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Fanconi Syndrome in Febrile Neutropenic Carcinoma Patient: A Case Report

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ABSTRACT:
Fanconi syndrome is associated with the impairment of proximal tubular reabsorption, which leads to Renal Tubular Acidosis (RTA) characterised by increased excretion of electrolytes. Febrile neutropenia (FN) is a condition commonly seen in chemotherapy patients, with the signs of fever and low Absolute Neutrophil Count (ANC).A 72 year old male patient was admitted with the complaints of fever, breathlessness for the past two days, with one episode of haemoptysis. It is a known case of carcinoma in the right lung undergoing chemotherapy in other hospital. He had a temperature of 100°F.Supportive measures were taken. The haemogram showed low levels of Total Count (TC), haemoglobin and sodium, which was managed. On third day, ANC was 700cells/ cumm, TC decreased to 1200cells/mm3 and CRP was 266.07mg/L, which indicates FN. Managed with Filgrastim along with Piperacillin-Tazobactam and Gentamycin. Then, the patient had massive haemoptysis, treated with Tranexamic acid. Later, the paient had refractory hypokalemia and undergone intensive potassium replacement therapy. On the day of discharge, the levels of magnesium and bicarbonate was found to be very low and thus, the diagnosis of Aminoglycoside induced Fanconi syndrome and Type 2 RTA was made. Gentamycin was withdrawn, supplementations were given and the patient got discharged for the next cycle of chemotherapy. The prevalence of FN condition is 17.5% in one lakh population. Patients undergoing chemotherapy are at high risk of electrolyte imbalance and haemogram variations. Therefore, careful monitoring is required for oncology patients with complications.

KEYWORDS: Febrile neutropenia, Fanconi Syndrome

I. INTRODUCTION:

Fanconi syndrome is associated with the impairment of proximal tubular reabsorption, which leads to Renal Tubular Acidosis (RTA) characterised by increased excretion of electrolytes. The Fanconi syndrome is a collection of proximal renal tubular dysfunctions that arise in response to drugs such as aminoglycosides. These antibiotics are still the first line of defence against most gram-negative infections, but their major disadvantage is nephrotoxicity. Proximal tubular dysfunction, which can accompany some of the symptoms of Fanconi's disease, such as hypokalemia, is uncommon.[1] The severity and clinical significance of this syndrome are determined by the amount and duration of medication administration, as well as other variables such as malnutrition and the presence of concurrent nephrotoxic medicines.[2] Hyperaminoaciduria, glucosuria despite a normal blood glucose level, and phosphate wasting are the hallmarks of the condition. Other symptoms may include defects in bicarbonate reabsorption, renal acidification, urate reabsorption problems, urine concentration problems and potassium conservation.[3] Febrile neutropenia (FN) is a condition commonly seen in chemotherapy patients, with the signs of fever and low Absolute Neutrophil Count (ANC). It is a medical emergency that necessitates immediate diagnosis, prompt treatment of empiric broad-spectrum antimicrobials, and close monitoring to improve patient outcomes and reduce the risk of comorbidities.[4] In this report, we describe a case of Aminoglycoside induced Fanconi Syndrome and Type 2 RTA on a febrile neutropenic carcinoma patient.

II. CASE DESCRIPTION:

A 72 year old male patient was admitted with the complaints of fever, breathlessness for the past two days, with one episode of haemoptysis. It

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is a known case of carcinoma in the right lung undergoing chemotherapy in other hospital. He had a temperature of 100°F. Supportive measures were taken for fever and breathlessness. The haemogram showed Total Count (TC) as 2400cells/mm3, 8.1g% of Haemoglobin and 126mmol/L of sodium. Low sodium and Hb was managed with 3%NS (300ml in three days) and blood transfusion respectively . Empirical antibiotic therapy was given for 2 days. On 3rd day, ANC was 700cells/cumm, TC decreased to 1200cells/mm3 and CRP was 266.07mg/L, indicates FN. And therefore, 2 doses of Filgrastim (300mcg/0.5ml) along with dual therapy of antibiotics (Piperacillin-Tazobactam 4.5gQ6H and Gentamycin-80mgBD) were given. Next day, the patient had massive haemoptysis, managed with Tranexamic acid (100mg/5mlQ8H) and Ondansetron (2mg/ml). Later, serum potassium was found to be consistently low (refractory hypokalaemia 3.6-2.1mmol/L). Then it improved to 3.7mmol/L with intensive potassium replacement therapy (20.25g in ten days). On the day of discharge, the levels of magnesium and bicarbonate were found to be 0.6mg/dl and 18mEq/L respectively. Thus, the diagnosis of Aminoglycoside induced Fanconi syndrome and Type 2 RTA was made. Gentamycin was withdrawn, supplementations were given. Tab. Remmag (Magnesium oxide) and Tab. Acidose (Sodium Bicarbonate) were given as the magnesium and bicarbonate levels were low. For maintaining serum potassium, Tab. Addkay (Potassium Chloride) was given and the patient got discharged for the next cycle of chemotherapy.Towards the end of hospital stay, patient was afebrile, the total count and haemoglobin levels were improved.

III. DISCUSSION:

Febrile neutropenia is a common complication in patients receiving chemotherapy for hematologic malignancies, and it is linked with a high rate of morbidity and mortality. Escrihuela Vidal F et al in his study suggests that several factors including the severity of neutropenia, clinical manifestations, previous use of antibiotics, presence of allergies and potential toxicities are need to be considered while considering empirical antibiotic therapy for patients with FN.[5] Antibiotic regimens should focus on gram-negative bacteria, which pose the greatest risk of death worldwide.[4]

In the current study, our patient presented with evidence of a reversible proximal tubular dysfunction induced by gentamicin. The study conducted by Schwartz J H et al pointed out that the renal function abnormalities were reversible in most patients who had appropriate follow-up after quitting gentamicin medication which is comparable to our scenario.[6]

However, the nephrotoxic potential of gentamicin therapy is much higher and more well-documented. High glucose and protien levels in the urine, as well as hypophosphatemia, hypobicarbonatemia, and hypokalemia, can all be signs of aminoglycoside-induced nephrotoxicity.[2] The severity of renal injury has varied, ranging from minor BUN increases or abnormalities in urine sediment, to severe renal failure. The selective accumulation of this drug in renal proximal convoluted tubules causes loss of brush border integrity, resulting in extensive disruption of renal tubular function.[7]

Eventhough advanced age can increase the risk for nephrotoxicity[8], Alexandridis G et al pointed out that in normal people, gentamicin induces rapid and transient renal calcium and magnesium wasting when given at conventional therapeutic dosages.[9] Amphotericin, vancomycin, cephalosporins, clindamycin, and piperacillin are also risk factors for aminoglycoside-associated nephrotoxicity when used concurrently.[10] Our patient was treated with piperacillin/ gentamycin, which may have been a contributing factor to the development of Fanconi syndrome.

It should be noted that this is a unique case report of a very ill patient with cancer who would be prone to significant proximal tubular injury by gentamycin. The distinctive characteristics of Fanconi syndrome in this case highlight the possible renal tubular toxic effects of gentamycin.

IV. CONCLUSION:

Because of the widespread use of aminoglycosides in clinical practice, it may be prudent to investigate for this disorder early, especially in patients who are on long-term therapy. Gentamicin should be used with caution to avoid nephrotoxicity, especially in high-risk patients, and renal function should be checked frequently during treatment. The prevalence of FN condition is 17.5% in one lakh population. It is also a medical emergency that requires urgent evaluation, the timely administration of empiric broad- spectrum antimicrobials and careful monitoring in order to optimize patient outcomes and mitigate the risk of complications. Also the patients undergoing chemotherapy are at high risk

of electrolyte imbalance and haemogram variations. Therefore, careful monitoring is required for oncology patients with complications.

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