

Serum Folate Levels in End Stage Renal Disease Patients

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Objective: This study was aimed to measure serum folate levels in patients of end stage renal disease (ESRD) on regular haemodialysis and compared with normal healthy individuals. **Study design:** It is a comparative study. **Setting:** Department of Pathology, Shaikh Zayed Hospital, Lahore **Patients and methods:** One hundred subjects were selected and divided into two groups. Group A include fifty patients of end stage renal disease on regular haemodialysis and group B include fifty normal healthy individuals as control. Two ml of blood was drawn by venepuncture, one ml for complete blood examination and one ml for serum folate level. **Results:** A significant decrease in folate level was observed in end stage renal disease patients on regular haemodialysis as compared to control group. **Conclusion:** By measuring serum folate level in patients on regular haemodialysis we can manage anaemia due to folate deficiency.

Key words: Folate, renal disease patient

Anaemia is one of the more constant clinical features of renal failure. During the haemodialysis anaemia is exacerbated due to haemolysis because of mechanical and thermal injury and folic acid deficiency.¹ Pathogenic mechanisms of anaemia development in chronic renal failure patients on dialysis may be due to low level of erythropoietin, ineffective erythropoiesis or a suppressive effect on haemopoiesis². Folic acid is easily removed by dialysis and if not supplemented deficiency occurs which impairs DNA synthesis and results in a megaloblastic erythroid marrow and macrocytic red cells³. Haemodialysis patients may develop a water soluble vitamin deficiency which was found to be folic acid, caused by poor intake and losses in dialysate⁴. Folate concentration is significantly decreased after haemodialysis, so folate supplementation is necessary during haemodialysis^{5,6}. In chronic haemodialysis patients total homocysteine levels depend on folate status and folate is significantly lost during haemodialysis and its supplementation is necessary to prevent complications⁷. Haemodialysis is an extracorporeal procedure, during which movement of solutes such as urea from one compartment (blood) to another (dialysate) occurs across a semipermeable membrane. It helps in removal of dialyzable toxic products and reverses the abnormalities in uraemia⁸. Patients of end stage renal disease require dialysis therapy to stay alive, and during dialysis erythropoietin deficiency occurs. Erythropoietin therapy improves the quality of life^{9,10}.

This study was purposed to measure serum folate level so that we can manage anaemia due to folate deficiency in patients on regular haemodialysis.

Subject and methods:

In this study one hundred subjects were selected and divided into two groups. Group A included 50 patients on regular dialysis and group B included 50 normal healthy subjects as control. Absolute values and Hb were done by haematology autoanalyzer and serum folate levels were done by using commercially available kits¹¹. Results were

analyzed by using students 't' test and level of significance was also done¹².

Results:

Results and level of significance of these groups are given in tables 1 and 2.

Table 1: Comparison of Hb, PCV, MCV, MCH, MCHC in groups A and B

Tests	Group A (Patients ESRD Dialysis)	Group B (Control)	Significance A vs B
Hb	8.5±1.5	12.6±1.34	HS
PCV	25.4±3.4	41.8±0.92	HS
MCV	107.8±8.6	78.7±11.8	HS
MCH	29.8±2.01	31.5±0.98	NS
MCHC	31.6±1.6	31.5±1.2	NS

Key: NS = Non-significant HS = Highly significant

Table 2: Comparison of serum folate levels in groups A and B

Tests	Group A (Patients ESRD Dialysis)	Group B (Control)	Significance A vs B
Serum folate	3.2±1.5	10.6±2.8	HS

Key: NS = HS = Highly significant

Discussion:

Haemoglobin: In patients of ESRD on dialysis (Group A) when compared with control (Group B), Hb was found to be lower, and the difference was highly significant ($p < 0.01$). The present study is consistent with the results of Bamonti-Catena et al⁴ and Jafee et al¹³ who also observed decreased Hb levels in ESRD patients on haemodialysis.

Absolute Values: PCV: In patients of ESRD on dialysis (Group A) PCV was found to be lower when compared with control (Group B). The present study is in favour of the results of Bamonti-Catena et al⁴ who also found decreased PCV in ESRD patients on regular hemodialysis.

MCV: In patients of ESRD on dialysis (Group A) when compared with control (Group B). MCV was found

to be raised. The present study is consistent with the results of Bamonti-Catena et al⁴ who also observed similar results. MCV is increased because of folic acid loss during dialysis which leads to megaloblastic change in RBCs.

MCH and MCHC: No significant difference was found when MCH and MCHC were compared.

Serum folate level: In this study, serum folate levels were found to be decreased in patients of end stage renal disease on dialysis (group A) as compared to controls (group B). This study is consistent with the results of Bamonti-Catena et al⁴ and Labelane et al¹⁴, who also observed decreased serum folate levels in patients of ESRD with dialysis. In the serum, folic acid is not bound with albumin and it is free, so is easily lost during dialysis, causing folate deficiency.

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