International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2015): 6.391

Prevalence of Anaemia among Haemodialysis Patients

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Abstract: ***Background: Anaemia is one of the common complications associated with Chronic Kidney Disease (CKD) liable for the increase in the morbidity and mortality in such patients. Numerous factors have been attributed to cause renal anemia, amongst which hyperparathyroidism is one of the less recognized reasons. The excess amount of Parathyroid Hormone (PTH) secondary to CKD has been suggested to be a contributing factor for anaemia. The introduction of erythropoietin considerably improved anaemia in patients with CKD by relieving symptoms and avoiding complications associated with blood transfusion. The aim of the study is to see the prevalence of the anemia severity among CKD patients who are on regular dialysis. Methodology: Prospective, Observational study was conducted at the Teaching Hospital Batticaloa, SriLanka. Results: Majority of the dialysis patients 26 (62%) had hemoglobin in the range of 7-9g/dl, 7(16.7%) patients had hemoglobin of more than 10g/dl and 4(9.5%) patients had hemoglobin below 7g/dl. This study is clearly shown that almost all (100%) dialysis population had anemia. Conclusion: The use of iron therapies and erythropoiesis stimulating agents (ESAs) has allowed improvement in patients with anemia of CKD.***

Keywords: Anemia amongChronic Kidney Disease and anemia among hemodialysis patient

1. Introduction

Chronic kidney disease (CKD) contributes to the globally growing burden of non-communicable diseases, which represent the largest cause of death worldwide. Deficiency in the renal erythropoietin production in patients with CKD leads to anaemia and, subsequently, to severe restrictions to health and quality of life. Iron therapy, with or without concomitant administration of erythropoiesis-stimulating agents (ESAs), has been used in the management of anaemia in the chronic kidney disease (CKD) population for many years. Several studies have revealed the association of hyperparathyroidism with CKD **[1]**. Parathyroid hormone (PTH) is a major uremic toxin which may be blamable for long term consequences in CKD such as renal bone disease (osteodystrophy), vascular calcification, altered cardiovascular function, immune dysfunction and anaemia **[2]**. However recently, the use of iron therapy as a means to delay the need for alternative anaemia management in the pre-dialysis population or to lower the required dosage of ESAs in the haemodialysis (HD) population has come to the fore **[3]**. Inadequate dietary iron uptake may be attributed by poor appetite or dietary restrictions, and intestinal bleeding may result in increased iron losses. The magnitude of this problem is exacerbated in patients receiving dialysis who experience significant additional iron losses due to blood residual in the dialyzer circuit after treatment**[4]**.In addition to that, Patients with CKD getting treatment with erythropoietin are very prone to develop iron deficiency due to the increased demand for iron to support erythropoiesis, and certainly iron deficiency is the most commonly identified cause of hypo responsiveness to erythropoietin therapy in dialysis patients**[5][6]**. However, various pathophysiological mechanisms have been sketched by in vitro and in vivo studies, regarding the worsening effect of raised parathyroid levels on the haemoglobin levels, but no definitive mechanism has been recognized**[7]**.The CKD is divided into five stages, classified according to the degree of the patient's renal function. Until the fourth stage of the disease, the so-called "conservative treatment" is recommended. In more advanced stages, called End-Stage Renal Disease (ESRD), i.e., when the kidneys can no longer maintain homeostasis of the body, the patient will depend on one of the modalities of Renal Replacement Therapy (RRT). Our study suggests that targeting hemoglobin levels in excess of 12.0 g/dL leads to small and not clinically meaningful improvements in health related quality of life(HQOL).However as a whole expert panel suggested that targeting treatment to hemoglobin levels that are in the range of 9.0 to 12.0 g/dL is preferred. Taken all the international guidelines and our clinical experiences together, we should consider administration of ESAs when the hemoglobin level becomes <11 g/dl in pre-dialysis patients and <10 g/dl in dialysis patients **[8]**.At present, suggested hemoglobin target levels for erythropoietin treatment in CKD in the USA are in the range of 11.0–12.0 g/dL and should not be greater than 13.0 g/ dL.In their clinical practice guidelines, the Kidney Disease Improving Global Outcomes (KDIGO) Work Group suggests erythropoietin should not be used to maintain hemoglobin concentration above 11.5 g/dL in adult patients with CKD, but recommends an individualization of therapy for some patients who may have improvements in quality of life with higher hemoglobinconcentrations **[9][10]**.The aim of the study is to see the prevalence of the anemia among ESRD patients who are on regular dialysis.

2. Methodology

A Prospective, Observational study of patients with ESRD attending for the haemodialysis unit Teaching Hospital Batticaloa, SriLanka. All cases attending the study center for regular dialysis were included in this study. However, we included all adults age of 18 years and above 18 years and those who have been on dialysis for at least three month duration. The study was conducted from mid of September 2017 to end of November 2017.We excluded patients with carcinoma involving one or both kidneys and patients who undergone renal transplant. Finally 42 ESRD patients were enrolled in this study. The study subjects were given information about the study by using patient information

sheet in a language understood by them and written informed consent was obtained from participants included in the study. In this study anaemia was defined by a decrease in hemoglobin to <130 g/l in men and <120 g/l in women**[11]**. The study protocol was approved by Head of the Department, Faculty of Health Care Sciences Eastern University SriLanka.

3. Results

Out of 42 patients there were 25(59.5%) males and 17(40.5%) females (Table 1). There was a male: female ratio of 1.47:1. The youngest patient was 19 years of age and the oldest was 68 years of age. In this study nearly half of the patients20 (47.6%) were in the age group of 50-69 and another half of the patients 21(49.1%) were in the age group of 20-40(Table 1).Only 7(16.7%) out of 42 patients had a hemoglobin level of above 10g/dl. Majority of the dialysis patients 26 (62%) had hemoglobin in the range of 7-9g/dl. However, 4(9.5%) patients had hemoglobin below 7g/dl (Table 3).

Table 1 Sex difference among ESRD patients

Sex		Frequency	Percent
	Male	25	59.5
	Female	17	40.5
	Total	42	100.0

Table 2: Age difference among ESRD patients

Age		Frequency	Percent
	<20	1	2.4
	20-29	3	7.1
	30-39	8	19.0
	40-49	10	23.8
	50-59	11	26.2
	60-69	9	21.4
	Total	**42**	**100.0**

Table 3: hemoglobin level among ESRD patients

Hemoglobin g/dl		Frequency	Percent
	<7	4	9.5
	7.1-8	13	31.0
	8.1-9	13	31.0
	9.1-10	5	11.9
	10.1-11	7	16.7
	Total	**42**	**100.0**

4. Discussion

The prevalence of anemia is higher among patients with chronic kidney disease (CKD) than among the general population. Moreover, anemia tends to be more severe in patients with more advanced CKD. The prevalence of anemia severity among dialysis patients haven't been evaluated in SriLanka. On the other hand, a study conducted among non-dialysis CKD patient in Korea, where the prevalence of anemia severity was 45.1% for Hb<13.0 g/dL, 18.8% for Hb<11.5 g/dL and 4.2% for Hb<10.0 g/dL, respectively**[12]**.A similar study conducted by Aleix Cases-Amenós et all among non-dialysis patients , which revealed that the prevalence of anemia was 58.5%, however, only 14.9% of patients had hemoglobin levels less than 11g/dl**[13]**.

However, this pattern has been totally changed from our study, majority of the dialysis patients 26 (62%) had hemoglobin in the range of 7-9g/dl, 7(16.7%) had hemoglobin of more than 10g/dl but less than 11g/dl and 4(9.5%) patients had hemoglobin below 7g/dl..Normocytic normochromic anemia is one of the hallmarks of progressive chronic kidney disease (CKD). Normocytic normochromic anemia is defined by a decrease in hemoglobin to <130 g/l in men and <120 g/l in women **[14]**. Our study is clearly shown that almost all (100%) dialysis population had anemia.

The treatment of anemia with erythropoietin in ESKD has revolutionized its treatment, but its use has been hardened by higher risks of cardiovascular morbidity and mortality. A recent meta-analysis found no difference in Hb concentrations between hemodialysis (HD) and peritoneal dialysis (PD) patients; however, treatment response to erythropoietin may vary depending on dialysis modality **[15]**.

Erythropoietin therapy only is effective in the presence of sufficient iron to support increased erythropoiesis iron deficiency is a major cause of erythropoietin hypo-responsiveness in patients with CKD. It is vital that iron deficiency should be addressed in patients prior to initiation of erythropoietin therapy **[16]**. The timing of iron therapy initiation, route of administration, and selection of treatment regimen should take into account a number of factors, including the severity of anemia, treatment goals, CKD stage and dialysis modality, comorbidities and concomitant patient health issues, as well as any relevant practical considerations. Intravenous administration of iron has been demonstrated to be more effective than oral administration with respect to the elevation of hemoglobin, ferritin and transfer in saturation levels in patients with ESRD **[17]**.

5. Conclusion

Anaemia is a commonly diagnosed complication among patients misery with chronic kidney disease. If left untreated, it may affect patient quality of life. There are several causes for anaemia in this patient population. As the kidney disease deteriorates, together with medications and dietary restrictions, patients may develop iron deficiency, resulting in reduction of iron supply to the bone marrow. The use of iron therapies and erythropoiesis stimulating agents (ESAs) has allowed improvement in patients with anemia of CKD. Newer therapies are under study, but this guideline will not make recommendations on agents such as hypoxia inducible factor stabilisers or hepcidin modulators as data remains preliminary. Chronic kidney disease patients may not be able to utilize their own body's iron stores effectively and hence, many patients, particularly those receiving haemodialysis, may require additional iron treatment, usually provided by infusion.

6. Funding

None (self-funded).

7. Competing Interests

The author has no competing interests to declare

References

[1] **[**Kettler M, P. A. Phosphate and FGF23 in early CKD: on how to tackle an invisible foe. *Nephrol Dial Transpl.***26,** 2430–32 (2011).
[2] Fukagawa M, Kazama JJ, K. K. Renal osteodystrophy and secondary hyperparathyroidism. *Nephrol Dial Transpl.***17,** 2–5 (2002).
[3] Roger, S. D. Practical considerations for iron therapy in the management of anaemia in patients with chronic kidney disease. *Clin. Kidney J.***10,** i9–i15 (2017).
[4] Macdougall, I. C. Intravenous iron therapy in patients with chronic kidney disease: recent evidence and future directions. *Clin. Kidney J.***10,** i16–i24 (2017).
[5] WH, H. Non-erythropoietin-based anaemia management in chronic kidney disease. *Nephrol Dial Transpl.***17,** 35–38 (2002).
[6] Macdougall, I. C. *et al.* Erythropoietic response to oral iron in patients with nondialysis-dependent chronic kidney disease in the FIND-CKD trial . *Clin. Nephrol.***88,** 301–310 (2017).
[7] Panda, S. Study of Red Cell Fragility in Different Stages of Chronic Kidney Disease in Relation to Parathyroid Hormone. *J. Clin. Diagnostic Res.* 29–32 (2017). doi:10.7860/JCDR/2017/27344.10514
[8] Mimura I1, Tanaka T, N. M. How the Target Hemoglobin of Renal Anemia Should Be. *Nephron***131,** 202–9 (2015).
[9] Kesztyüs, T., Simonsmeier, U. & Kesztyüs, D. Developing a classification system for haemoglobin management in patients with end-stage renal disease on haemodialysis: a secondary data analysis. *BMJ Open***7,** e017423 (2017).
[10] Mikhail, A. *et al.* Renal association clinical practice guideline on Anaemia of Chronic Kidney Disease. *BMC Nephrol.***18,** 345 (2017).
[11] Xu, Y., Peng, H. & Ke, B. α-klotho and anemia in patients with chronic kidney disease patients: A new perspective (Review). *Exp. Ther. Med.***14,** 5691–5695 (2017).
[12] Lee, S. W. *et al.* Serum Hepcidin and Iron Indices Affect Anemia Status Differently According to the Kidney Function of Non-Dialysis Chronic Kidney Disease Patients: Korean Cohort Study For Outcome in Patients with Chronic Kidney Disease (KNOW-CKD). *Kidney Blood Press. Res.***1830,** 1183–1192 (2017).
[13] Cases-Amenós, A. *et al.* Prevalence of anaemia and its clinical management in patients with stages 3-5 chronic kidney disease not on dialysis in Catalonia: MICENAS I study. *Nefrologia***34,** 189–98 (2014).
[14] P, Z. J. and H. Pathophysiology of anemia in chronic kidney diseases. *Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub***159,** 197–202 (2015).
[15] Zhang Y, Thamer M, Stefanik K, Kaufman J, C. D. Epoetin requirements predict mortality in hemodialysis patients. *Am J Kidney Dis***44,** 866–76 (2004).
[16] WH, H. Clinical aspects of iron use in the anemia of kidney disease. *J AmSoc Nephrol***18,** 382–393 (2007).
[17] Agarwal R, Rizkala AR, B. B. et a. A randomized controlled trial of oral versus intravenous iron in chronic kidney disease. *AmJ Nephrol***26,** 445–454 (2006).