Diclofenac Induced Rapidly Progressive Renal Failure in Elderly Patient – A Case Report

Chandana C*, Srirangam Anusha, Kavya H B

Department of Pharmacy Practice, Sree Siddaganga College of Pharmacy, Tumakuru, Karnataka, INDIA.

ABSTRACT

(RPRF) Rapidly progressive renal failure is categorized by a rapid loss of kidney functions over days to weeks. Acute kidney injury is a sudden episode of kidney failure or kidney damage that happens within a few hours to days. Non-Steroidal Anti-Inflammatory Drugs and/or acetaminophen are commonly used in mild to moderate pain management. NSAID and/or acetaminophen have been reported to cause reversible acute renal failure. A 68-year-old male patient brought with the chief complaints on admission of vomiting, breathlessness since 4 days, pain in the abdomen since 5 days, burning sensation in chest, burning micturition, haematuria since 2 weeks. He was a known case of wind-swept deformity and receiving combination of Tablet Diclofenac sodium 50 mg/Acetaminophen 500 mg once a day in the past 8 years for knee pain. He was diagnosed with Rapidly Progressive Renal Failure-Acute Kidney Injury, Contrast induced Nephropathy, Bladder Outlet Obstruction. The laboratory investigations show abnormality in the serum creatinine, blood urea, haematological parameters indicate normocytic normochromic anaemia with neutrophilic leucocytosis. In the assessment of this case it was found that Diclofenac/Acetaminophen has induced Rapidly Progressive Renal Failure. After withdrawal of Diclofenac/Acetaminophen all the values returned within the normal range and his oedema was also subsiding, showing clinical improvement with the diuretic treatment, fluid, and salt restriction.

Keywords: Diclofenac, Acetaminophen, Renal Failure, Diuretics, Non-Steroidal Anti-inflammatory Drugs, Prostaglandin.

INTRODUCTION

Non-steroidal Anti-inflammatory Drugs are commonly prescribed drugs and their nephrotoxic effects are well known.[1] NSAID and/or acetaminophen are commonly used in mild to moderate pain management. These agents are usually given as two single agents and in oral formulation.[2] Diclofenac is widely used as analgesic and anti-inflammatory drug. Non-steroidal anti-inflammatory drugs have been reported to cause reversible acute renal failure.[3] Reports of renal dysfunction have been documented mostly in volume decompensated patients and are favoured by various drug interactions. The objective of this case description is to provide useful information about the importance of monitoring parameters of the drugs NSAIDs/Analgesics in the treatment for the elderly patients. Renal dysfunctions are more protruding in elderly population with dropping renal functions.[1]

Rapidly progressive renal failure is categorized through a rapid damage of renal functions over days to weeks.[4] Acute kidney injury (AKI), also known as acute renal failure, is a rapid occurrence of kidney failure or kidney damage that occurs within a few hours or a few days.[5]

CASE REPORT

A 68-year-old male patient worked as a farmer brought with the chief complaints on admission of vomiting, breathlessness since 4 days, pain in the abdomen since

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Address for correspondence:
Ms. Chandana C, Pharm D
Sree Siddaganga College of Pharmacy, B H Road, Tumkur-572102, Karnataka, INDIA.
Email id: chandanac2100@gmail.com

www.ijopp.org

5 days, burning sensation in the chest, burning micturition, haematuria since 2 weeks on Siddaganga Medical College and Research Institute. He is not having family history of Diabetes/ Hypertension/ Epilepsy/ Tuberculosis/ Coronary artery disease/ Renal disease. He is not taking any other OTC, herbal medications. He is non-smoker and non-alcoholic. He is taking caffeine intake of 2-3 cups per day. He is taking soft diet since he is symptomatic before that he was on mixed diet. His sleeping pattern are normal, appetite was decreased and bowel/bladder functions shows abnormal activity. His physical examinations and systemic examinations show normal but in abdomen, tenderness and rigidity was present. He had pedal oedema. He was a known case of wind-swept deformity and receiving combination of Tablet Diclofenac sodium 50 mg/Acetaminophen 500mg once a day in the past 8 years for knee pain.

On investigation, it was found that his serum creatinine and urea were raised to 6.6 mg/dl (0.5-1.2mg/dl) and 82.9 mg/dl (10-71mg/dl) respectively. Among the electrolytes, serum sodium was 132 mmol/L (136-145 mmol/L) and his Ultrasound abdomen and pelvis shows Bilateral Grade-I medical renal disease, Bilateral mild to moderate hydroureteronephrosis with significant perinephric interstitial oedematous fluid-likely secondary to urinary bladder wall thickening-suggestive of cystitis, Mild ascites, Bilateral mild pleural effusion (left more than right) causing underlying subsegmental passive atelectasis. The haemodialysis was done on the 2nd, 4th and 12th day after admission. On 6th day of admission, serum creatinine 9.8 mg/day (0.5-1.2mg/dl) increases and sodium level comes under normal limits. The haemodialysis again done after the day-6 of admission. His hepatic function test and urine clinical pathology were normal. His haematology examination shows reduced haemoglobin as 12.1 g/dl (13-18 g/dl), Packed Cell Volume 34.8% (40-50%), White Blood Cells 17500 cells/cu.mm (4000-11000), Neutrophils 86.3% (40-75%), Lymphocytes 7.3% (20-45%) indicates normocytic normochromic anaemia with neutrophilic leucocytosis. He was diagnosed with Rapidly Progressive Renal Failure-Acute Kidney Disease, Contrast induced Nephropathy, Bladder Outlet Obstruction. According to Naranjo ADR probability scale, diclofenac/ acetaminophen is the PROBABLE cause of this Rapidly Progressive Renal Failure.[6]

He undergone surgery of Arteriovenous fistula on Day-8. Before surgery, he was given Injection Ondansetron 4 mg once daily for 8 days, Injection Acetaminophen 1g SOS for 9 days, Injection Furosemide 100 mg twice daily for 11 days by tapering the doses as 60 mg and 20 mg, Injection Piperacillin and Tazobactam combination of 4.5 mg two times daily for 9 days, Injection Ceftriaxone 1g twice daily for 1 day, Tablet Domeperidone10 mg thrice a day for 3 days, Injection Pantoprazole 40 mg one time a day for 6 days. The patient was on treatment for a total duration of 12 days in the hospital. On discharge, Tablet Torsemide 40 mg twice daily, Capsule Multivitamin, combination of Tablet Esomeprazole magnesium and Domperidone taken for 14 days after discharge.

After 22 days, he was suggested to haemodialysis and visited casualty department with the complaints of generalised weakness. On physical evaluation, he was conscious, oriented and his pulse rate and BP were in normal limits. He had no oedema, lymphadenopathy, pallor, icterus, or clubbing. His oxygen saturation level, respiratory rate were in normal limits.

Following the report, the diclofenac/paracetamol was come to a stop and his laboratory examinations were repeated the following days 6th, 7th and 22nd. His serum creatinine and blood urea didn't show substantial variation on the subsequent day then on day 7, the values underway to drop to normality. His oedema was also dropping showing clinical improvement.

On subsequent visit, on day 22, his serum creatinine level further came down to 1.3mg/dl (0.5-1.2mg/dl), potassium 2.60 mmol/L (3.50-5.30mmol/L). After a month, all the values returned within the normal level with creatinine 1.1mg/dl (0.5-1.2mg/dl), blood urea 55 mg/dl (10-71mg/dl) and potassium 3.6mmol/L (3.5-5.3mmol/L).

DISCUSSION

NSAIDs inhibits prostaglandin synthesis pathway, follows in a decrease in pain and inflammation and thereby reduce nociceptive stimuli. Acetaminophen is recommended for the short-term treatment of mild to moderate pain or fever. NSAID alone causes about 15% of all cases of drug induced nephrotoxicity or 1-5% of all NSAID users. Nephrotoxicity occurs about 1–2% in acetaminophen overdose.[2] Diclofenac, a NSAID, have an adverse effect on renal physiology. Inhibit renal prostaglandin production, limiting renal afferent vasodilation, rises afferent resistance; this leads to the glomerular capillary pressure to fall below normal values and the Glomerular Filtration Rate (GFR) to decrease. This demonstrates as acute renal dysfunction, fluid, and electrolyte disorders and pathologically reveal renal papillary necrosis, interstitial nephritis. Serum analysis of blood urea, creatinine, uric acid, sodium, potassium

was impaired and severe tubular damage was observed.[7]

Diclofenac inhibits renal endogenous prostaglandin production, decreases renal afferent vasodilation, raises afferent resistance, all of these causes the glomerular capillary pressure to fall below normal values and decline in Glomeruli Filtration Rate (GFR). Normal kidney produces a hormone called prostaglandin that are used to protect the kidney from stress. Diclofenac cause the kidney to lose the capacity to make theses protective hormones and over time, can result in progressive kidney damage. Diclofenac increases levels of proteinuria, BUN, serum creatinine, and oxidative stress. In kidney tissue, diclofenac additionally increases oxidative stress and induces morphological variations dependable with kidney damage.[1-8] Diclofenac/Acetaminophen used for longer duration causes nephrotoxicity by inhibition of COX-2 mediated enhanced prostaglandin synthesis at the place of injury. According to Naranjo ADR probability scale, diclofenac/acetaminophen is the PROBABLE cause of this Rapidly Progressive Renal Failure.[6]

CONCLUSION

Non-steroidal anti-inflammatory drugs represent the most broadly used drug in medical practice. Based on the specific mechanism involved in the activation, NSAID induced nephrotoxicity should be considered as significant adverse effect. The pivotal drug should be discontinued and never be rechallenged. Consequently, observing of kidney function and creatinine levels is compulsory throughout therapy, collected with evaluation of electrolytes. Patient should be advised regarding the adverse effect of the medication, keep on visits for monitoring symptoms and nephrotoxicity. Patient should be advised for using the medications only by physician advice.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

NSAID: Non-Steroidal Anti-inflammatory Drugs; **RPRF:** Rapidly Progressive Renal Failure; **AKI:** Acute Kidney Injury; **ADR:** Adverse Drug Reaction; **OTC:** Over the Counter; **SOS:** Si Opus Sit; if necessary; **GFR:** Glomerular Filtration Rate; **COX-2:** Cyclooxygenase-2.

SUMMARY

Diclofenac have been reported to induce nephrotoxicity, which is considered as significant adverse effect. Withdrawal of this drug will help to enhance the renal function, indeed though diclofenac is demanded for better outcome in majority of the cases.

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