



The role of the clinical pharmacists to improve the clinical outcomes of a kidney disease patient - A case Report

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Article History:

Received on: 13 Jan 2020
Revised on: 13 Feb 2020
Accepted on: 13 Mar 2020

Keywords:

Anemia,
Clinical pharmacist,
Kidney disease,
Pruritis,
quality of life

ABSTRACT

Pruritis is mostly presented as a warning/symptom of a few chronic diseases that may include kidney diseases. Often it can be an indication of any neurologic, systemic, psychiatric or dermatologic disorders. About 10-70% of patients with chronic renal failure, and patients undergoing dialysis exist with Pruritis. Undiagnosed Pruritis may develop into cellulitis and other complications such as septicemia. A clinical pharmacist role is crucial in managing such patients. Clinical pharmacists' vital role towards the patient helps them manage the unhealthy condition, restore, and improve their quality of life. We had a case report of anaemia in chronic kidney disease presented with Pruritis. The treatment was going on for the severe anaemic condition. Pruritis was left undiagnosed. The treating physician accepted the intervention of the clinical pharmacist to add Epoetin-alfa 3000 units/mL thrice a week. This intervention reaffirms the role of clinical pharmacists in developing the pharmaceutical care plan for patients.

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ISSN: 0975-7538

DOI: <https://doi.org/10.26452/ijrps.v11i3.2584>

Production and Hosted by

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INTRODUCTION

Pruritis is a condition which causes an intense desire to scratch and is mostly presented as a warning/symptom of some chronic diseases. Mostly, it can be an indication of neurologic, systemic, psychiatric or dermatologic disorders. Histamines, 5-Hydroxy tryptamine (5-HT), Proteases, IL-2, IL-3, IL-4, IL-6, and IL-10, Bradykinin, Substance-P (SP), calcitonin gene-related peptide (CGRP), Opioid peptides, Cannabinoids, Leukotrienes (LTs), Platelet-

activating factor (PAF) are some of the mediators involved in the mechanism of causing Pruritis. Apart from treating the underlying disease, phototherapy with Ultraviolet B (UVB), topical medications such as coolants (liquid nitrogen), doxepin (topical antihistamine), and systemic therapy with tricyclic antidepressants or opioid receptor antagonists are found to be effective in the management of Pruritis. Mirtazapine is effective in End-Stage Renal Disease (ESRD) patients ([Song et al., 2018](#)).

Pruritis is the most common manifestation of Chronic Kidney Disease (CKD) ([Adejumo et al., 2016](#)) and severe anaemia. Almost 10-70 % of patients with chronic renal failure and patients undergoing renal dialysis present with Pruritis ([Weisshaar and Mattered, 2014](#)).

The third National Health and Nutrition Examination Survey has mentioned that (NHANES III), 8% of elderly participants with anaemia had renal insufficiency with creatinine clearance below 30 mL/min and another 4% of anaemia cases had both renal insufficiency and anaemia ([Patel, 2008](#)).

Clinical pharmacists play a vital role in better patient

management and improvement in their quality of life. Here we report a case which emphasizes the critical role of clinical pharmacist in deciding the pharmaceutical care plan for a patient.

Case Description

A 70-year-old male patient was presented to the casualty of a secondary care hospital referred from Primary Health Care Centre with a history of fever for past one week and itchy skin that resulted in the formation of blisters followed by swelling and ulcer in the right foot. He also complained of easy fatigability and breathlessness. He was not a known case of diabetes, hypertension, bronchial asthma or tuberculosis. Laboratory investigations were done and are presented in Table 1.

The patient was not working, and there was no significant family history and allergies. When he came to the casualty, he was initiated with Inj. Cefotaxime 1gm IV BD, Inj. Metronidazole 500 mg IV BD, Inj. Ranitidine 50 mg IV BD, Inj. Diclofenac 50 mg IV BD, Tab. Chymoral Forte and Packed Red Blood Cells (PRBC) blood transfusion. He was provisionally diagnosed for Severe Anaemia with Cellulitis in the right foot and admitted in ICU for further treatment.

On the 2nd and 3rd day of admission, the same treatment was continued along with blood transfusion. The patient was shifted to the male medical ward. On 4th day, Debridace Ointment (Papain 521700 IU + Urea 100 mg) was added along with other drugs. Wound swab was sent on the next day for testing, which ensured it was healthy. Tab. Ferrous Sulphate and Tab. Vitamin C was added to the treatment from the 5th day. One unit of PRBC was again transfused on the 6th day. The patient was discharged on the 7th day with Cap. Amoxicillin 250 mg 2TDS, Tab. Metronidazole 200 mg 2BD, Tab. Ranitidine 150 mg BD, Tab. B complex 30.5 mg OD and Tab. FS 335mgTDS. Discharge plan was checked by the clinical pharmacist and intervened to add Epoetin-alfa 3000units/mL thrice a week for this patient on the same day. This was accepted by the physician and added in the discharge summary.

DISCUSSION

Dropping of Hb to 3mg/dL drew the attention of the clinical pharmacists and reconciliation with the patient helped to understand that patient did not have any bleeding episodes or any emergency nor the patient have any genetic or infectious aetiology. This reconciliation indicated that the patient was suffering from some chronic condition that might lead to his severe anaemia. Chronic conditions lead-

ing to anaemia include renal disease, hepatic disease, chronic infections, neoplasia or collagen vascular disease ([Emedicine.com, 2020](#)).

Elevated Serum Creatinine of the patient indicated he was in the 4th stage of CKD (Chronic Kidney Disease) based on creatinine clearance calculated as per the Cockcroft-Gault equation. The Cockcroft-Gault formula is a standard method for measuring creatinine clearance from serum creatinine by using patient's age, serum creatinine and body weight ([Scribd and Cray, 2020](#)).

CKD stages based on GFR include: Stage 1 (GFR > 90 mL/min), Stage 2 (GFR = 60-89 mL/min), Stage 3A (GFR = 45-59 mL/min), Stage 3B (GFR = 30-44 mL/min), Stage 4 (GFR = 15-29 mL/min) and Stage 5 (GFR <15 mL/min) ([Davita.com, 2020](#)).

Severe anaemia of this patient was a complication of his CKD. Anaemia in CKD is characterized by normocytic, normochromic, and hypo proliferative⁸, which was depicted in his laboratory investigations. The peptide hormone Hepcidin secreted by liver plays a major role in iron regulation. Excretion of Hepcidin is reduced in CKD patients which down-regulates erythropoiesis causing anaemia.

RBC production in bone marrow requires erythropoietin and iron ([Babitt and Lin, 2012](#)). But this cause behind his anaemia was left undiagnosed. Collecting his history for understanding the cause for cellulitis showed he did not have any previous wound or any animal/insect bite. The patient told he developed itching a few days before the consultation and it had furthered with blisters.

It was this blisters that turned into cellulitis in his right foot. Correlating his low Hb level and increased serum creatinine (4th stage CKD) with cellulitis made us believe that the patient might have developed Pruritis which is a marker of end-stage renal disease and also iron deficiency anaemia. The etiopathogenesis behind the Pruritis in end-stage CKD is not clearly understood. However, several pathogeneses have been hypothesized such as the accumulation of histamine in renal failure or the up-regulation of central μ -opioid receptors due to the cumulated endorphins or the activation of antagonism of μ - and κ -opioid receptors ([Mettang, 2014](#)).

Several cases reports also added to the evidence that Pruritis can be seen in patients with iron deficiency anaemia. This condition can be explained as the normal assembly of dermal elastic fibres is negatively affected by the decreased serum iron level, which engenders the loss/reduced skin elasticity ([Tamaro et al., 2018](#)).

Discussion with the treating physician, Pruritis was

Table 1: Abnormal Laboratory parameters of the patient

S.no.	Abnormal laboratory Parameters	Observed value	Normal value
1	Hemoglobin	3.2 g/dL	12-16g/dL ↓
2	Differential Count	81%	54-62% ↑
3	Polymorphs	11%	25-33% ↓
4	Lymphocytes	8%	3.7% ↑
5	Monocytes	1.06*10 ⁶ /mm ³	3.5-5.0 *10 ⁶ /mm ³ ↓
6	RBC's	9.3%	33-43% ↓
7	PCV	70mg/dL	20-40mg/dL ↑
8	Renal Function Test	1.5mg/dL	0.6-1.2mg/dL ↑
9	Blood Urea	1.3mg/dL	0.1-1mg/dL ↑
10	Serum creatinine	0.6mg/dL	0-0.2mg/dL ↑
11	Bilirubin		
12	Total		
13	Direct		

confirmed. In this condition, treating the patient alone with blood transfusion cannot help in increasing his Hb level because of the deficiency of erythropoietin is the primary cause of anaemia in CKD. Even after transfusing 4 unit of PRBC his Hb level was only 7mg/dL. The primary cause of anaemia in CKD is the deficiency of erythropoietin (Salifu, 2008).

The increased level of haemoglobin with blood transfusion alone will not make the blood level stable. The patient should have been treated for anaemia in CKD. Erythropoietin stimulating agents should be considered along with blood transfusion for such patients (Kdigo, 2012).

Discharging the patient with ferrous sulphate tablets was not the choice of treatment in this patient. This decision was brought to the notice of the physician. At this juncture, the clinical pharmacist intervened and suggested to add Epoetin-alfa 3000 units/mL thrice a week. The physician accepted the suggestion.

CONCLUSIONS

A patient presenting with severe anaemia should be checked for its underlying disease, and treatment should be planned accordingly. Pruritis being rare is often left unnoticed. Untreated Pruritis may develop into cellulitis and other complications such as septicemia. Clinical pharmacists undoubtedly play a vital role in optimizing the pharmaceutical care plan for the patient.

ACKNOWLEDGEMENT

The authors are grateful to the Department of Pharmacy Practice, JSS College of Pharmacy, Ooty and

Govt. District Headquarters Hospital, Ooty, 643001, The Nilgiris, India, for their support provided.

Funding Report

None.

Conflict of interest

None.

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