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Burkitt lymphoma in a child: A case report

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ABSTRACT

Background: The diagnosis of Burkitt Lymphoma is made based on a medical history, physical examination, complete blood count (CBC), blood smear and bone marrow examination. Many other diseases with similar symptoms must be excluded. Typically, the higher white blood cell count, the worse prognosis. A bone marrow aspiration provides conclusive proof of the cases. Blast cells were seen on blood smear in the majority of the cases.

Case Presentation: A six-year-old male was admitted to Sanglah General Hospital with vomiting for few days and found hepatomegaly. After several days of being treated, patients showed deterioration with decreased awareness and convulsions. Burkitt Lymphoma enforced by peripheral blood smear and bone marrow examination. Bone Marrow smear showed lymphoblastic infiltrations about 20% lymphoblasts with heterogeneous morphology. Moreover, there were some lymphoblasts with many vacuoles on the cytoplasm, and from all of the features, it concluded as Acute Lymphoblastic Leukemia (L3) or Burkitt type.The disease had metastasized to the kidney and central nervous system (CNS) showing a decrease in consciousness and the presence of convulsions.

Conclusion: The patient may have a CNS leukemia leading to a bad prognosis.

Keywords: Burkitt Lymphoma, CNS Leukemia

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INTRODUCTION

In a histopathology examination, a high-grade non-Hodgkins lymphoma (NHL) called Burkitt lymphoma (BL) shows a mass of diffuse small noncleaved B cell lymphocytes.[1,2] BL is a very aggressive lymphoma accompanied by a very high proliferation rate. It is frequently found in extranodal sites. The doubling time is 24 hours. Thus, showing an explosive growth.[3]

Despite the identical histological appearances, BL occurs in two different settings. One of them is the African or the endemic form, the most common childhood malignancy in parts of equatorial Africa and New Guinea.[4] The form involves the jaw and may extend into the orbit. Ovary, testes, liver, retroperitoneum, breast and gastrointestinal tract are other commonly affected organs. The African form is associated with Epstein-Barr virus (EBV) and involved a chromosomal translocation. The non-African or the non-endemic form is a rare lymphoma occurred in a wider age range with many adult cases. It is often found in patients with immunodeficiency. The organs involved are usually the gastrointestinal tract, particularly the terminal ileum, the ovaries, and the kidneys. Lymph node involvement is less frequently seen.[4] EBV was found in the minority of these cases, usually in people with immunodeficiency. The genetic features suggest that the endemic form is a neoplasm involving an early B cell. However, the non-endemic form arises from a B cell at a later stage of development.[4-8]

Initial symptoms of BL are not unique to acute lymphoblastic leukemia (ALL). The symptoms area result of the lack of normal and healthy blood cells. Because the normal blood cells are crowded out by the malignant and immature white blood cells (WBC). Therefore, people with ALL experience anemia symptoms, an increased tendency to get an infection, and to bleed due to thrombocytopenia. Blood count test, renal function test, electrolyte, and liver function test may show abnormalities.[5,9]

A complete medical history, physical examination, complete blood count (CBC),and blood smears will support the diagnosis of BL. Studies have shown the higher the white blood cell count, the worse the prognosis. Blast cells, the precursors or stem cells to all immune cell lines, are seen on blood smear in most of the cases. A bone marrow aspiration will provide a conclusive proof of ALL.[9]

Neoplastic cells are medium sized and uniform. Their nuclei are not bigger than the nuclei of admixed histiocytes. The nuclei are usually round and accompanied by several or multiple small basophilic nucleoli. The cytoplasm is quite abundant. But, a formalin fixation may cause a slight cytoplasmic retraction leading to a presentation of squared-off edges between the neighboring cells. The RNA-rich cytoplasm is dark blue on Giemsa or Wright stain. In marrow aspirates or Wright-stained touch preps, the cytoplasm usually shows multiple vacuoles because of the presence of lipid. The mitotic

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rate can be seen to be unusually high. Numerous admixed tangible body macrophages phagocytosing abundant apoptotic debris are creating a starry-sky pattern characterizing the BL.[10,11]

Table 1 Complete blood count results

Parameter	Dates						Reference Range
	17/4	21/4	22/4	11/5	12/5	12/5	
WBC	44.59	53.85	50.36	13.87	8.52	5.88	6.0-14.0 x 10^3/µL
Neutrophils	30.80	24.17	24.01	12.81	11.85	5.91	18.30-47.10 %
Lymphocytes	57.60	66.81	71.07	33.49	46.21	86.41	30.00-64.30 %
Monocytes	9.04	6.08	2.31	46.94	36.49	5.63	0.0-7.10 %
Eosinophils	0.42	0.75	0.63	1.37	1.41	0.72	0.0-5.0 %
Basophils	2.14	2.19	1.98	5.40	4.04	1.34	0.0-0.70 %
RBC	4.58	4.24	3.94	2.03	1.63	1.96	4.10-5.3 x 10^6/µL
HGB	11.84	11.48	10.79	5.63	4.62	5.52	12.0-16.0 g/dL
HCT	37.25	32.78	30.53	16.35	13.23	15.96	36.0-49.0 %
MCV	81.27	77.32	77.47	80.40	81.18	81.33	78.0-102.0 fL
MCH	25.83	27.09	27.37	27.69	28.33	28.13	25.0-35.0 pg
MCHC	31.78	35.03	35.33	34.44	34.90	34.59	31-36 g/dL
RDW	17.09	15.83	15.93	15.65	16.07	14.55	11.6-18.7 %
PLT	95.74	67.13	66.42	8.90	3.75	8.07	140-440 10^3/µL

Table 2 Electrolyte serum and urine result

Parameter	Date									Reference Range
	26/4	27/4	29/4	1/5	3/5	5/5	6/5	8/5	10/5	
Serum										
Kalsium	7.3	7.9	8.4	9.0	9.1	9.4	10.1	9.8	9.5	9.20-11.00 mg/dl
Natrium	136	137	137	135	128	132	136	132	130	136-145 mmol/L
Potassium	1.5	1.9	2.3	2.7	2.4	3.0	2.5	2.7	2.5	3.50-5.10 mmol/L
Chloride	93.5	97.6	105.2	102.2	97.5	103.3	108.1	104.3	103.5	94-110 mmol/L
Magnesium	1.76	2.00								1.6-2.6 mg/dl
Urine	**24/4**									
Kalsium	12.60									<0.15 mmol/24h
Natrium	193.50									30-300 mmol/24h
Potassium	56.57									25-100 mmol/24h
Chloride	164.25									85-170 mmol/24h

Table 3 Blood gas analysis

Parameter	25/4/17	27/4/17	Reference Range
pH	7.35	7.31	7.35-7.45
pCO2	30.6	23.4	35.00-45.00
pO2	139.70	143.70	80.00-100.00
BEecf	-9.3	-14.7	-2-2
HCO3	16.40	11.60	22.00-26.00
SO2	98.7	98.7	95%-100%
TCO2	17.30	12.30	24.00-30.00

CASE REPORT

A 6-year-old male with continuous nausea and vomiting was admitted to Sanglah General Hospital on April 21, 2017. The patient had vomited since four days before the admission. The vomits contained only food and beverage consumed, but no blood was present. There was no diarrhea, fever, or a cough. On physical examination, the liver margin was 4 cm below the costal margin, showing a hepatomegaly without splenomegaly. The initial CBC showed WBC 44.59 × 10^3/μL, RBC 4.58 × 10^6/μL, Haemoglobin (HGB)

Table 4 Clinical chemistry analysis

Parameter	23/4/17	7/5/17	11/5/17	Reference Range
RFT				
BUN	39.0	29.0	60.0	8.00-23.00 mg/dL
Creatinine	2.63	2.25	2.49	0.70-1.20 mg/dL
LFT				
Total Bilirubin			0.25	0.00-1.00 mg/dL
Direct Bilirubin			0.09	0.00-0.30 mg/dL
Indirect Bilirubin			0.16	mg/dL
Alkali Phosphatase			110	0-269 U/L
AST			42.2	11.00-30.00 U/L
ALT			21.90	11.00-50.00 U/L
Gamma GT			41	11.00-49.00 U/L
Total Protein			6.9	6.00-8.00 g/dL
Albumin			4.0	3.50-5.20 g/dL
Globulin			2.89	3.2-3.7 g/dL

Table 5 Urinalysis

	Date				
Parameter	**23/4/17**	**28/4/17**	**10/5/17**	**11/5/17**	**Reference Range**
Dipstick					
Spesific gravity	1.001	1.005	1.003	1.007	1.003-1.035
Clarity			Clear		Clear
pH	5.50	5.00	5.50	6.00	4.5-8
WBC	Negative	Negative	Negative	Negative	Negative
Nitrite	Negative	Negative	Negative	Negative	Negative
Protein	(1+)	(1+)	(1+)	(2+)	Negative
Glucose	Normal	Normal	Normal	(1+)	Normal
Ketones	Negatif	(2+)	(1+)	Negatif	Negative
Blood	(1+)	(1+)	(1+)	(3+)	Negative
Urobilinogen	Normal	Normal	Normal	Normal	Normal
Bilirubin	Negative	Negative	Negative	Negative	Negative
Color	colorless	p.Yellow	colorless	Light orange	p. yellow-yellow
Sediment					
WBC	0-1	0-1	1-3	1-2	≤ 7
RBC	1-2	1-2	8-10	10-15	≤ 3
Epithelial cell					
Flat	0-1		1-2	3-4	
Cylinder			Granules (+)	Granule (+)	
Bacteria			(1+)	(1+)	

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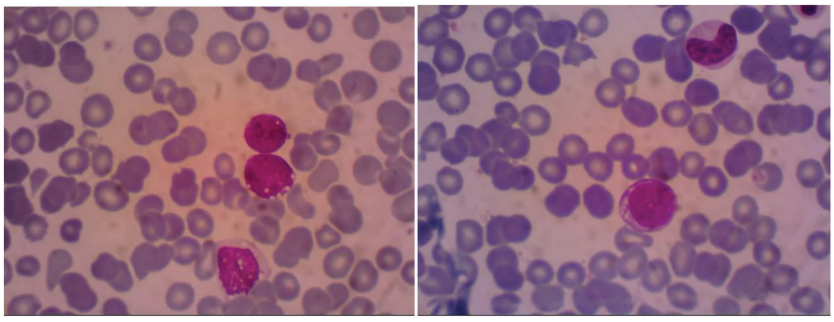

Figure 1 Bone marrow aspirate

11.84 g/dL, and platelet 95.74 × 10^3/μL. The bone marrow aspirate showed an ALL L3 (Burkitt type).

April 27, 2017, only a few days of the hospitalization, his condition became worse. The electrolyte serum test showed hypocalcemia and hypokalemia. The blood gas analysis showed metabolic acidosis. He was treated with potassium chloride to correct the hypokalemia.

On May 7, 2017, he complained to have abdominal pain, vomiting, feeling weak, and also became pale. The blood test showed blood urea nitrogen (BUN) 29.0 mg/dL, creatinine serum 2.25 mg/dL, Aspartate Aminotransferase (AST) 42.2 U/L (Table 4), and WBC 13.87 × 10^3/μL, RBC 2.03 × 10^6/μL, HGB 5.63 g/dL, PLT 8.90 × 10^3/μL (Table 1). A urinalysis showed hematuria and proteinuria (Table 5). A few moment later, he had seizures and became unconscious.

DISCUSSION

ALL L3 or Burkitt type is the most common leukemia in children or young adults. It is more commonly found in male than female. Clinically, ALL tends to be very acute, showing lymph nodes enlargement, hepatomegaly, and splenomegaly. Meningitis leukemia occurs in the advanced stages of leukemia. Our patient was vomiting for a few days, and we found a hepatomegaly. After several days of being hospitalized, the patient showed deterioration. He presented a decreased awareness and several convulsions.

The diagnosis of BL is made through peripheral blood and bone marrow smear. The bone marrow smear showed infiltrations about 20% lymphoblast with heterogeneous morphology. Moreover, there were some lymphoblasts with many vacuoles in the cytoplasm. Therefore, based on the cell features, it concluded as acute lymphoblastic leukemia (L3) or Burkitt type.

The patient's blood tests and the decreased consciousness and convulsions signaled the kidney and CNS metastasizes. There was also a possibility that the patient had CNS leukemia, thus having a bad prognosis. Hypokalemia in our patient may be a result of the leukemia process, although Barter syndrome cannot be excluded.

The ALL treatment strategy is to eradicate all of the malignant cells so that nothing left to cause a reoccurrence. The chemotherapy combination includes vincristine, prednisone, and L-asparaginase. CNS prophylaxis is carried out by administering methotrexate into the spinal fluid and cranial irradiation. The maintenance chemotherapy should be continued for 2 to 3 years with six mercaptopurine and methotrexate administration to the spinal fluid and cranial irradiation. Our patient had not had a chemotherapy because his hemoglobin had never reached 10 mg/dl although he had been transfused with packed red cells (PRC) and thrombocyte concentrate (TC). Indeed, the CNS leukemia that may be present had also not been tackled.

CONCLUSION

Burkitt Lymphoma is a rare but progressive malignant tumor of childhood with various clinical features. Our patient had ALL L3 Burkitt type with CNS involvement and multi-organ complications.

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