

Study of Effects of Acute Renal Failure on Haemostasis

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ABSTRACT

Acute renal failure (ARF) is an abrupt or rapid loss of renal function due to damage to the kidneys. It results in retention of nitrogenous (urea and creatinine) and non-nitrogenous waste products that are normally excreted by the kidney. This can be with or without a decrement in urine output. Several studies have reported haemostatic abnormalities, both in terms of bleeding and coagulation disturbances. The aim of this study is to observe the role of haemostasis and coagulopathy in acute renal failure as it they are an important determinant of morbidity and mortality. From the analysis of more recent literature data, it is evident that coagulation abnormalities are a consequence of uremia, renal artery damage, and activation of Von willibrand factor, factor VIII and beta-thromboglobulin. Ninety patients, both males and females were included in the study. The demographic information Name, Age, Sex and address was noted. The history of present illness was obtained and they were examined for positive signs. Routine laboratory investigations CBC (Haemoglobin, TLC, DLC and platelet count) were carried out on sysmex KX21 and verified by peripheral smear examination. Serum urea and creatinine levels were obtained to establish ARF and see the degree of renal insult. Following tests were carried out to establish coagulopathy. Platelet count, Bleeding Time, Prothrombin time, Activated partial thromboplastin time and Fibrinogen levels. Out of 90 patients bleeding time was raised in 30%, raised PT in 45%, raised APTT in 46% and raised fibrinogen levels in 18%.

Key words: Haemostasis, renal failure, cvoagulopathy

INTRODUCTION

Acute renal failure (ARF) is an abrupt or rapid loss of renal function due to damage to the kidneys. It results in retention of nitrogenous (urea and creatinine) and non-nitrogenous waste products that are normally excreted by the kidney¹. Renal disease is assumed to possess risk for thrombotic complications and bleeding diathesis which are associated with a high morbidity. Laboratory tests are useful for assessing the etiology of ARF as well as establishing the level of injury/insult helping in proper management and prompt treatment of the patient^{3,4}.

In acute renal failure of any etiology, the mortality rate associated with haemorrhagic propensity ranges from 3-to15%^{5,6}. Analysis of recent literature data, shows that coagulation abnormalities are a consequence of uremia, renal artery damage, and Von willibrand factor with factor VIII and beta-thromboglobulin activation. In Thrombotic thrombocytopenic purpura, Haemolytic uraemic syndrome and Disseminated intravascular coagulation additional mechanisms play part and lead to coagulopathy^{2,7}. Bleeding disorders are extremely important determinants of morbidity and mortality^{8,9}.

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MATERIALS AND METHODS

A total number of 90 patients were included in the present study.

- Primary criteria of inclusion was the presence of acute renal failure based on a combination of history of acute renal shut down and raised serum urea and creatinine .
- The patients with history of congenital coagulation disorders and chronic renal failure were excluded.

Laboratory investigations

- Platelet count
- Plasma prothrombin time.
- Activated partial thromboplastin time
- Plasma fibrinogen level

Platelet counts were performed on Sysmex KX 21 blood auto analyzer. Low platelet counts were confirmed manually using improved neuber chamber. Prothrombin time, activated partial thromboplastin time and fibrinogen levels were measured manually by standard methods at 37 degree in water bath control plasma were also run in the same way. All the tests were done in duplicate and mean of the values was recorded.

Data was entered on and processed using statistical program for social sciences (SPSS) version10. T –test was applied as test of significance.

RESULTS

A total of 90 adult patients were included in the study .The mean age of patients with acute renal failure was 36.54 ± 10.51 with range of 20-65 years. In the present study 63(70%) were females and 27(30%) were males. These patients presented with different diseases. In this study 28(26.7%) patients were of Gastroenteritis, 11(9.5%) were of Septicaemia, 10 (9%) were of HELLP syndrome, 4(4.4%) were of hemolytic uremic syndrome (HUS), 4(4.4%) were of intra uterine death (IUD), 19(30.2%) were of Pregnancy induced renal failure (other than those mentioned before).In 14(10.5%) of cases were consequence of various causes e.g. trauma, gunshot wound, shock and snakebite. All of these were associated with DIC (Table 3) $12,500 \pm 63000/\text{mm}^3$ which falls in the normal range of $150,000\text{--}4000,000/\text{mm}^3$. PT mean value was 16.57 ± 5.29 second with range of 11-30 seconds. APTT mean value was 39.05 ± 9.95 second .Plasma fibrinogen levels showed a wide range of 1.10-3.66g/l with the mean value of 2.38 ± 1.30 g/l.

Disturbance in coagulation

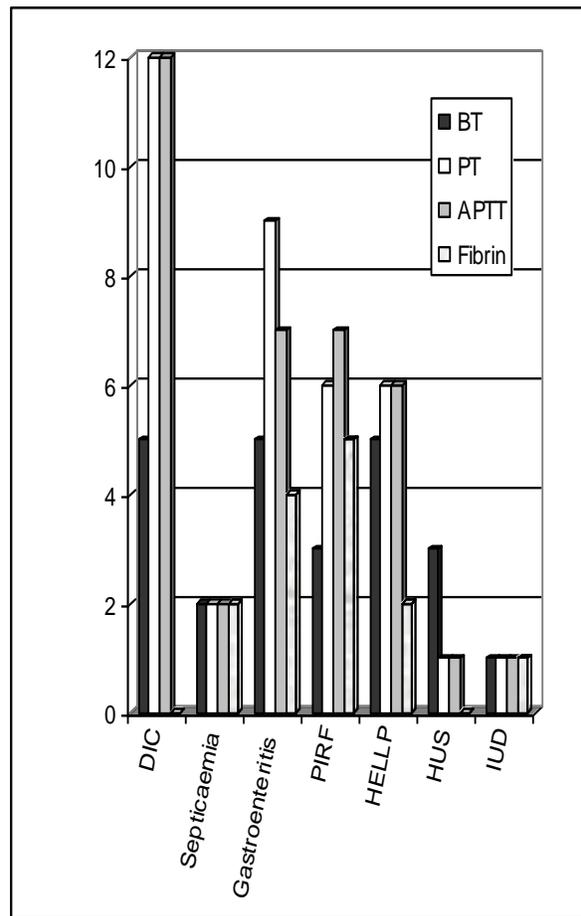


Table 3: Diseases associated with acute renal failure

Diseases associated with ARF	n=
DIC	14 (10.5%)
Gastrentritis	28 (26.7%)
Septicaemia	11 (9.5%)
Pregnancy induced renal failure	19 (30.2%)
HELLP	10 (9%)
HUS	4 (4.4%)
IUD	4 (4.4%)
Total	90

Table 4: Disturbance in coagulation profile associated with acute renal failure

Diseases associated with ARF	=n	Raised BT	Raised PT	Raised APTT	Raised Fibrinogen level
Gastrentritis	28	05(14%)	09(30.4%)	07(28%)	04(7%)
Septicaemia	11	02(17%)	02(17%)	02(17%)	02(17%)
Pregnancy induced renal failure	19	03(15%)	06(31%)	07(36%)	05(26 %)
HELLP	10	05(50%)	06(60%)	06(60%)	02(20%)
HUS	4	03(75%)	01(25%)	01(25%)	0
IUD	4	01(25%)	01(25%)	01(25%)	01(25%)
DIC	14	05(26%)	12(85%)	12(85%)	0
Total	90	24(30%)	37(46%)	36(45%)	14(18%)

CONCLUSION

In this study following conclusions were made

- PT and APPT are the key test for determining coagulopathy in patients of acute renal failure irrespective to the cause of ARF.
- Pregnancy induced renal failure comprises a large and important
- Haemostatic disturbances in acute renal failure are significant as they can enhance the rate of morbidity and mortality in patients of acute renal failure.

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