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Case Report

Pharmacology Section

Adverse Reactions of Ferric Carboxymaltose

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ABSTRACT

The author reports a 55-year-old female diagnosed of chronic kidney disease grade-5 with associated co-morbidities like type 2 diabetes mellitus, diabetic retinopathy and hypothyroidism was admitted for arteriovenous fistula construction. She was started on ferric carboxymaltose for the treatment of anaemia. She was given a test dose before administering the drug intravenously and she did not develop any reaction. The drug ferric carboxymaltose was then administered over a period of one hour. About half an hour after drug administration, the patient developed breathlessness and myalgia. After half hour of the above episode of breathlessness and myalgia she also developed vomiting (one episode). Patient was managed with oxygen therapy, IV fluids and other drugs like corticosteroids, phenaramine maleate and nalbuphine which controlled the above symptoms.

Keywords: Anemia, Breathlessness, Chronic kidney disease, RFT(renal function test)

CASE REPORT

A 55-year-old female with chronic kidney disease grade-5, with type 2 diabetes mellitus, diabetic retinopathy and hypothyroidism. Her family history was not significant. She was admitted for arteriovenous fistula construction for future dialysis. She had deranged renal function test, high blood glucose, high blood pressure (170/100) and anemia (hemoglobin-9.0 g/dl) at the time of presentation. With the preview of anaemia, patient was started on ferric carboxymaltose after a test dose (0.5ml) which she tolerated. Ferric carboxymaltose (Encicarb) was planned to give on two days with each day a dose of 500mg (one vial) intravenous over one hour. The patient developed breathlessness and myalgia half an hour after the first dose was completed. Half hour later patient had vomiting (one episode) non-projectile which was managed with an anti-emetic. A diagnosis to allergy to ferric carboxymaltose was made.

LAB PARAMETERS

At the time of admission the lab characteristics are as follows: random blood sugar- 207mg/dl; fasting blood sugar- 114mg/dl; serum sodium- 140mEq/L; serum potassium- 5.9mEq/l; urea - 95 mg/dl; creatinine – 6.6mg/dl;urine protein- ++ (100mg/dl);urine sugar- trace (100mg/dl);24 hour urine protein- 6050mg/24 h.

TREATMENT

Patient developed breathlessness and myalgia half an hour after completing the dose of ferric carboxymaltose. She was treated with oxygen (100%) and IV fluids. Later, she was given single dose of injection hydrocortisone 100mg i.v, injection Avil 1ampule I.V and injection Nalfy 100mg IV. Breathlessness subsided over 10 minutes. The intensity of myalgia decreased over a period of one hour. One episode of vomiting was controlled with Romesetron 0.3 mg IV. No other drugs were given in this period. Other drugs for her chronic kidney disease were continued.Patient was given thyroxine for his hypothyroidism and insulin intravenous for controlling blood sugar.

DISCUSSION

Anaemia is a condition where there is deficiency of oxygen carrying capacity of the erythrocytes in the blood. Anaemia can be classified based on nutritional deficiency, functional deficiency which causes blood loss and lack of production. The nutritional elements for erythrocytes are iron, vitamin B12 and folate. Deficiency of one of the component can causes anemia. Functional deficiency causes various anaemias like thalassemia, sickle cell anaemia etc. which causes increased destruction of RBC and this can be managed by repeated transfusion.

The management of nutritional anemia is of great importance as they are most commonly seen in patients. Iron deficiency anaemia can be managed by oral and parenteral preparations. Ferrous sulphate, ferrous fumurate and ferrous gluconate are more commonly used. Parenteral iron therapy is given to patients who are having chronic anaemia and cannot tolerate oral iron therapy. These include patients with advanced chronic renal disease requiring hemodialysis various postgastrectomy conditions, previous small bowel resections, inflammatory bowel diseases etc. The biggest challenge of parenteral iron preparations is to administer free inorganic iron which produces dose dependent toxicity. The preparations available are iron dextran, sodium ferric gluconate complex and iron sucrose. Iron dextran is given intramuscularly or intravenously (most common). This drug has high adverse effects like nausea vomiting and arthralgia etc. and result a test dose of 0.5 mg i.v. is given and waited for half hour to check for tolerability. Adverse reactions with respect to iron dextran are seen less with low molecular weight dextran. The other two iron preparations are given intravenously B12 and folate deficiency are corrected with their respective supplements in advanced chronic kidney disease who are undergoing hemodialysis erythropoietin supplements(darbepoetin alpha) is used [1].

Ferric carboxymaltose is a recently approved drug by FDA in July 2013. It is approved in patients who are intolerable to oral iron and in non-dialysis chronic kidney disease patients. Ferric carboxymaltose is a colloidal iron hydroxide in complex with carboxymaltose, a carbohydrate polymer that releases iron. It is a solution given in intravenous form. The dose given above is well within the normal limits [2]. The adverse effects like vomiting is seen in more than one percent of the population involved in the clinical trials prior to FDA approval. Breathlessness and myalgia were also seen in the population who were involved in the clinical trial phases but these adverse reaction were rare (<1%).The proposed reason for nausea and breathlessness is hypersensitivity reaction (anaphylactic type) which is also known as type 1 Hypersensitivity reactions [3]. In the post marketing surveillance done in 6,755 patients the above adverse reaction was seen in more than 1 in 1000 people of the population using the drug [4].

Various studies have shown the importance of ferric carboxymaltose in treatment of anemia in chronic kidney disease patients. A randomized active controlled multicenter study has shown that ferric carboxymaltose in a dose 1000mg (high dose) is well tolerated and

has shown comparable efficacy and safety with respect to other i.v. formulations [5-9]. Studies have shown that ferric carboxymaltose can be given without the test dose and single infusion can bring down cost, fewer hospital visits and patient inconvenience [10, 11]. A randomized control trial has shown that 1000mg ferric carboxymaltose can be rapidly administered and is more effective and is better tolerated than oral iron for treatment of iron deficiency in chronic kidney disease (non-dialysis) patients [12]. Studies have shown that intravenous iron offers an effective feasible route towards reducing the heavy burden of iron deficiency anaemia in non-dialysis chronic kidney disease patients even in the absence of erythropoietin therapy [9].

CONCLUSION

Ferric carboxymaltose a newer iron preparation has shown better efficacy and tolerability in treating anaemia in non-dialysis chronic kidney disease patients. The advantage of this newer preparation is that they do not require test doses before administration of the drug. The author wants to denote that hypersensitivity reactions do develop when newer iron preparations are used and in this case it developed even after tolerating the test dose.

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