Study of Acute Renal Failure in Anemic Patients at Vidharbha Region

Gangaram Bhadarge[1], Pradip Jain[2], Neha Bhatt[3], Archana Dhok[4]

[1]Tutor Dept. of Biochemistry Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Sawangi Meghe Wardha, [2]Professor and HOD Dept. of Biochemistry Datta Meghe Medical College, Nagpur, [3]Assistant Professor Dept. of Pathology Datta Meghe Medical College, Nagpur, [4]Professor and HOD Dept. of Biochemistry Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Sawangi Meghe Wardha

Abstract

Introduction: Anemia is commonly characterised as haemoglobin in men of less than 13.0 g/dL and in premenopausal women of less than 12.0 g/dL. Chronic kidney disease (CKD) anaemia is a type of normocytic normochromic hypo-proliferative anaemia. It is also associated with poor results in CKD and raises mortality among other CKD complications. After a greater than 50 percent loss of kidney function, the disease normally begins to progress, generally when the glomerular filtration rate (GFR) falls to less than 60 mL/min. When chronic kidney disease (CKD) progresses, the seriousness of anaemia continues to worsen. Erythropoietin deficiency in renal development and the incidence of anaemia do not always appear to correlate with renal impairment severity.

Material and Methods: Total 60 patients of iron deficiency anemia were taken for the study which contains 55% (33) male patients and 45% (27) of female patients. This is a cross-sectional investigation wherein cases were out-patients. Patients went to the Directly Observed Treatment Short-course focus in the Dept. of General Medicine. The samples were used to analyze serum urea, Creatinine and Hematocrit value.

Result: The level of urea in male (260.69±38.25) is non-significantly high than in female (241.0±34.16) patients.The hematocrit value was significantly low in both men and women (p=0.0006) indicating no difference irrespective of gender. However, it was discovered that the mean value of females (20.14±2.63) was higher than that of males (17.90 ±2.16).

Conclusion: Our study concluded that hematocrit value had a strong association with acute renal failure irrespective of the gender and the severity of the anemia is independent of the maximum or minimum value of the creatinine or urea.

***Key Words**: Anemia, Hematocrit, Acute Renal Failure, CKD and GFR.*

Introduction

Anemia is commonly characterised as haemoglobin in men of less than 13.0 g/dL and in premenopausal women of less than 12.0 g/dL.[1]Chronic kidney disease (CKD) anaemia is a type of normocytic normochromic hypoproliferative anaemia. It is also associated with poor CKD outcomes and increased mortality, among other complications of CKD.[2]

After a greater than 50 percent loss of kidney function, the disease normally begins to progress, generally when the glomerular filtration rate (GFR) falls to less than 60 mL/min. When chronic kidney disease (CKD) progresses, the seriousness of anaemia

Corresponding author:
Dr. Neha Bhatt
Assistant Professor Dept. of Pathology
Datta Meghe Medical College, Shalinitai Meghe Hospital and Research Centre Nagpur.
Email.id. nehabhatt1381@gmail.com
Mob No.09595912224

continues to worsen. Erythropoietin deficiency in renal development and the severity of anaemia do not always appear to correlate with the severity of the disease. At least 90% of patients who end up on dialysis will inevitably experience chronic disease anaemia.[3]

Renal failure or illness is called the inability of the kidney to expel the toxic material and metabolic waste from the blood. There are two forms of renal failure: acute and chronic renal failure. Acute renal failure is a condition with a high level of urea and creatinine due to an unexpected decline in kidney function resulting in a substantial decrease in filtration of glomerulus.[4]

Laboratory analysis showing elevated levels of serum creatinine or Blood Urea Nitrogen (BUN) is the diagnostic normal.[5]

Acute renal failure (ARF) is divided into causes of kidney damage, including pre-renal, intrinsic, and post-renal, for further understanding. With repeated signs of vomiting, diarrhoea, inadequate fluid intake, fever, use of diuretics and heart failure, pre-renal ARF is the reduction of blood supply to the kidney. By causing damage to kidney tubules, interstitium and glomeruli, intrinsic ARF occurs. Post renal ARF is due to one or both of the urinary tracts being blocked. ARF is a threatening health issue for surgical patients, with a high mortality rate depending on disease status.[6]

Normocytic, normochromic, and hypo proliferative are usually anaemia in CKD. The discovery of a factor developed in the renal cortex and responsible for stimulating erythropoiesis, later known as erythropoietin (EPO), led to the belief that the key cause of anaemia in patients with CKD may be its deficiency.[7]

Chronic kidney disease (CKD): It is regarded as a major health concern that affects about 13% of the population of the United States. There will continue to be an increase in the number of prevalent CKD patients, reflecting the growing elderly population and the increasing number of patients with diabetes and hypertension. If the number of CKD cases grows, the treatment of complex medical conditions specific to patients with permanent renal disease would be handled by primary care practitioners. The nephrologist seldom handles the medical needs of CKD patients before renal replacement therapy is needed, as is well established in the literature. CKD staging will be described in this chapter and five risks associated with CKD will be discussed: anaemia, hyperlipidemia, diet, osteodystrophy, and cardiovascular risk.[8]

CKD is characterised as the presence of kidney injury, manifested by excessive excretion of albumin or decreased renal function, quantified by glomerular filtration rate (GFR) measured or calculated, which persists for more than three months.[9]

Although creatinine clearances can be calculated from urine creatinine concentration measured A more realistic solution in the office is to measure GFR (estimated GFR or eGFR) from the serum creatinine concentration in a 24 hour urine sample and a concomitant serum creatinine concentration, using either the Cockcroft-Gault or the Alteration of Diet in Renal Disease (MDRD) Research estimation equations.[10]

Materials and Methods

Study area:

Total 60 patients of iron deficiency anemia were taken for the study which contains 55% (33) male patients and 45% (27) of female patients. This is a cross-sectional investigation wherein cases were out-patients. The present study was conducted in the Dept. of General Medicine in collaboration with Dept. of Biochemistry, Datta Meghe Medical College and Shalinitai Meghe Hospital and Research Center, Nagpur and collaboration with Jawaharlal Nehru Medical College (Datta Meghe Institute of Medical Sciences Deemed to be University), Sawangi, Wardha, Maharashtra.

Sample Collection:

5ml of blood sample were taken from each patient and divided into EDTA and Plain Vial. EDTA sample were used for the estimation of Hematocrit and the plain sample were used to estimate the level of serum creatinine and serum urea

Inclusion Criteria:

patients with proven acute renal insufficiency.
endocrinopathy,
anemic patients
hepatosplenomegaly

Exclusion Criteria: No patient had a blood transfusion or dialysis.

Biochemical Analysis:

Estimation of urea and creatinine was done by using by Beckman Coulter AU480.

Results

Table 1: Gender wise distribution of patient with acute renal failure

Gender	Number of patients	Percentage
Male	33	55
Female	27	45

Table 1 shows gender wise group distribution of patients with acute renal disease, 55% male and 45% female patients were included in this study.

Table 2: Relation of creatinine and urea among male and female with ARD

Parameters	Male(Mean±SD)	Female (Mean±SD)	P-value
Creatinine (mg/dl)	6.10±1.56	5.89 ±1.54	P=0.6038
Urea (mg/dl)	260.69±38.25	241.0±34.16	P=0.0419

Table 2 shows the average levels of creatinine and urea in patients with acute renal failure. The level of creatinine was 6.10±1.56 in male patients as compare to female patients i.e. 5.89±1.54. Level of creatinine is non-significantly increased in male than in female. The level of urea in male (260.69±38.25) is non-significantly high than in female (241.0±34.16) patients.

Table 3: Relationship between hematocrit value among men and women with acute renal disease

Sex	Mean±SD	P-Value
Male	17.90 ±2.16	P = 0.0006
Female	20.14±2.63	P = 0.0006

Table 3 shows The correlation between the importance of hematocrit in males and females with acute renal disease. In acute renal failure (p=0.0006), the hematocrit value was considerably low, suggesting a close interaction between them. In both men and women, the hematocrit value was slightly low (p=0.0006), suggesting little distinction, regardless of sex. Nevertheless, the mean value of females was found to be (20.14±2.63) It was better than the men's (17.90 ±2.16)

Discussion

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Acute renal failure or disease (ARF) is a complex condition that induces a sudden decline in kidney function due to the rapid increase in serum creatinine and urea from multiple sources[11]. The prevalence of incidence of acute renal failure rose more than 10 years ago, accounting for 20% of hospital admissions, most of which are seriously ill.[12.] The risks of acute renal failure are as follows: progression to progressive renal dysfunction, coronary disease, long patient life and elevated hospital mortality.[13] Recognition of clinical investigation of acute renal disease, however, has decreased the mortality rate and mortality will occur only when the condition is severe for dialysis-requiring acute renal failure.[14]

91 % of anaemic patients with acute renal failure due to elevated urea levels and the presence of oliguria were observed in several previous studies. 53 of the 56 patients with moderate anaemia (hematocrit<35 percent) were hospitalised and 433 of those with hematocrit below 30 percent were hospitalised.[15] The same result was found in another study in which the majority of patients (87.5 percent) with acute renal failure had less than 35 percent hematocrit and less than 30 percent hematocrit in just 12.5 percent of patients. These results are not consistent with existing findings in which all our patients (100%) with acute renal failure have extreme hematocrit anaemia below 30%, with just 1.8% of patients having hematocrit hematocrit. Extreme anaemia can be caused primarily by a complication of renal insufficiency due to reduced development of erythropoietin in the kidney.[16] The anaemic disease leaves patients vulnerable to oxidative stress and kidney hypoxia. Numerous anaemic patients also have undetectable kidney failure that is predisposed to renal insults.[17]

Conclusion

Our research concluded that, regardless of gender, hematocrit value was closely correlated with acute renal failure and the severity of the anaemia was independently of the maximum or minimum value of creatinine or urea. Women with acute renal failure were also shown to have a higher hematocrit value than men as a result of a decreased male testosterone level. This research has taught us that acute renal failure should be examined for any given serious anaemia.

Extreme anaemia can be linked with other disorders of acute renal failure, such as male infertility. Another insight is that the cause of a high degree of hematocrit value in males is testosterone than females. More precise information is that the low value of female hematocrit is not correlated with their menstrual menstruation.

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