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Case Report *Clinical Research*

Rare case report on Amikacin induced Nephrotic syndrome

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ABSTRACT

Nephrotic syndrome is a collection of symptoms due to the many nephrotic drugs and some diseases effecting to the kidney characterized by hypo proteinaemia, hyper cholesterolaemia, generalized edema and heavy proteinuria. Amikacin is the antibiotic which is used in treating many infectious diseases in children. It is having many side effects like nephrotoxicity, hypersensitivity reactions and Ototoxicity etc. The therapeutic dose of amikacin also leads to the nephrotoxicity in the childrens due to the pharmacokinetic and pharmacodynamic changes. Here in this case report a 10 years old female child was presented with facial puffiness, generalized edema, increased total cholesterol, decreased serum albumin and urine output due the usage of amikacin.

Keywords: Amikacin, Nephrotic syndrome, Facial puffiness, Edema, Decreased serum albumin, ADR analysis.

INTRODUCTION

Nephrotic syndrome is a group of symptoms that include protein in the urine, low blood protein levels, high cholesterol levels, high triglyceride levels, and swelling. Common symptoms of this includes: Swelling (edema) in the face and around the eyes (facial swelling) in the arms and legs, especially in the feet and ankles In the belly area (swollen abdomen) Other symptoms include: Poor appetite and weight gain (unintentional) from fluid retention [1]. The patients with nephrotic syndrome will be having a major side effect of Acute Renal Failure. Nephrotoxicity leads to Acute Renal Failure. Nephrotoxicity is a major adverse effect of many drugs hence it is difficult to identify the causative drug since in many cases, multiple drugs are administered to a patient simultaneously [2]. Many reports are available with drug induced nephrotoxicity [2, 3] and use of Amikacin mostly causes Nephrotoxicity. Amikacin falls under the category of "aminoglycoside antibiotic". It plays an important role in the treatment of life-threatening infections; especially for treating infections in children hence it requires a dose adjustment. Children are more susceptible to the complications of this category of

drugs due to their pharmacokinetic and pharmacodynamic differences [4].

CASE REPORT

A 10 years old female child was admitted in PICU with the complaints of cold, cough and fever since 1 week. No history of similar complaints in the past. Birth history of the patient was found to be normal vaginal delivery, no history of neonatal jaundice and birth asphyroxia. Development of the child is appropriate for the age. On general examination the patient was conscious and coherent. Her vitals were found to be BP – 80/70 mm of Hg, PR – 80 bpm and systemic examination were found to be CVS – S1S2 +, CNS – NAD, RS – BLAE+, P/A – Soft. Clinical evaluation was done and patient was treated symptomatically on day 1 with parenteral antibiotics (Amikacin 90mg IV BD), parenteral anti ulcer drug – Pantoprazole 30 mg IV BD, and oral antipyretic drug – Paracetamol 250 mg. On day 2, 3 &4 she was treated with same medications. On day 5 patients complained of Facial puffiness, pedal edema (*Fig. 1*), shortness of breath and abdominal pain.

Fig.1: Facial puffiness and Pedal edema

After the symptoms laboratory examinations shows Serum albumin – 1.7 g/dl, Total cholesterol – 369 mg/dl, urine examination showed that the patient has proteinuria, decreased urine output and glycosuria. Culture report (urine sample) has shown negative for bacterial growth. Blood profile shows Hb – 12g%, TC – 9000 cells/cumm, Differential count: P – 50%, L – 40%, E – 2%. Liver function tests shows Total bilurubin – 0.2 mg/dl, indirect bilirubin – 0.3 mg dl and SGOT – 17mg/dl. Ultra sound abdomen shows *normal.* We the Pharm-D students intimated about the patient's condition and then the physician withdrawn the suspected drug and then the patient's laboratory results are as follows

S.No	Tests	Values	Reference values
1.	Serum albumin	3.9 g/dl	3.5 – 5 g/dl
2.	Total cholesterol	170 mgs/dl	150 – 200 mgs/dl
3.	Urine Output	950 ml/day	800 – 2000 ml/day

ADR ANALYSIS

Causality assessment

The suspected drug causing "Nephrotic Syndrome" is analysed by using Naranjo's scale, WHO-UMC scale, Karch & Lasagna scale shown in *table-1,* and severity, predictability and preventability were shown in *table-2.*

DE-Challenge

After causality assessment the suspected drug was stopped and symptomatic treatment was given.

Table 1: Causality assessment of suspected ADR

Sl.No	Suspected drug	Naranjo's scale	WHO-UMC	Karch & Lasagna scale
1	Amikacin	Probable	Likely	Probable

Table 2: Severity, Predictability and Preventability of suspected ADR

ADR	Severity	Predictability	Preventability
Amikacin induced Nephrotoxicity	Moderate level 4a	Not Predictable	Probably preventable

DISCUSSION

Aminoglycoside-induced nephrotoxicity is defined by tubular necrosis, proliferation and apoptosis, basal membrane disruption, mesangial cell contraction, detected by a decrease in glomerular filtration [5]. Drug-induced nephrotoxicity symptoms are fever, weight loss and anorexia nervosa. In this case patient had manifestations consistent with the symptoms mentioned above. The laboratory tests usually show glycosuria, proteinuria, hypercholestemia and decreased urine output [2-4]. Drugs that are associated with nephrotoxicity include antibiotics, anticonvulsants, NSAIDs and diuretics [6]. Incidence of nephrotoxicity due to aminoglycosides has risen from 2-3% in 1969 to 20% in the past decade. Despite nephrotoxicity and ototoxicity, these drugs are still being used in clinical practice because of the antibacterial effect, low cost, and limited bacterial resistance [7]. An increase in glomerular permeability leads to albuminuria and eventually to hypoalbuminemia. In turn, hypoalbuminemia lowers the plasma colloid osmotic pressure, causing greater transcapillary filtration of water throughout the body and thus the development of edema. However, studies of humans with tubular transport defects suggest that the glomerular urinary space albumin concentration is 3.5 mg/L. With this concentration, and a normal daily glomerular filtration rate (GFR) of 150 liters, one would expect no more than 525 mg per day of albumin in the final urine. Amounts above that level point to glomerular disease [8].

CONCLUSION

Amikacin is the antibiotic which is used in treating many infectious diseases in children. It is having many side effects like nephrotoxicity, hypersensitivity reactions and Ototoxicity etc. The therapeutic dose of amikacin also leads to the nephrotoxicity in the childrens due to the pharmacokinetic and pharmacodynamic changes. Here in this case report a 10 years old female child was presented with facial puffiness, generalized edema, increased total cholesterol, decreased serum albumin and urine output due the usage of amikacin.

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