



BMH Med. J. 2020;7(3):81-83. **Case Report**

Hypokalemia Myopathy due to Piperacillin-Tazobactam Induced Resistant Hypokalemia

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Abstract

Piperacillin-tazobactam can be used for the treatment of polymicrobial infections, including intra-abdominal, skin and soft-tissue, and lower respiratory tract infections. Hypokalemia is an uncommon side effect of piperacillin-tazobactam. This is the case of an elderly lady who was given piperacillin-tazobactam for lower limb cellulitis, and developed hypokalemia, which was resistant to oral and intravenous potassium correction. Her potassium levels got corrected only after stoppage of piperacillin-tazobactam.

Keywords: Piperacillin-tazobactam, hypokalemia, cellulitis, atrial ectopics

Case presentation

An elderly lady presented with pain and swelling of her left lower limb since 1 week, which was associated with low grade fever. She is a known case of coronary artery disease, and underwent by-pass grafting about 1 year ago. Her oral medication list consists of metoprolol (25 mg twice daily), aspirin (75 mg once daily), clopidogrel (75 mg once daily), atorvastatin (40 mg once daily) and spironolactone (25 mg once daily).

On examination, she was conscious, oriented and febrile (100 degrees F). Her vitals and systemic examinations were normal. Her left lower limb was mildly oedematous extending from the ankle to mid leg, with redness, pain and local rise in temperature. Her blood investigations showed neutrophilic leucocytosis (13,400 cells/cumm with neutrophils 89%, lymphocytes 11%). Her renal and liver functions, electrolytes (sodium 139 mEq/L, potassium 4.0 mEq/L), HbA1c and urine routine were normal. Doppler study of left lower limb did not show any features of deep vein thrombosis. She was started on intravenous piperacillin-tazobactam (P-T) 4.5 gram every eighth hourly. Her blood cultures were sterile.

Repeat blood investigations on day 2 showed hypokalemia (3.0 mEq/L). She did not have any diarrhoea and was not on laxatives or proton pump inhibitors. Oral potassium chloride (15 ml or 20 mEq thrice daily) was started. The following day her potassium levels were 2.8 mEq/L. Serum magnesium and calcium levels were normal. Oral potassium doses were increased to 30 ml thrice daily. Over the next 2 days, her potassium levels continued to fall, reaching 2.1 mEq/L. Intravenous potassium correction was started (40 mEq/L in 1 liter 0.45% saline). She also noticed mild weakness of her proximal lower limb muscles. Neurological examination revealed a diminished power of 4/5 at hip and knee joints and normal 5/5 at the ankles. Bilateral knee jerks were diminished. Her plantars were bilaterally flexors. Her upper limb power and reflexes were normal. Cranial nerves and sensory system were not affected. Her ECG showed atrial ectopics. On review of her drugs, the possibility of P-T induced hypokalemia was considered. Intravenous P-T was stopped and changed to intravenous cefuroxime. The following day, her potassium levels started rising (2.6 mEq/L). Potassium corrections (oral and intravenous) were continued. Over the next 2 days, her potassium levels were normalized (3.8 mEq/L) and her lower limb weakness disappeared. Potassium corrections were stopped. Her lower limb cellulitis also improved. She was discharged on day 10 of admission with stable electrolytes. She was asked to continue her routine medications. On review after 1 week, her cellulitis resolved, with normal electrolytes. The course of her potassium levels have been depicted below (**Figure 1**).

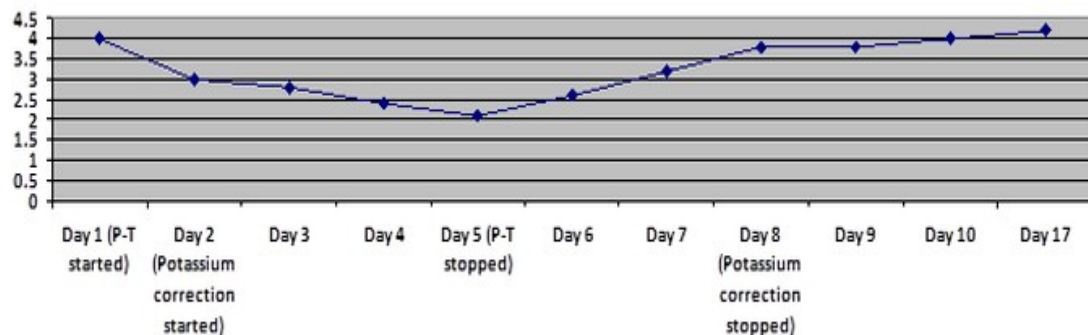


Figure 1: Course of serum potassium levels (mEq/L)

Discussion

Piperacillin is an ureidopenicillin which has action against Gram-negative organisms, Gram-positive cocci (except penicillinase-producing *Staph aureus*) and anaerobic organisms [1]. Tazobactam is a beta-lactamase inhibitor, and when combined with piperacillin restores the activity of piperacillin against beta-lactamase producing bacteria. Due to its broad spectrum coverage, the combination of P-T is used in polymicrobial infections of skin, soft tissue, intra-abdominal and lower respiratory tract. Piperacillin is mainly excreted by renal, followed by biliary route. Piperacillin may lead to or aggravate dyselectrolytemia and tubular dysfunction even in patients with normal renal functions [2].

Hypokalemia refers to serum potassium levels less than 3.5 mEq/L (normal 3.5-5 mEq/L). It can occur due to malnutrition or decreased dietary intake and parenteral nutrition, drugs like diuretics, aminoglycosides, beta-adrenergic agonists, theophylline and steroids, hypomagnesemia, Cushing syndrome, Bartter syndrome, Fanconi syndrome, leukemia and gastrointestinal losses such as vomiting, diarrhoea, enemas and laxatives or pyloric stenosis [2,3]. The ECG change associated with hypokalemia include increase in amplitude and width of the P wave, prolongation of PR interval, flattening or inversion of T wave, ST depression, prominent U waves, long QU interval, supraventricular and ventricular ectopics, supraventricular tachyarrhythmias and ventricular arrhythmias. Hypokalemic myopathy mainly involves proximal muscles more than distal.

Only a handful of P-T induced hypokalemia have been reported [4,5]. Thrombocytopenia, paresthesiae, myelosuppression, hepatic dysfunction and delirium are some of the other adverse effects observed with P-T [6-9]. Our patient had a score of 8 according to Naranjo et al adverse drug reaction probability scale [10], suggestive of a probable drug association. Hypokalemic myopathy following P-T administration is an unreported scenario.

Conclusion

P-T can cause hypokalemia even in the presence of normal renal functions. Patients receiving P-T should be regularly monitored for potassium levels. Our patient developed hypokalemic myopathy which was resistant to potassium correction. Following the withdrawal of P-T, her potassium levels got corrected and became asymptomatic.

References

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