

ORIGINAL ARTICLES

EVALUATION OF PRIMARY SCREENING TEST FOR PLATELET HOMEOSTASIS IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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Abstract:

This observational study was done on 50 cases of predialytic chronic kidney disease (CKD) patients. The aim of the study was to determination of total platelet count and bleeding time, comparison of the platelet count and bleeding time with the severity of chronic kidney disease. The mean age of the patients was 41.22±2.0 years, mean haemoglobin 4.96 ±0.32gm/dl , serum creatinine 430.74± 11.92 µmol/L ,platelet count 246.50 ± 13.63x10⁹/L and bleeding time were 4.13± 0.28 min respectively. Thrombocytopenia (<150x10⁹/L) were found in 19(38%) cases. Bleeding time was prolonged (>9min) 6(12%) cases , among them only 4(8%) cases were thrombocytopenic. There was no significant relationship between platelet count and serum creatinine. No correlation was found between platelet count and bleeding time. No significant correlation was also found in Bleeding time and creatinine. Therefore, it can be concluded that platelet count is highly variable in chronic kidney disease and it is not a reliable screening test for bleeding diathesis in chronic kidney disease patients. Bleeding time is the best platelet function test that correlates clinical bleeding.

Key words: platelet, haemostasis, chronic kidney disease

Introduction:

Numerous haemostatic abnormalities associated with chronic kidney disease (CKD)¹. Patients with Chronic kidney disease develops haemostatic disorder mainly in the form of bleeding diathesis . Hemorrhage occurs at cutaneous, mucosal and serosal sites. Retroperitoneal and intracranial hemorrhage also occur². Bleeding diathesis in Chronic kidney disease is one of the indication for dialysis. Therefore it is important to know the exact platelet haemostatic status of the chronic kidney disease patients with bleeding diathesis for proper management.

Chronic kidney disease is associated with excessive bleeding for a variety of reason³. Pathogenesis of bleeding in chronic kidney disease is multifactorial in origin, there is no single explanation for this complex and confusing disorder⁴. Platelet dysfunction is probably the most consistent and important feature particularly platelet-platelet and platelet vessel wall interaction. Platelet dysfunction resulting from different adverse biochemical and hormonal effects associated with progressive uremia. There is defective membrane expression and activity of glycoprotein adhesive receptor complex causing both impaired

platelet aggregation and adhesion to endothelium⁵. In addition, platelet volume and the circulation platelet mass are reduced in chronic kidney disease possibly due to reduction in thromboxane concentration or activity⁶. The mean platelet life span also reduce in advance chronic kidney disease⁷. Bleeding time in chronic kidney disease patients not only depends on circulating platelet mass ,largely depends on its functional status.

Determination of total platelet count and bleeding time are the most popularly used primary screening test for bleeding diathesis. Among the different platelet function test, determination of bleeding time is the single most test that mostly correlates with the clinical bleeding and it is frequently used test for platelet function^{1,8}. In this study total platelet count and bleeding time was determined in chronic kidney disease patients , comparison between platelet count and bleeding time and correlation between platelet count and bleeding time, platelet count and serum creatinine, bleeding time and creatinine were evaluated.

Materials and Methods:

This descriptive observational study was conducted in the Nephrology Unit of Rajshahi Medical College

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Hospital, Bangladesh from July, 2007 to December, 2007. A total 50 patients due to various causes were included in this study .There were 33 male and 17 female patients. The age ranges between 21-65 years. The inclusion criteria were predialytic chronic kidney disease patients with serum creatinine concentration >177 µmol/L not taking anti platelet drug like aspirin/ clopedegrol or other and erythropoietin therapy . Chronic kidney disease patients having primary haematological disorder, chronic liver disease and pregnancy were excluded from the study. All patients gave verbal consent prior to study entry.

After taken all aseptic precaution, 05 ml venous blood was collected from antecubetal vein ,two spot blood film were made and aliquots of blood send to the laboratory for biochemical and haematological analysis. Blood films were dried in the air and stained in with Leishman’s stain for examination of smear under microscope. Total platelet count was determined by visual microscopic methods from the smear white blood cell (WBC) as reference(PCW=Platelet count based on WBC).Total platelet count <150x10⁹/L regarded as thrombocytopenia.Bed side bleeding time was determined following IVYs method. Bleeding time >9 min was regarded as prolonged bleeding time. Serum creatininine concentration was estimated by Alkaline cupric method. The results were recorded in printed form and subsequently analyzed. All data’s were expressed as mean+ SD and SPSS windows version 12 software package was used for all statistical analysis.

Results:

A total of 50 Chronic kidney disease patients were included in the study. There were 33 male and 17 female with a male female ration of 1.9:1.The mean age of the patients was (41.22±2.0) years(ranges between 22-65 yrs) and the mean haemoglobin , serum creatinine concentration, platelet count and bleeding time were 4.96 ±0.32 gm/dl, 430.74± 11.92 µmol/L , 246.50 ± 13.63 x10⁹/L ,4.13± 0.28 min respectively (Table-I).Out of these 50 patients thrombocytopenia were found in 19(38%) patients (<150x10⁹/l). Bleeding time were found prolonged (>9 min) in 6(12%) patients. Among those patients with prolonged bleeding time , thrombocytopenia were found in 4(8%) patients (Table-II).There was no correlation observed between platelet count and severity of Chronic kidney disease (r=0.079 , p=<0.584). No correlation between platelet count and bleeding time(r =0.100, p=<0.49). No significant correlation also observed between bleeding time and severity of CKD (r=0.189 , p=<0.189) (Figure-1,2,3).

Table-I

Characteristics of 50 Chronic Kidney disease patients

Total number of patients	50
Sex	
Male	33
Female	17
Mean age	41.22±2.0
Mean haemoglobin	4.96 ±0.32 gm/dl
Mean serum creatinine	430.74± 11.92 µmol/l
Mean Platelet count	246.50 ± 13.63x10 ⁹ /l
Mean bleeding time	4.13± 0.28 9(min)

Table -II

Comparison between bleeding time and platelet count

Bleeding time	Platelet count x10 ⁹ /L			
	<150 (n, %)	150-300 (n, %)	300- 450 (n, %)	>450 (n, %)
Bleeding time prolonged (>9 min) n=6	04(8)	01(2)	01(2)	0
Bleeding time normal n=44	15(30)	13(26)	14(28)	02(4)
n=50	19 (38)	14 (28)	15 (30)	02 (4)

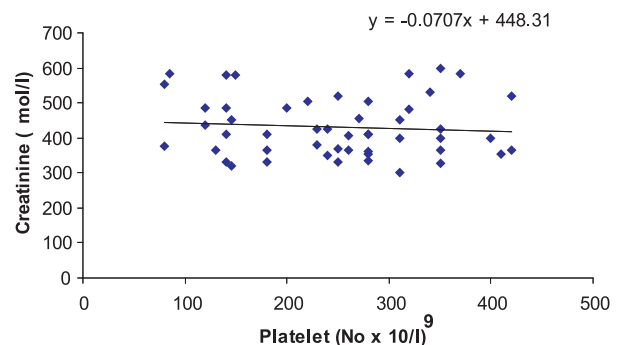


Fig-1: Scattered diagram showing no correlation between platelet count and creatinine

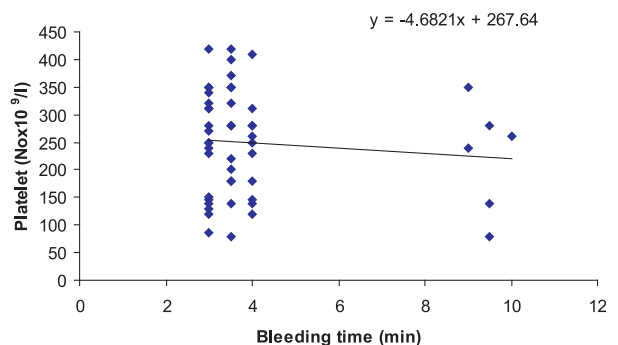


Fig-2: Showing no correlation between platelet count and bleeding time.

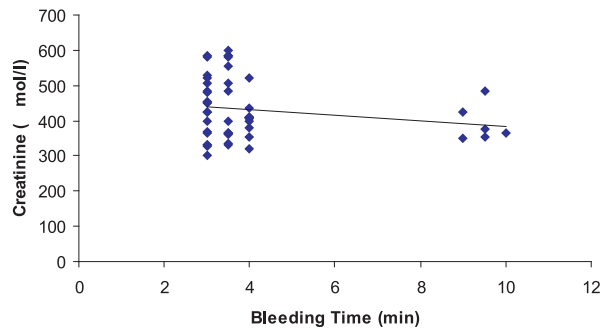


Fig-3 : Scattered diagram showing no correlation between bleeding time and creatinine.

Discussion:

The frequency of thrombocytopenia in chronic kidney disease patients is controversial⁹. Platelet count is highly variable in chronic kidney disease patients, largely depends on the etiopathogenesis of the disease. The greatest role in the development of haemostatic disturbances in patients with chronic kidney disease is ascribed to the Platelet¹⁰. Bleeding tendency in chronic kidney disease patients not only depend on platelet count mostly depends on the platelet functional status. Patients with advanced chronic kidney disease suffer from complex haemostatic disorders. Uraemic patients show a bleeding diathesis that mainly due to abnormalities of primary haemostasis; in particular platelet dysfunction and impaired platelet vessel wall interaction¹¹.

In present study, out of 50 predialytic chronic kidney disease patients, thrombocytopenia was found in 38% cases ($<150 \times 10^9/L$). This finding contradict with that of Akinsola et al, Talwar et al and Aboo et al, where they found thrombocytopenia in 7.6%, 52% and 29.3% cases respectively^{12,13,14}. Small variation may be possible due to difference in the method of determination of platelet count. But this contradiction justified that platelet count in chronic kidney disease patients is highly variable.

Out of 50 chronic kidney disease patients, bleeding time was found prolonged (>9 min) in 6(12%) cases, among them, thrombocytopenia was found in 4(8%) cases. This findings are in consistent with that of Akinsola et al, who found prolonged bleeding time in 25.6% cases where 7.6% cases were thrombocytopenic¹².

There was no correlation observed between platelet count and serum creatinine. No correlation between platelet count and bleeding time. No significant correlation also observed between bleeding time and serum creatinine (Figure-1,2,3). This findings are consistent with that of Akinsola et al who found no correlation between platelet count and bleeding time and between bleeding time and serum creatinine¹².

Conclusion:

Therefore, it is concluded that though determination of total platelet count is the first line screening test for platelet haemostatic disorder, it is not a absolute reliable parameter as it is highly variable in chronic kidney disease patients. It is also concluded that bleeding time is the best platelet function test that reflects both qualitative and quantitative platelet haemostatic abnormalities and should considered first line screening test for bleeding diathesis associated with chronic kidney disease patients in developing countries.

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