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Leukemic Infiltration of the Kidney

by

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Introduction

As a systemic disease, leukemia may infiltrate almost all organs and tissues of the body. The most frequent involved organ in all forms of leukemia is the kidney (Kirshbaum and Preuss, 1940). They found the incidence to be 63% (78 out of 123 autopsied cases). Norris and Wiener (1961) reviewed the necropsy files of a 25-year period (1934 - 1958), and found that 111 out of 214 leukemic patients showed renal infiltration (52%).

With the advance of chemotherapeutic agents, the life of the patients may be prolonged, at least their clinical course is altered. But on the other hand, the incidence of infiltration of various organs is increased, including the infiltration of the kidney (Pierce, 1957). Lightwood, Barrie and Butler (1960) reported that kidneys of more than double expected weights were found in 18 out of 24 treated leukemic cases (75%) as opposed to 5 out of 19 untreated leukemic cases (26%). Renal infiltration occassionally occurs in the state of remission of Acute Lymphocytic Leukemia, probably due to the activation of "persistant leukemic foci" while the rest of leukemic cells has been destroyed (Dameshek and Gunz, 1964). Leukemic involvement of urinary organs is often a common finding on postmortem examination but the clinical manifestation produced by these changes are comparatively infrequent (Troup et.al., 1972).

The case presented below is probably the first report concerning renal involvement of leukemia ever published in the Indonesian literature.

Case report

G, an Indonesian boy, 11 years of age, was a patient with Acute Lymphocytic Leukemia since June, 1973. He was admitted for the first time in the Department of Child Health, Dr. Tjipto Mangunkusumo General Hospital, Jakarta, from June 23, 1973 until July 23, 1973. The second

admission was from December 1, 1973 until February 25, 1974. He was discharged after remission was achieved. During these hospitalizations he was treated with VAMP as induction and maintained on 6-Mercaptopurine. In order to prevent meningeal or cerebral involvement, cranial irradiation and intrathecal injections of methotrexate were instituted. Unfortunately, after the second hospitalization he never came back for follow up. However, on April 1, 1974, he was seen for the third time in the clinic because of severe headache and vomiting, Physical examination on the first day of his third admission revealed: an apathetic and malnourished boy with a body weight of 25.7 kg and a height of 120 cm. Heart rate 62/minute, pulse rate 62/minute regular and equal, blood pressure 160/90 and body temperature 36.5° C. Alopecia was noticed on his head, probably as a consequence of previous cranial irradiation. No neurological abnormality was present.

Heart and lungs were within normal limits. Liver and spleen were not palpable. A swelling of the size of approximately 13 × 7 × 7 cm was felt on the right and left sides of the abdomen which was elastic in consistency, unmovable from the surrounding structures, and pain was elicited on palpation. Both testicles were not enlarged and the lymphnodes were within normal size. The extremities showed no abnormality. Laboratory examinations of the blood showed: hemoglobin 11 gm%, erythrocytes 3.9 million/cmm, leucocytes 5.200/cmm, thrombocytes 288.000/cmm. Hemogram: eosinophils 5%, metamyelocytes 1%, stabs 9%, segments 44%, lymphocytes 34%, monocytes 8%, anisocytosis (+), hypochromy (+), poikilocytosis (+), creatinine 1.27 mg%, creatinine clearance 43.3 %, blood urea 27 mg%, urea clearance 41.7% and uric acid 6.2 mg%. Urine was yellow in colour, with daily amount of 700 - 900 ml., specific gravity 1.003 - 1.005, bilirubin (—), glucose (—), protein (—) and the sediment showed no abnormality.

Stool was normal. Bone marrow picture revealed Acute Lymphocytic Leukemia in remission. Laboratory examination of the blood was repeated at weekly interval, whereas bone marrow puncture at monthly interval. He was treated with VAMP, and adelphane was administered as an antihypertensive drug. A few hours after admittance the child got convulsive attacks, clonic in type, for about 5 minutes duration. He cried as soon as the convulsion ceased. Neurological examination at that time revealed no abnormality. Cerebrospinal fluid showed a pressure of 16 cmH20, clear, Nonne and Pandy reactions were negative and cells 4/3. Electroencephalography recorded a dysfunction of the posterior part of the brain. Diazepam and phenobarbi-

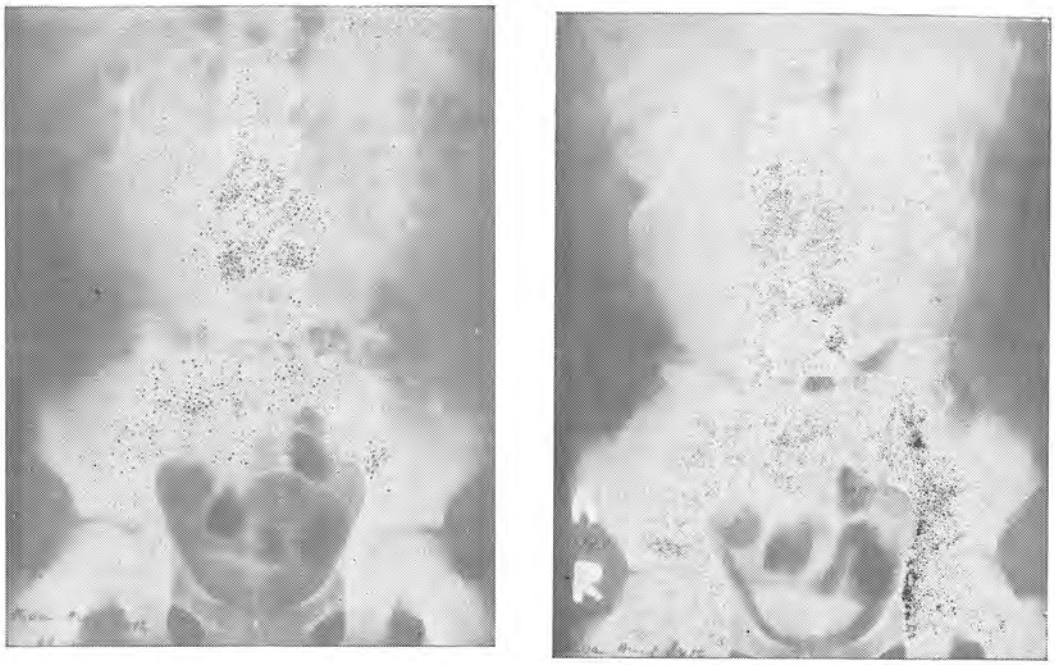

FIG. 1 : *Intravenous pyelography of the patient taken on April 2, 1974 showng an enlargement of both kidneys associated with delayed secretion especially of the right side.*

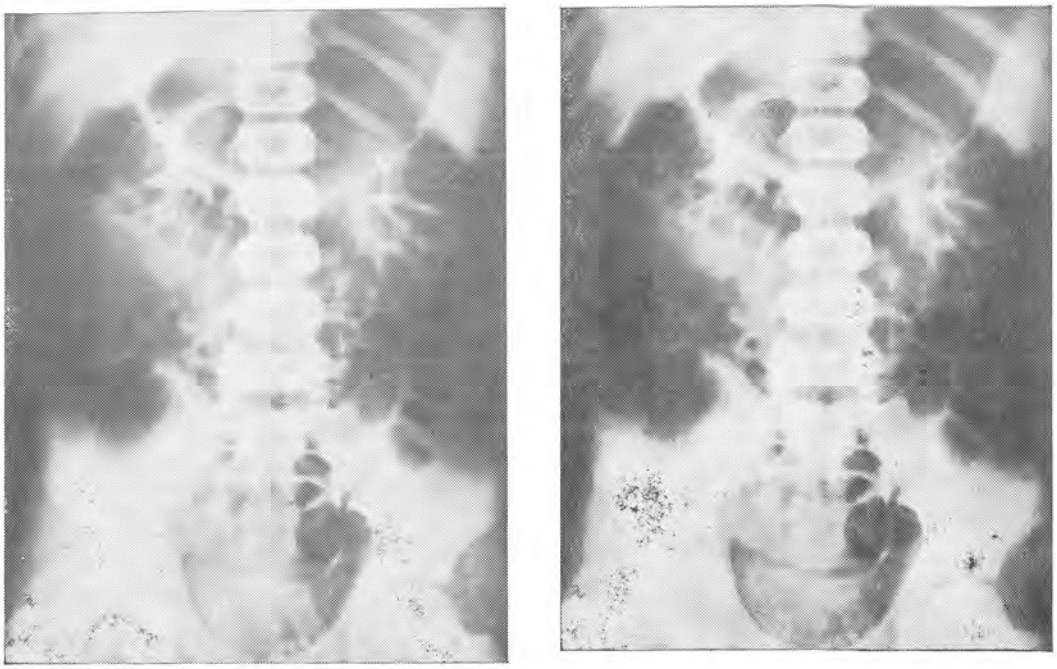

FIG. 2 : *Intrapenous pyelography of the same patient taken on April 20, 1974 showing that both kidney are within normal limits in size as well as in secretory function.*

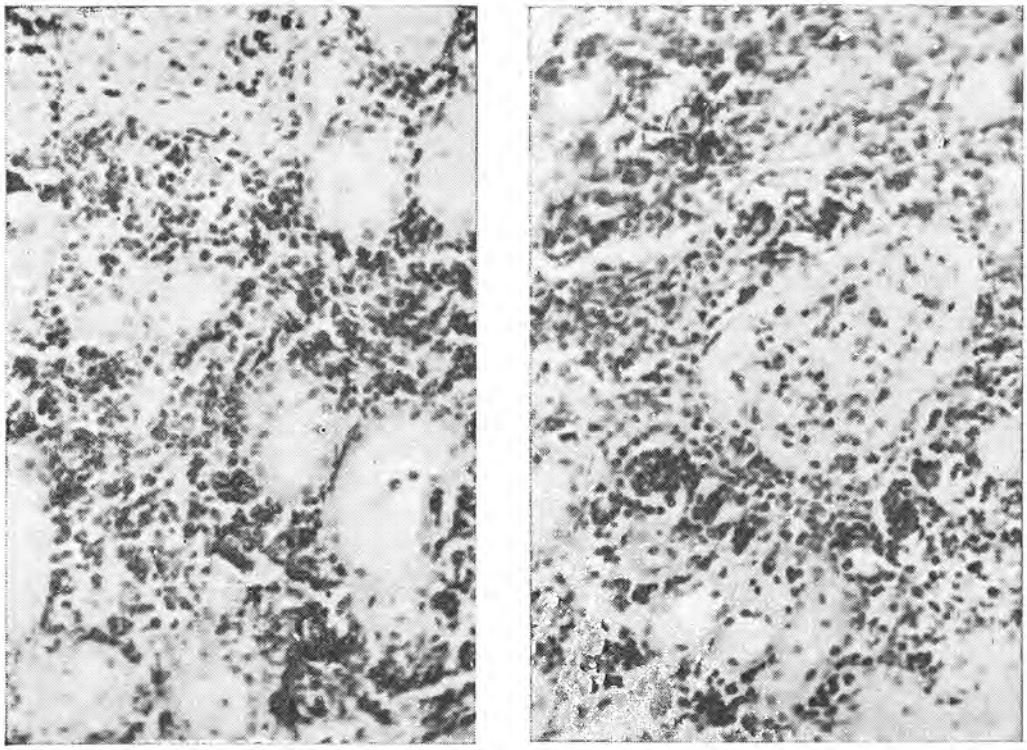

FIG. 3 : *PA No. 742821. Histopathologic picture of the right kidney showing an extensive infiltration of leukemic cells.*

tone were immediately administered as anticonvulsive drugs.

Intravenous pyelography made on the 2nd day of his hospitalization revealed an enlargement of both kidneys, associated with delayed secretion especially of the right side. Percutaneous needle biopsy of the right kidney was successfully performed on the 8th day of admission. Histopathologic examination of the renal specimen showed an extensive infiltration of the kidney with leukemic cells. On the 18th day of admission he developed gross hematuria which gradually disappeared within 8 days. By that time urine culture was sterile, cytologic examination revealed many transtitional cells, erythrocytes and few lymphocytes. Laboratory examinations of the blood showed hemoglobin 11.9 gm%, erythrocytes 4.02 million/cmm., hematocrit 38 volume%, reticulocyte 6 ‰, thrombocyte 4.000/cmm., leucocytes 2.200/cmm. Hemogram: eosinophis 1%, segments 48%, lymphocytes 50%, monocytes 1%; Bleeding time 4′, Clotting time 4′30″ and Tourniquet test was negative.

Six days after his hospitalization, he became fully conscious and the blood pressure returned to normal (105/70). Neither convulsion nor headache were present. Renal enlargement gradually diminished. On the 20th day of admission renal size became normal. The urea clearance test was 63.1% and excretory urogram on I.V.P. examination was within normal limit.

Discussion

A patient with Acute Lymphocytic Leukemia in remission state was admitted for the third time with severe headache and enlargement of the kidney. A few days before admission he complained of severe headache followed by episodes of convulsion. This is probably due to the meningeal or cerebral involvement, although he previously received cranial irradiation and intrathecal injections of methotrexate adequately. However, the laboratory findings did not support this assumption. This case clearly illustrated that renal infiltration may occur in the state of remission of Acute Lymphocytic Leukemia. This condition is in conformity with the opinion of Dameshek and Gunz (1964). The gross hematuria developed on the 18th day of admission which was cleared within 8 days, reflected the evidence of haemorrhage somewhere in the urinary tract. Although radiologic examination failed to show an anomally of the bladder, it does not mean a possible damage does not exist. Bleeding in leukemia such as this case is probably due to the diminution of the number of platelets, producing an increased capillary permeability. In other instances, diffuse or nodular infiltrations in the organ involved can cause a stasis of the smaller

blood vessels which may result in rupture and haemorrhage (Mayer, 1943) as cited by Troup et al., (1972).

Gilbert et. al., (1957), in their pathologic study of 35 cases with renal infiltration, were unable to find the impairment of the renal function. Similar finding was reported by Zuelzer and Platz (1960) who presented several cases with impaired renal function during renal enlargement, while during the intervening remission the kidneys were smaller and renal function became normal. Lampkin et al. (1972) stated that renal enlargement with or without hypertension should be treated with radiation.

Fortunately, our case has been successfully treated with chemotherapeutic agents. In case chemotherapeutic drugs failed, local radiation should be considered.

Summary

Leukemic infiltration of the kidney in an Indonesian boy is reported. The diagnosis was confirmed by histopathologic examination of the renal specimen obtained by percutaneous needle biopsy. This case obviously showed that renal infiltration may occur in remission state of Leukemia. Renal function was impaired. Treatment with VAMP gave a statisfactory result.

Acknowledgement

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