FREQUENCY OF BLOOD GROUPS AMONG A SAMPLE OF PATIENTS WITH RENAL FAILURE AT ROYAL MEDICAL SERVICES

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Abstract

Introduction: Renal failure underlies various etiologies among which are infectious and autoimmune origins which may link directly or indirectly with blood groups.

Objectives: To determine the frequency of blood groups among a sample of patients with renal failure at Royal medical services, and to investigate the association of renal function tests with blood groups.

Methodology: A retrospective study design was followed to collect data from files of patients with renal failure. Files of renal patients was included if blood groups were written and kidney function tests were provided. A data sheet was made for each patient that included relevant information about renal patients. A total of 197 files were reviewed.

Data were entered into excel sheet to make raw data for all patients. Data analysis was conducted using SPSS V20. Data were presented as frequencies and percentages. The relationships between blood groups and renal function tests were investigated using T-independent test. Significance was considered at alpha level ≤ 0.05.

Results: the most prevalent blood group among renal failure patients was blood group A (45.7%), blood group O (30.4%), blood group B (17.3%), and blood group AB (6.6%). When biochemical tests including renal function tests were compared between renal failure patients according their blood groups, results showed slight variations, which were not statistically

significant (p>0.05), except for potassium level which was observed in its maximal level among patients with blood group A, and its minimal levels were observed among patients with blood group AB (p=0.032).

Conclusions: The present study showed that renal failure patients exhibited more frequency with blood groups A and O and agreed with other studies in which blood group AB is the least associated blood group with renal failure. The level of potassium was highest in patients with blood group A and lowest in patients with blood group AB and this was statistically significant (p=0.032).

Keywords: Renal failure, blood groups, blood group A, blood group B, blood group AB, blood group O

Introduction

Renal Failure usually occurs as a result of lacking the function of kidney normal function as either partly or completely. This is a severe condition since water, waste and toxic materials are accumulated in the body (Kathuria, 2008).

Therapeutic options for renal failure vary according to the severity of disease and renal replacement therapy with dialysis or transplantation may be required (Agodaoa and Eggers, 1995). According to the study of Martin, MacDonald, and Moore (2015), chronic renal failure is treated based on two therapeutic options in which the first option is the conservative management of renal insufficiency, while the second approach is by renal replacement therapy with dialysis or transplantation. In case of hypertension has been encountered with renal failure patients, angiotensin-converting enzyme inhibitors and angiotensin receptor blocker drugs are of potential use (Martin, MacDonald, and Moore, 2015).

Attempts have been made to explore a possible association between blood groups and other diseases which generated such an association with various diseases including gastric cancer, salivary gland tumors, duodenal ulcer, colorectal cancer, thyroid disorders, ovarian tumors, small cell carcinoma of lung and coronary heart disease (Waseem et al., 2012).

Hamed et al (1979) conducted a study to compare the frequency of ABO blood group distribution between renal patients and normal population. Study findings pointed to significantly increased renal patients in B and O blood groups compared with normal populations (p<0.01).

Hassoon et al (2013) conducted a study to investigate the relationship between hemodialysis patients and ABO blood grouping. Results showed that 55% of patients had blood group O, 25% blood group B, 10% blood group A, and 10% blood group AB.

Study objectives
　　　　The present study was conducted to achieve the following objectives:
1-　　　To determine the frequency of blood groups among a sample of patients with renal failure at Royal Medical Services, and
2-　　　To investigate the association of renal function tests with blood groups.

Methodology
　　　　We employed a retrospective study design to collect data from files of patients with renal failure. A total of 250 files of renal patients were reviewed, and 197 files were selected. Files of renal patients were included if blood groups were mentioned in files and if kidney function tests were provided. A data sheet was made for each patient that included relevant information about renal patients. Biochemical data included hematocrit (HCT), mean cell volume (MCV), ferritin, blood urea nitrogen (BUN), creatinine, phosphorous, calcium, albumin, sodium, and potassium.
　　　　Data were entered into excel sheet to make raw data for all patients. Data analysis were conducted using SPSS V20. Data were presented as frequencies and percentages. The relationships between blood groups and renal function tests were investigated using T-independent test. Significance between variables was considered at alpha level ≤ 0.05.

Results
Frequency of blood groups among renal patients
　　　　Table 1 summarizes the frequency of blood groups among participants with renal failure. The most prevalent blood group among renal patients was blood group A (45.7%), followed by blood group O (30.4%), then blood group B (17.3%), and the least prevalent blood group was AB (6.6%).

Table 1: Frequency of blood groups among renal patients

Blood group	Frequency	Percentage
A	90	45.7%
B	34	17.3%
AB	13	6.6%
O	60	30.4%
Total	197	100%

The levels of laboratory findings of renal patients by blood groups
　　　　As shown in table 2, the level of HCT was the highest among renal patients with A blood group (31.22+6.12), followed by O blood group (29.07+7.28), while approximate levels were observed among patients B and AB blood groups. The total level of HCT was 29.95+7.4. The total level of MCV was 84.40+16, and the highest level was 86.03+10.65 among renal

patients with A blood group, followed by patients with O blood group. The least level of MCV was shown among renal patients with AB blood group (78.65$\pm$24.81). Ferritin level was the highest among renal patients with blood group O, and the lowest level was among renal patients with B blood group. The level of BUN was the highest among B blood group and the lowest level of BUN was among renal patients with AB blood group. Creatinine level was at highest level among renal patients with B blood group, and the lowest level was among renal patients with O blood group. The phosphorous level was the highest among renal patients with AB blood group, and its lowest level was among those with O blood group. Calcium level peak was observed among A blood group renal patients, while renal patients with other blood groups had approximate calcium levels. Albumin level was at peak B blood group renal patients, while its minimal level was at O blood group renal patients. The levels of sodium and potassium were almost the same among all patients.

Table 2: The levels of laboratory findings of renal patients by blood groups

Variable	A (M$\pm$ SD)	B (M$\pm$ SD)	AB (M$\pm$ SD)	O (M$\pm$ SD)	Total (M$\pm$ SD)
HCT	31.22$\pm$6.12	28.57$\pm$9.31	28.85$\pm$9.46	29.07$\pm$7.28	29.95$\pm$7.4
MCV	86.03$\pm$10.65	82.014$\pm$21.73	78.65$\pm$24.81	84.50$\pm$16.62	84.40$\pm$16
Ferritin	347$\pm$349.31	186.33$\pm$203.61	470$\pm$53.03	568.2$\pm$442.1	419.58$\pm$340.96
BUN	62.38$\pm$21.89	67.70$\pm$17.16	57.25$\pm$25.5	61.22$\pm$19.1	62.58$\pm$20.51
Creatinine	8.99$\pm$2.75	9.71$\pm$2.86	9.07$\pm$4.14	8.58$\pm$3.15	8.98$\pm$3
phosphorous	4.66$\pm$1.72	4.72$\pm$1.26	5.05$\pm$2.04	4.53$\pm$1.90	4.65$\pm$1.71
Calcium	9.04$\pm$1.024	8.76$\pm$1.42	8.69$\pm$0.95	8.77$\pm$0.83	8.9$\pm$0.98
Albumin	38.76$\pm$6.09	40.28$\pm$4.27	36.89$\pm$5.75	38.44$\pm$5.96	38.79$\pm$5.77
Sodium	139.21$\pm$5.45	139.39$\pm$4.27	139.17$\pm$2.03	139.81$\pm$3.48	139.42$\pm$4.50
Potassium	4.66$\pm$0.83	4.62$\pm$0.76	4.05$\pm$1.22	4.58$\pm$0.83	4.58$\pm$0.85

The relationships between levels of laboratory findings of renal patients and blood groups (T-test independent)

As it can be shown in table 3, using T-test independent, we tried to explore any possible association between levels of laboratory findings of renal patients and blood groups. No significant associations were found between all variables and blood groups of patients with renal failure (p>0.05 for all variables), except the level of potassium which its levels showed significant variations between blood groups A and AB (p=0.032).

Table 3: The relationships between levels of laboratory findings of renal patients and blood groups (T-test independent)

Variable	A-B	A-AB	A-O	B-AB	B-O	AB-O
HCT	0.131	0.396	0.062	0.926	0.788	0.926
MCV	0.308	0.309	0.529	0.650	0.535	0.298
Ferritin	0.634	0.705	0.561	0.163	0.218	0.780
BUN	0.181	0.519	0.746	0.210	0.117	0.537
Creatinine	0.525	0.950	0.426	0.567	0.10	0.643
phosphorous	0.867	0.580	0.676	0.635	0.592	0.469
Calcium	0.245	0.248	0.084	0.824	0.984	0.762
Albumin	0.256	0.387	0.776	0.134	0.130	0.473
Sodium	0.859	0.977	0.438	0.821	0.619	0.541
Potassium	0.818	0.032	0.587	0.161	0.826	0.184

Discussion

The present study was conducted to satisfy two objectives: the frequency of blood groups among renal failure patients and if there is any possible association between blood groups and some selected biochemical data with putting focus on renal function tests.

Our data showed that blood group A was the most prevalent blood group among renal failure patients (45.7%), followed blood group O (30.4%). Little studies across the literature have investigated this topic. The study of Hassoon et al (2013) showed a different pattern of frequency of blood groups among renal failure patients in which blood group O was more prevalent, followed by blood group B. Also the study of Hamed et al (1979) indicated that blood groups O and B were more associated with renal failure patients. In all studies we reviewed and in addition to our study, blood group AB was the least associated blood group with renal failure.

The results of the present study demonstrated that each of the biochemical tests under study varied between blood groups, but insignificantly except the level of potassium which varied significantly between blood groups A and AB (p=0.032).

Up to the best knowledge of the researchers in this study, no previous studies have been identified that investigated the variations of biochemical tests by blood groups to compare our findings with, and accordingly this study presents a new piece of knowledge that may participate in future studies.

Conclusion

The present study showed that renal failure patients exhibited more frequency with blood groups A and O and agreed with other studies in which blood group AB is the least associated blood group with renal failure. The level of potassium was highest in patients with blood group A and lowest in patients with blood group AB and this was statistically significant (p=0.032).

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