Effect of Dialysis on Bleeding Time in Chronic Renal Failure

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Abstract

Renal failure is associated with severe haemorrhagic complications. Platelets play an important role in coagulation and their dysfunction may be responsible for the bleeding tendency in these patients. Sixty patients with advanced renal failure were investigated for bleeding tendency due to platelet dysfunction. The pre-dialysis platelet count was 46 to 325x109IL) (mean 166x10 9/L), Post-dialysis platelet count was 60 to 310x109IL, (mean 172x109/L) Pre-dialysis mean bleeding time (BT) was 4.95±0.27 minutes (range 1.30 to 20 minutes), Thirty-three patients (55%) had prolonged BT before dialysis. Mean BT in all patients after dialysis was 2.46±0.24 minutes (range 1.15 to 10 minutes). BT was corrected in 27(81.8%) out of 33 patients with prolonged BT before dialysis. In 6 patients (10%) it remained prolonged. This improvement in BT after dialysis was statistically significant (p value <0.001). Both peritoneal and hemodialysis resulted in significant improvement in bleeding time (JPMA 48:242,1998).

Introduction

Severe haemorrhagic complications in the course of uremia due to renal failure have long been reported[1]. The advent of dialysis has definitely lowered the incidence of the most severe haemorrhagic event, but bleeding still remains a major problem for uremic patients especially while undergoing surgezy or invasive procedures[2,3].

Quantitative and qualitative defects of platelets were suggested on the basis of prolonged bleeding time and other investigations. Bleeding time is the test that provides an overall measures of the primaiy hemostatic plug formation and is now generally accepted as the best laboratory parameter of clinical bleeding. This study was designed to find out the incidence of prolonged bleeding time in patients with chronic renal failure, the effect of dialysis prolongedbleeding time and to compare the effect of two methods of dialysis.

Patients and Methods

A total of sixty patients were included in the study irrespective of age, sex orethnic group. All these patients were suffenng from advanced renal failure. Half of them underwent acute peritoneal dialysis and the other half were on regular hemodialysis. The diagnosis of advanced renal failure was confirmed by clinical and laboratory parameters. Platelet counts and bleeding time were perfonned before initiation of dialysis and 6 hours after the dialysis was completed to allow time for disappearance of action of heparin given during dialysis. Bleeding time was done by Duke's method.

Duke's method

Ear lobe was warmed and 3 mm deep puncture was made with a disposable lancet. As soon as the puncture was made, stop watch was started. At 15 seconds interval the drop of blood which had exuded from the wound was absothed into a filter paper without touching the surface of the ear. The time takenforbleedingto ease fromthis standarized wound was the bleeding time. Normal range by this

method is 1-3.5 minutes. Value of 4 minutes or above was considered abnormal.

Results

Total sixty patients were included in this study. Forty fourpatients were males and 16 females. Theiragevaried from 15 to 68 years.

Table I. Causes of renal failure in the patient population.

Diagnosis	Patients number	Percentage
Hypertension	16	26.7
Diabetes Mellitus	13	21.7
Chronic glomerulonephritis	8	13.3
Obstructive nephropathy	5	8.3
Toxic nephropathy	4	6.7
Polycystic kidneys	2	3.3
Amylodosis	2	3.3
Toxic nephropathy	1	1.7
Kidney transplant rejection	1	1.7
Unknown etiology	8	13.3

Table I shows causes of renal failure in these patients. Hypertension, diabetes mellitus and chronic glomerulonephritis were leading causes of renal failure.
The incidence of bleeding from different sites in these patients is depicted in Table II.

Table II. Symptoms in the patient population.

Symptom	No. of patients	Percentage
Epistaxis	11	18.3
Hematuria	11	18.3
Gum bleeding	7	11.7
Rectal bleeding	3	5.0
Hemoptysis	2	3.3
Hematemesis	2	3.3
Purpura	1	1.7

Hematuria and epistaxis were the most common, present in 11 patients each. Hematuna could have been due to underlying primary renal pathology in some patients.

Pre-dialysis platelet count was 46 to 325x10^9/L (mean 166x10^9/L). Post-dialysis count was 60 to 360x10^9/L (mean 172x10^9L) which was not statistically different from pre-dialysis count.

Thirty-three patients out of 60 (66.7%) showed abnormally prolonged bleeding time (BT)before dialysis. Of these 20 were from the peritoneal dialysis and 13 from the hemodialysis group. After dialysis only 6 (10%) showed pronged BT (Table III).

Table III. Incidence of prolonged bleeding time before and after dialysis.

Method of dialysis	Pre dialysis		Post dialysis		P value
	Patients	Percent	Pateints	Percent	
Peritoneal dialysis (n=30)	20	66.7	4	13.3	<0.01
Hemodialysis (n=30)	13	43.3	2	6.7	<0.01
Total (60)	33	55.0	6	10.0	<0.01

Sixteen out of 20 (80%) patients in peritoneal dialysis group and 2 out of 3 (84.6%) patients with prolonged BT in hemodialysis group showed improvement in BT alter dialysis (P value <0.001). Mean BT was 4.95±0.72 before dialysis. Post-dialysis BT improved to 2.46±0.24 minutes (Pvalue <0.001). Effect oftwo types ofdialysis onBT are shown in Table IV.

Table IV. Effect of dialysis on mean bleeding time and comparison of two methods.

Method	Pre-dialysis		Post-dialysis		P value
	Mean	SEM	Mean	SEM	
Peritoneal Dialysis (n=30)	5.78	0.81	2.43	0.81	<0.001
Hemodialysis (n=30)	4.12	0.39	2.50	0.30	<0.001
P value		NS			

In peritoneal dialysis group pre and post-dialysis mean BT was 5.78±0.81 and 2.43±0.81 respectively (P<0.001). Similarly in hemodialysis group pre and post-dialysis mean BT was 4.12±0.39 and 2.50±0.30 respectively (P<0.001). Pre-dialysis BT was lower in the hemodialysis group as these patients were getting regular hemodialysis and were not severely uremic. Onthe other hand patients in peritoneal dialysis group had dialysis for the first tune and they were more uremic.

Discussion

Prolonged bleeding time is afrequentfinding inpatients of chromc renal failure. In uremic patients there is impainnent of platelet function which is based upon the availability of storage pool and the platelete phospholipid[5].

Aggregation studies using various agents have demonstrated such defects in platelet aggregation[6]. There is evidence that impaired vessel wall and platelet interaction mediated by prostacyclin and Von Willebrand Factor(VWF) is an important defect responsible for bleeding tendencies in uremic patients[7,8]. Aggregation studies have demonstrated decreased sensitivity of platelets to the aggregating agents like adenosine phosphate, epinephrine and collagen in vitro[9]. Platelet factor-3 availability is also abnormal in chronic renal failure[10,11]. Some dialyzable compounds like guanidino-succinic acid, phenol and several other hydroxy phenolacetic acids have been implicated in various hematological abnormalities in renal failure[12,13]. With frequent dialysis platelet abnormality can be corrected and normal hemostasis maintained, suggesting that the observed defects am due to inhibition of platelet function by retained metabolites.

None of our patients had thrombocytopenia severe enough to cause haernorrhagic complications. Mild thrombocytopenia was noticed in 3 out of 12 patients (25%) by Lewis et al[5], in 8 out of 33 patients by Cheney et al[4] and in 3 out of 29 patients with uremia by Evans et al[15]. Nancy et al[6]. Ivanovich et al[16]. Mannucci et al[17] and Bloomm et al's reported normal platelet count in uremic patients.

Bleeding time was prolonged in55% of ourpatients and was corrected with hemodialysis in 81.8% and in 80% with peritoneal dialysis. Ourfindings are in agreement with most of the reports in literature.[8,14,15,19,20].

The study concluded that the incidence of prolonged bleeding time in chronic renal failure was 55% and a significant decrease was observed in the bleeding time after dialysis. Statistical analysis proved bothtechniques of dialysis i.e., hemodialysis and peritoneal dialysis to have the same efficacy.

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