Study of some biochemical parameters in patients Of acute myeloid leukemia

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الخلاصة :

دراسة بعض التغيرات البايوكيمياويه عند مرضى سرطان الدم التقياني ا لحاد تم فحص (150)عينة دم مصابين بسرطان الدم التقياني الحاد في المركز الوطني لبحوث وعلاج مريض امراض الدم من حزيران لنهاية كانون الاول عام (2004) وقد تم تشخيص الحالات المرضيه عن طريق الفحص الهيماتولوجي وقد تم فحص (25) مريض منهم مصابين بالنوع (قبل M4) قبل العلاج بالكيمياوي و(25) منهم مصابين بعد العلاج وكذلك فحص (25) مريض مصابين بالنوع M2) العلاج و(25) مريض بعد العلاج بالكيمياوي0 وكان اعمار المرضى 36,6 سنه ومنهم (64 %) ذكور و(36 %) اناث واظهرت النتائج الخاصة بوضائف الكلى ارتفاع معدلات اليوريا بنسبة (40 %) عند المرضى 0 و(42%) الكرياتينين قبل وبعد العلاج.

Summary

Hundred and fifty samples were collected patients with acute myeloid leukemia in the national center of Hematology, from period began at (1) June till end of December 2004. The diagnosis of acute myeloid leukemia was made according to standard hematological criteria. Twenty five patients had (France, American, British) type M2 before treatment chemotherapy and 25 patients after chemotherapy, and leukemia patients M4 before treatment

Average age of patient is 36.6 years and sex is 64% males and 36% females

The study calculated the renal function by measuring urea and creatinine 40% of patients have elevated urea , 42% have elevation in creatinine either after or before treatment as possible complication of leukemia

Introduction

Leukemia means a group of disorders characterized by the accumulation of abnormal cells which may cause bone marrow failure

Raised circulating white cells count and infiltrate other organs Acute Myelogenous Leukemia (AML) called granulocytic or myelocytic leukemia account for about 20% of childhood leukemia (2).

AML is a cancer of bone marrow which characterized by granulocytic cells predominance, these a typical blood cells are produced in the bone marrow.

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Materials and methods
Instruments and equipments

Instruments	company	source
Spectrophotometer	Ceilceloll	France
Centrifuge	Grifin	U.K.
Incubator	Fisher	Scientific Turkish
Micropipette	Oxford Pipette	France
Magnetic stirrer	Bainal Tatlock	
Water bath	Memert	

Biochemical kits

KIT	COMPANY	SOURCE
Urea	Linear	Spain
Creatinine	Linear	Spain

SAMPLES

Blood samples were collected form (150) patients and 20 healthy persons from the National Center of Hematology and Laboratory of al-Batool hospital.
These 150 patients with AML where equally divided into M2, M3 and M4 (50 patients each)

Procedure

Urea concentration determination method (Linear –company Kit).
Urea hydrolyzed by urea-3 into ammonia and carbon dioxide.
Ammonia react with sodium hydrochloride (NAOH) and sodium nitro prusside yield a blue solution; the value of absorbance is proportional with concentration of urea.

REAGENT COMPOSITON

R1 = urea enzyme
R2 = buffer solution and sodium salycilate with nitro prusside
R3 = alkaline hydrochloride- sodium hypochlorate working reagent (W.R.)
Working reagent (W.R.) = mix 1 volume R1 + 24 R2.

Procedure

1. **1.0 ml of W.R. was added to 10 ml of sample.**
2. **mix and incubate to 5 minutes at 37 Ċ**
3. **1.0 ml of R3 was added.**
4. **read the absorbance at 600 nanometer against reagent blank**

Concentration of urea = Sample = mg/dl urea
Standard

CREATININE
(Linear company Kinetic method Kit)
The principle of determination of creatinine by converting creatinine to color solution and measuring absorbance then determine concentration.

Creatinine + picric acid PH12 ב Red complex
37e

R1= picric acid + potassium ferric cyanide
R2= Alkaline buffer solution

Working Reagent (W.R.) 1 volume of R1+ 1 volume of R2

PROCEDURE

1. **Incubate the working reagent.**
2. **Spectrophotometer read at 510 nm and set it to absorbance distilled water.**
3. **Pipette in accurate a 1.0 ml of WR + 100 ml sample are standard.**
4. **Mix and insert the cuvette in its place and start the stop watch.**
5. **Record the increase of absorbance with repeat to the time of stand and sample at 510 nm after 30 second and after 90 second.**

CALCULATION

Concentration = ΔA sample x c standard =mg/dl creatinine
Δ A standard

RESULT

This study includes 150 patients with AML in three categories; M2, M3 and M4 each class with compared reading before and after treatment.

TABLE 1

Shows the mean value of blood urea of leukemia patients (AML M2).
The first group represents the mean value before treatment (44.9 mg/dl), after treatment (53.6 mg/dl) compared with normal value (34.09 mg/dl).

TABLE 2

Appear the mean value of blood urea for leukemia patients (AML M3).
The first group represents the mean value before treatment (51.8 mg/dl) and after treatment (57.18 mg/dl).

TABLE 3

Shows the mean blood urea for leukemia patients (AML M4) (45.2 mg/dl) before treatment and (50.8 mg/dl) after treatment.

TABLE 4

Shows the mean value of creatinine for leukemia patients (AML M2) (1.18 mg/dl) before treatment and (1.314 mg/dl) after treatment.

TABLE 5

Appear the mean value of creatinine for (AML M3) patients (1.15 mg/dl) before treatment and (1.29 mg/dl) after treatment.

TABLE 6

Illustrate the mean value of creatinine (AML M4) patients (1.08 mg/dl) before treatment and (1.187 mg/dl) after treatment compared with normal value (0.73 mg/dl).

DISCUSION

Data in table (1), (2), (3) and tables (4), (5), (6) shows a mild elevation of creatinine and urea these 2 parameters used to monitor the impairment of renal function.
The deposition of tumor antigen in glomiruli followed with antibodies.
Deposition and complement activation is the mechanism for this association (4) and (5).
AML in which filtered lysozyme released from leukemia cells may be responsible for the tubular injury (6).
Tumor infiltrations spread of primary tumor to the kidney is not uncommon
However involvement is sever enough to impair renal function with rapidly growing hematological malignancies in such AML (7) and (8).

Thrombotic thrombocytopenic purpura can occur in patient usually with malignancy especially with AML blocking bone marrow with leucoplasts , thrombocytopenia and hemolytic anemia may present(9).
Acute renal failure has been found or known as a possible complication of leukemia for many years and many cases has been reported (10).
Increase in turn over nucleic acid in malignancy can cause acute renal failure due to the release of urate which cause blocking by crystalline uric acid (10) and (11) , after treatment the value urea and creatinine elevated in some patients and these are shown in the tables (1),(2),(3),(4),(5) and (6), these elevation values are due to the complication in kidney because of the drugs taken the patients such as cytotoxic drugs (anthracycline derivatives)
Renal failure in AML may relate to disease history of the kidney such as kidney stones and genitourinary tract or using immunosuppressive agents.

Others studies shown elevation of creatinine in the treatment of AML patients (11).

Abnormal catabolism of nucleic acid and purine lead to increase of precipitation of uric acid (12).
Renal disorders in patients with AML have been shown in this study before and after chemotherapy.
Renal complications in AML may be due to preexisting disorder, leukemic infiltration of the kidneys, metabolites of leukemia cells including uric acid and phosphate (13).
Renal disorder may be as a result of nephrotoxic drugs and renal disorders increase with chemotherapy as a result of the toxicity of the drugs taken (11) and (10).

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Table(1)Descriptive statistic with their comparison of Urea mg/dl among different groups of AML M2

Parameter	Statistics		Before treatment	Normal	After treatment
UREAM2	Mean		44.9	34.095	53.663
	S.D		18.039	2.827	24.352
	95%c.I	U.B	53.342	35.814	65.06
		L.B	36.457	32.772	42.265

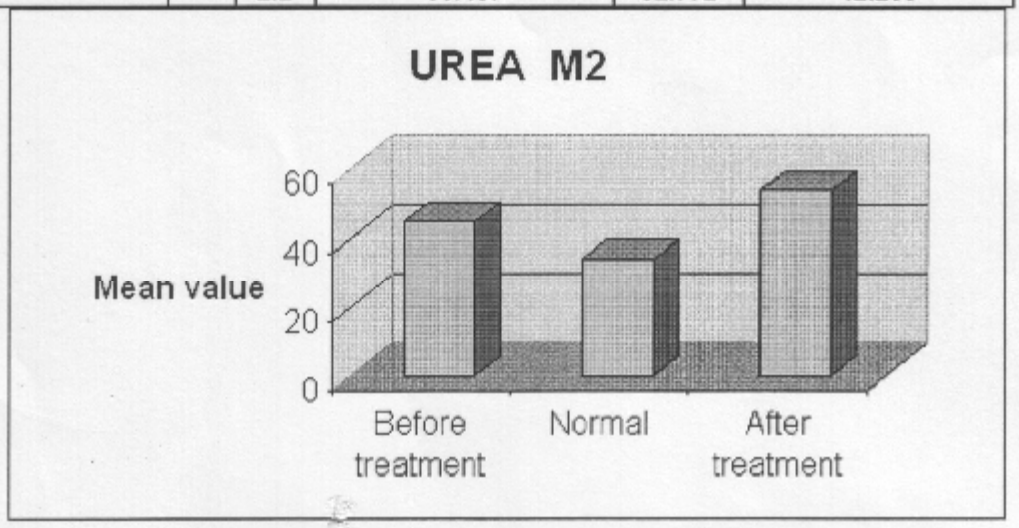

Figure (1) Urea parameter distribution M2

Table(2)Descriptive statistic with their comparison of Urea mg/dl among different groups of AML M3

Parameter	Statistics		Before treatment	Normal	After treatment
UREAM3	Mean		51.858	34.095	57.183
	S.D		36.072	2.827	35.516
	95%c.I	U.B	68.74	35.814	73.804
		L.B	34.976	32.772	40.561

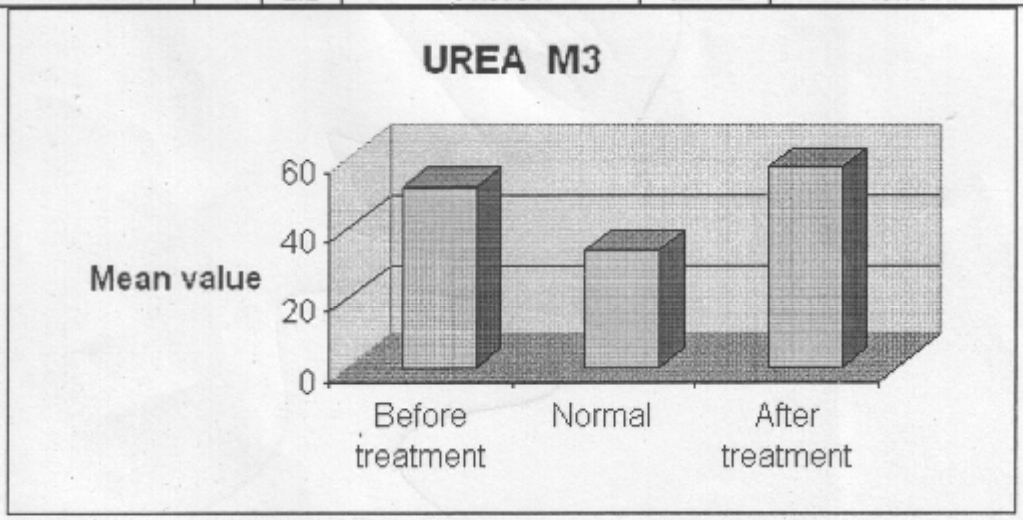

Figure (2) Urea parameter distribution M3

Table(3)Descriptive statistic with their comparison of Urea mg/dl among different groups of AML M4

Parameter	Statistics		Before treatment	Normal	After treatment
UREAM4	Mean		45.284	34.095	50.865
	S.D		15.055	2.827	26.408
	95%c.I	U.B	52.33	35.814	63.222
		L.B	38.238	32.772	38.508

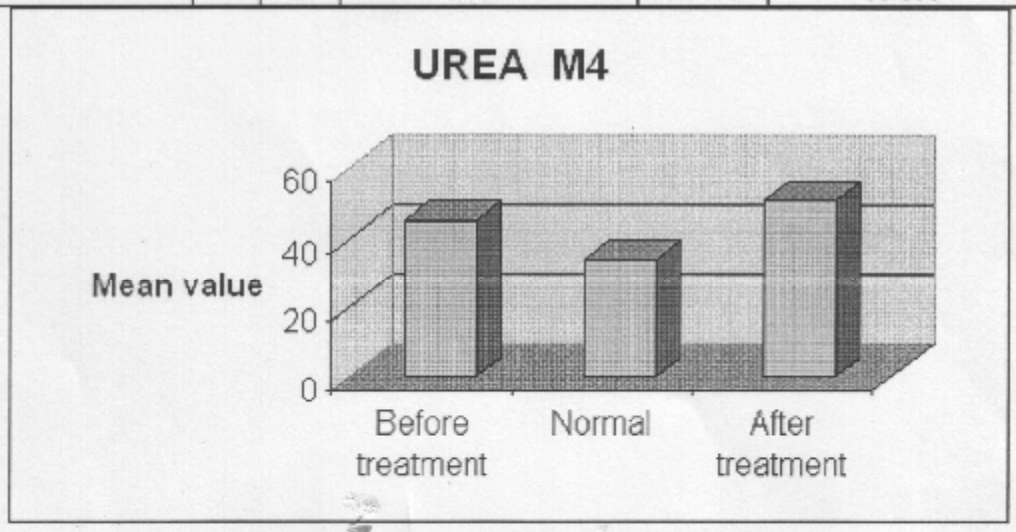

Figure (3) Urea parameter distribution M4

Table(4)Descriptive statistic with their comparison of Creatinine mg/dl among different groups of AMLM2

Parameter	Statistics		Before treatment	Normal	After treatment
CREATM2	Mean		1.1875	0.7385	1.314
	S.D		0.4035	0.1024	0.849
	95%c.I	U.B	1.3763	0.7864	1.7113
		L.B	0.9987	0.6906	0.917

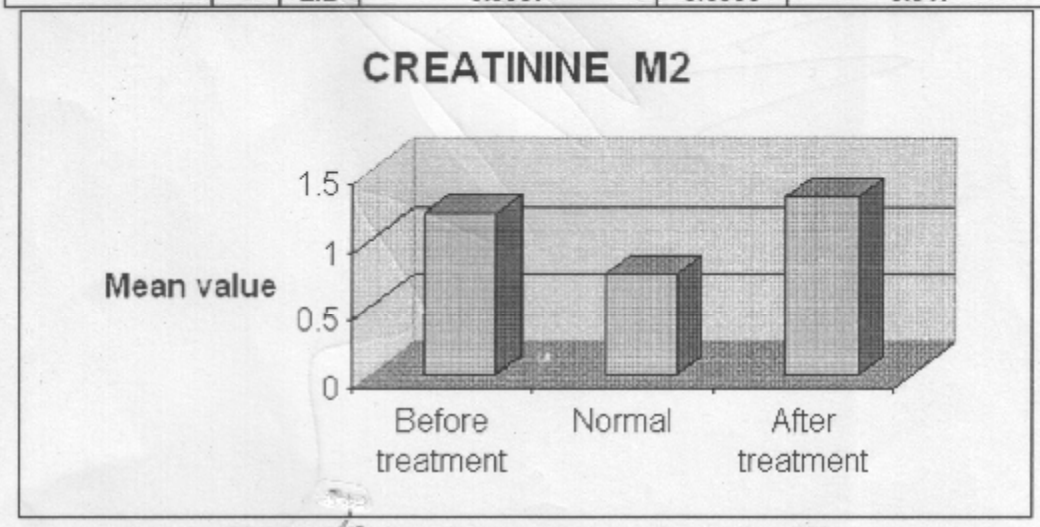

Figure (4) Creatinine parameter distribution M2

Table(5)Descriptive statistic with their comparison of Creatinine mg/dl among different groups of AML M3

Parameter	Statistics		Before treatment	Normal	After treatment
CREATM3	Mean		1.151	0.7385	1.2914
	S.D		0.5988	0.1024	0.7234
	95%c.I	U.B	1.4312	0.7864	1.6299
		L.B	0.8708	0.6906	0.953

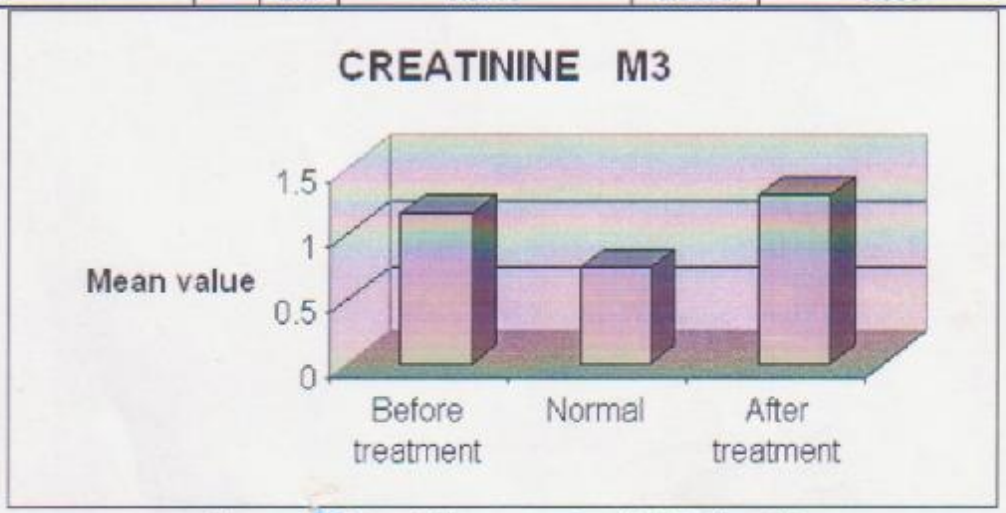

Figure (5) Creatinine parameter distribution M3

Table(6) Descriptive statistic with their comparison of Creatnine mg/dl among different groups of AML M4

Parameter	Statistics		Before treatment	Normal	After treatment
CREATM4	Mean		1.0872	0.7385	1.1874
	S.D		0.3117	0.1024	0.3109
	95%c.I	U.B	0.9414	0.7864	1.2248
		L.B	1.2331	0.6906	1.045

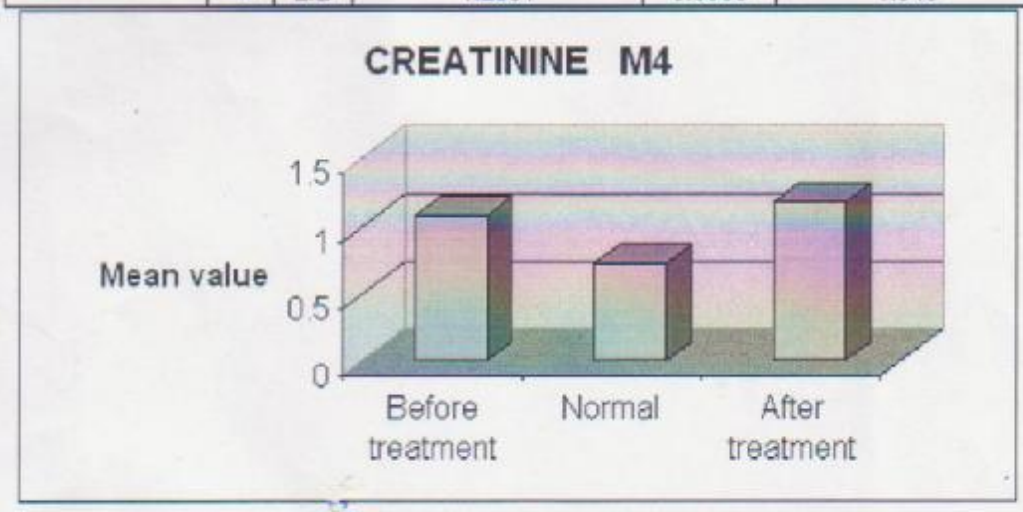

Figure (6) Creatinine parameter distribution M4