic kidneys.

Reproducibility: Not applicable

Ethics and consent:Case has been approved by ethical committee and consent taken from the subject.

Competing interests: The author(s) have no competing interests to declare.

Authors' contributions:

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