



A Case of Carbapenem-Induced Encephalopathy

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Introduction

A 74-year-old female patient under the care of the medical team was admitted as a failed discharge from Urology. The patient had undergone bilateral nephrostomy placement for obstructive nephropathy. The left-sided nephrostomy had previously been removed and the right-sided nephrostomy was on free drainage until follow-up Urology appointment 6 weeks from the point of review. The patient had ongoing infection from the nephrostomy and grew multiple antibiotic resistant *Proetus* species in the urine. She was initially on Intravenous (IV) Cefuroxime pending cultures and after cultures was due to be discharged under IV antibiotics at home team. The case was discussed with Microbiology consultant for consideration of an antibiotic that would treat the multi-resistant species and would not require, ideally, multiple administrations throughout the day (the maximum, we were informed, would be twice a day administration). With consideration of these points the Microbiology advice was to start Ertapenem, which could be given once daily and would likely cover for the multi-resistant organisms. The patient was commenced on Ertapenem via a newly placed PICC line. However, due to social factors, the patient had to remain in hospital for a further number of days than previ-

ously thought. During this time (after 72 hours of Ertapenem), she developed acute delirium or confusion. The patient had previously been sat out in a chair and could hold conversations with no difficulty. There was no reason to believe her cognition was impaired and, other than ongoing mobility concerns that may impact her Activities of Daily Living (ADLs), she was functionally and cognitively at baseline. Overnight, she became significantly confused, not orientated to time, place, person, or date. She had full confusion screen (which was unremarkable other than ongoing electrolyte disturbances) and CT Head, which was unremarkable for acute pathologies (there were age-related involuntional changes, however this was not thought to be a significant factor in the confusion given its chronic nature). The patient was therefore changed back to IV Cefuroxime. A further 5 days went by before the patient's confusion ceased (this was also an overnight event).

It is fair to say that the diagnosis of the medical team of Ertapenem-induced confusion/delirium was met with a degree of scepticism. The patient had an ongoing focus of infection, multiple electrolyte abnormalities and had not had full septic screen when this diagnosis was first suggested. However, the medical team persisted in this diagnosis- while it was true that



there was a recognised focus of infection in the urinary tract, this had been the case for a number of weeks without causing confusion. The electrolyte abnormalities too were longstanding, and not significantly deranged to make confusion high on the differentials.

Discussion

Ertapenem-induced Encephalopathy is a recognised, although rare, adverse reaction associated with Ertapenem, few case reports mentioned the link between ertapenem and confusion as well as altered mental status, hallucinations, and dystonic symptoms. The first two of these were experienced in our patient, although dystonia was not witnessed. The Rationale could be a neurotoxic association for carbapenems stems from animal models [1]. Carbapenem neurotoxicity is often reported in few case reports (although they are not numerous) in terms of seizure activity, which our patient did not appear to exhibit- it should be noted that the patient had Ertapenem stopped soon after first being given so it is entirely possible that further neurological deterioration may have occurred if further doses had been given. In the reviewed case reports, the patient's neurological status recovered within 2 days- after stopping ertapenem, this is shorter than the time that was seen in our patient, although the patient in the case report had normal renal function, whereas our patient had an eGFR during the event of between 18-23, which may account for the delay (Ertapenem being almost entirely renally excreted) [2].

The patient had ongoing visual hallucinations, which appears to be a hallmark symptom of Ertapenem-induced Encephalopathy, she was reviewed by our neurologist who agreed that no other cause of encephalopathy but ertapenem as a possible cause of this presentation [3].

Learning points

1. Ertapenem-induced Encephalopathy, is rare and occur mainly in patients with chronic kidney disease and prolonged Ertapenem use.
2. Common causes of delirium like infection, organ failure, metabolic, or intracranial causes are required to be ruled out first before linking encephalopathy to ertapenem.
3. Resolution of encephalopathy after discontinuation can last for few days if the kidney function is reduced.

References

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