ORIGINAL ARTICLE

To Determine the Frequency of Anemia in Hospitalized patients with Heart Failure and to compare the Outcome between Anemic versus Non-Anemic patients

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ABSTRACT

Background: Anemia is particularly common among cardiac patients and is associated with poor outcome. Most of the studies, estimating its prevalence and effect on the outcome contain conflicting results partly owing to population difference. Yet no such study was available in local population**.**
Aims: To determine the frequency of anemia in hospitalized patients with heart failure and to compare the outcome between anemic versus non-anemic patients.
Place and duration of study: The study was conducted in Department of Medicine Sheikh Zayad Hospital Lahore from September 2017 to June 2018.
Method: It was a descriptive case series study. 260 hospitalized patients with heart failure were taken to determine the frequency of anemia among them and then compare the outcome of anemia in term of their mean hospital stay, readmission and mortality. Statistical analysis was done on SPSS version 12.
Results: The mean age of the patients was 59.59±11.93 years and 53.8% of the patients were male. Mean hemoglobin of the patients was 11.96±2.23g/dl and 56.2% were anemic. The mean ejection fraction of the patients was 33.26±4.46% and was lower among anemics (31.88±4.77 vs 35.03±3.27; p=0.000) as compare to non-anemics. The mean length of hospital stay was 6.93±4.62 days and was longer among anemic (7.56±4.87 vs 6.12±4.15; p= .012). 7.7% (85% anemics & 15% non-anemics) died within 6 months of first admission into hospital. 24.6% (52% anemics & 12% non-anemics) required admission.
Conclusion: Anemia is highly prevalent (56.2%) among heart failure patients in Pakistani population and is independently (excluding age, gender, BMI) associated with poor cardiac function, increased length of stay, readmission rate and mortality.
Key words: Anemia, Heart Failure, Hospital Stay, Readmission, Mortality.

INTRODUCTION

Heart failure is clinical syndrome that occurs in patients who had abnormality of cardiac structure and function because of an inherited or acquired abnormality to develop symptoms like dyspnea and fatigue that lead to frequent hospitalization, a poor quality of life and reduce life expectancy. Heart failure is a worldwide problem involving more than 20 million people. The overall prevalence of heart failure in the adult population in developed countries is 2%. It is being rising with age and affects 6-10% of population of age more than 65[1].

Anemia is common in patients with heart failure and it is a multidimensional and multifactorial problem. The appreciation is being increased that anemia is really significant in pathophysiology, treatment and prognosis of heart failure. Long before it was considered a downstream complication of heart failure, but now anemia is emerging as an important and potentially modifiable factor in overall treatment strategy for heart failure patients. The anemia prevalence was reported to be 38% in patients hospitalized with heart failure[2]. Anemia is associated with increased risk of mortality31.8% versus 11.17% in non-anemics and readmission in anemic patients is 67.8% versus 38% in non-anemic patients with heart failure and mean hospital stay 7.5 (significant deviation 3.4) days in anemic versus 4.9 (4.2-5.6) days in non-anemic patients with heart failure[3,4,5,6,7]

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Globally, anemia affects 1.62 billion people (95% CI: 1.50–1.74 billion), which corresponds to 24.8% of the population (95% CI: 22.9–26.7%)[8]. It was mostly a problem of the poor socio-economic class especially in developing countries. Unfortunately, most of the studies regarding anemia and its impact in congestive heart failure have been carried out in western society. Data available in Pakistan is very limited but expected prevalence is high because majority of population is undernourished due to which anemia is more common in our society. That was the reason to carry out this study, so I would be able to see the frequency of anemia with heart failure patients and its outcome in our population to generate local magnitudes.
Inclusion Criteria: All patients of either gender age 18 and above with heart failure diagnosed on echocardiography with ejection fraction less than 40%.
Exclusion Criteria: All patients already diagnosed with any malignant disease, anemia cause by upper and lower GI bleeding and Patients with congenital heart diseases like atrial septal defect and ventricular septal defect.

MATERIAL AND METHOD

The study was conducted in Department of Medicine Shaikh Zayed Hospital Lahore from September 2017 to June 2018. It was Descriptive Case Series. 260 diagnosed patients of cardiac failure admitted in medicine ward fulfilling the inclusion criteria were included. Demographic characteristics including name, age, gender, weight, BMI, address were noted.

Statistical Analysis: SPSS version 12 was used for analysis of the collected data. The quantitative variables like age, hemoglobin level, and mean hospital stay have been presented by mean ± SD. The qualitative variables like gender, readmission and mortality have been presented by calculating frequency and percentage. Mean hospital stay has been tested by T-test. Readmission, mortality have been compared in both groups i.e. anemic versus non-anemic by Chi-Square test. Statistically significant p-value was considered as ≤0.05. Data has been stratified for age, gender and BMI to address effect modifiers.

RESULTS

We took 260 patients in this descriptive case series study. The age of the patients was between 26- 95 years. when analyzed in term of gender 53.8% of the patients were male. The height of the patients ranged from 2.19 to 3.49 meters with a mean height of 2.80±0.37 meters. The weight of the participants ranged from 52 kg to 120 kg with a mean of 74.9154±14.49 kg while the calculated BMI ranged from 20.08 kg/m2 to 39.13 kg/m2 with a mean of 26.45±2.79 Kg/m2. Hemoglobin of the patient ranged from 6.50 g/dl to 17.40 g/dl with a mean of 11.96±2.23 g/dl. More than half (56.2%) were anemic (Table1& 2).

The ejection fraction of the patients ranged from 20% to 40% with a mean of 33.26±4.46. Mean ejection fraction was lower among anemics (31.88±4.77 vs. 35.03±3.27; *p*=0.000) as compared to non-anemics and this difference was statistically significant as shown in table 3.

When compared anemics and non-anemics in terms of age, gender and BMI, it revealed no significant (*p*>0.05) difference between the two groups. The length of hospital stay ranged from 1 to 30 days with a mean of 6.93±4.62 days. It varied between groups beings 7.56±4.87 days among anemic and 6.12±4.15 days among non-anemics and this difference was statistically significant (*p*=.012) as shown in table 4

Regarding mortality, 7.7% (85% anemics & 15% non-anemic) died within 6 months of first admission into the hospital, The rate of morality was higher among anemics as compared to non-anemics (11.64% vs. 2.63%) and this difference was again statistically significant (*p*=.007) a shown in table 5.

24.6% (52% anemics & 12% non-anemics) patients required re-admission. The re-admission rate was higher among anemics as compared to non-anemics (35.62% vs. 10.53%) and this difference was statistically significant (*p*=.000) as shown in table 6

Table 1: Descriptive Statistics for Hemoglobin Level

	n	Min	Max.	Mean	Std/ Deviation
Haemoglobin (g.dl)	260	6.50	17.40	11.9562	2.22626
Vaid N (list wise)	260				

Table 2: Frequency Table for Anemia Status

Valid	Frequency	%age	Valid %	Cumulative %
Yes	146	56.2	56.2	56.2
No	114	43.8	43.8	100.0
Total	260	100.0	100.0	

Table 3: Ejection Fraction among anemic and non-anemics

Anemia status	N	Mean	Std. Deviation	Std. Error Mean	*P* value
Yes	146	31.8788	4.77186	.39492	.000
No	114	35.0351	3.27482	.30671	
Total	260	100.0	100.0		

Table 4: Length of Hospital Stay among anemic and non-anemics

Anemia status	N	Mean	Std. Deviation	Std. Error Mean	*P* value
Yes	146	7.5616	4.87495	.40345	.012
No	114	6.1228	4.15441	.38910	

Table 5: Mortality * Anemia Status Cross tabulation

			Anemia Status			
			Yes	No	Total	*P* value
Mortality	Yes	Count	17	3	20	.007
		% within Mortality	85.0%	15.0%	100.0%	
		% within Anemia Status	11.6%	2.6%	7.7%	
	No	Count	129	111	240	
		% within Mortality	53.8%	46.3%	100.0%	
		% within Anemia Status	88.4%	97.4%	92.3%	
Total		Count	146	114	260	
		% within Mortality	56.2%	43.8%	100.0%	
		% within Anemia Status	100.0%	100.0%	100.0%	

Table 6: Re-admission Required * Anemia Status Cross tabulation

			Anemia Status			
			Yes	No	Total	*P* value
Re-admission required	Yes	Count	52	12	64	.000
		% within Re-admission Required	81.3%	18.8%	100.0%	
		% within Anemia Status	35.6%	10.5%	24.6%	
	No	Count	94	102	196	
		% within Re-admission Required	48.0%	52.0%	100.0%	
		% within Anemia Status	64.4%	89.5%	75.4%	
Total		Count	146	114	260	
		% within Re-admission Required	56.2%	43.8%	100.0%	
		% within Anemia Status	100.0%	100.0%	100.0%	

DISCUSSION

During the last decade, anemia in patients with chronic heart failure(CHF) has obtained growing consideration. Insistent anemia is notorious to induce hemodynamic alterations that ultimately may lead to left ventricular hypertrophy, intolerance to exercise, and heart failure. Accordingly, anemia may exacerbate pre-existing cardiac disease in patients with CHF and can distress the disease outcome. Anemia has been allied with deterioration and abridged functional status in patients with CHF. Still, it has been recognized as an independent threat for morbidity and mortality in such patients[9].

However, in spite of the growing evidence that anemia adds to worse disease outcome; there is only limited data available on this association and whatever is available is conflicting due to potential differences among various populations as summarized in. It can be appreciated that anemia is a frequent finding in patients with heart failure and is associated with poor cardiac function and death. It can also be concluded that there is a great degree of disparity in frequency (10% among Polish[10] to 48% among Brazilians[11], cardiac function (EF%; 24±9 among Americans[12] to 40±8 among Polish[10] and mortality (19% among Brazilians[13] to 56% among French[14].

The purpose of the current study was therefore to determine the anemia prevalence in Pakistani population and to see its effect on the outcome. The overall prevalence of anemia with heart failure patients in Pakistani population has been found to be 56.2% which is quite high as compared to other populations; a possible explanation could be high prevalence (39%) of iron deficiency anemia in Pakistani population as demonstrated by Akhtar et al. in 2013[13].

Ejection fraction was found to be significantly lower among anemics as compared to non-anemics (31.88±4.77 vs. 35.03±3.27; *p*=0.000) which correlates well with the other authors mentioned above. Similarly, mortality was also significantly higher among anemics (11.64% vs. 2.63%; *p*=0.007) which can be partly due to poor cardiac function in these patients which can also be blamed for higher re-admission rate (35.62% vs. 10.53%; *p*=0.000). We also evaluated that low hemoglobin effect on length of stay and it revealed significantly increase length of stay among anemics (7.56±4.87 days vs. 6.12±4.15 days; *p*=.012) as compared to non-anemics which highlights the potential effect of anemia on recovery.

However, no previous study clearly evaluated the effect of confounders (Age, Gender, BMI) among anemics and non-anemics. In our study, we compared these 2 groups in terms of age, gender and BMI and didn't observe any significant association (*p*>0.05).

Thus anemia is highly prevalent (56.2%) among heart failure patients in Pakistani Population and is independently (excluding age, gender, BMI) associated with poor cardiac function, increased length of stay, re-admission rate and mortality.

CONCLUSION

Anemia is highly prevalent (56.2%) among heart failure patients in Pakistani Population. It has been proven in our study that anemia is independently (excluding age, gender, BMI) associated with poor cardiac function, increased length of hospital stay, re-admission rate and mortality.

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