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Case Report

Anaphylactic Reaction after Intramuscular Injection of Cyanocobalamin (Vitamin B12): a Case Report

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Abstract

We report a case of anaphylactic reaction to intramuscular injection of cyanocobalamin. This 52-year-old lady was diagnosed as a case of megaloblastic anemia secondary to dietary vitamin B12 deficiency. She had severe anaphylactic reaction after the parenteral administration of cyanocobalamin. Later she received oral vitamin B12 with no adverse effects.

The purpose of this case report is to draw attention to the hypersensitive reaction to injectable vitamin B12, which is rarely seen. This could be due to sensitization to the vitamin B12 molecule itself or an IgE mediated reaction.

We concluded that anaphylactic reaction to vitamin B12 is a rare but serious side effect and it should be kept in mind while the drug is being administered to the patient, especially via the parenteral route.

Introduction

Vitamin B12 is commonly used in the management of megaloblastic anemia, which is mostly caused by deficiency of vitamin B 12 or folic acid. Both oral and parenteral preparations of vitamin B 12 are available. Most physicians generally use parenteral form of therapy. A typical treatment schedule consists of 1000µg cobalamin administered intramuscularly daily for two weeks, then

weekly until the hemoglobin and hematocrit is normal and then monthly for life.¹ We present a case of anaphylactic reaction secondary to intramuscular injection of cyanocobalamin in a female patient diagnosed to have megaloblastic anemia due to vitamin B12 deficiency.

Case Report

A 52-year-old female presented in the hematology outpatient with history of weakness for six months. Her past medical and surgical history was unremarkable. Her personal history revealed that her diet consisted mainly of vegetables and there was hardly any intake of meat or dairy products. She gave no history of any drug intake. General examination revealed pallor, while rest of the general and systemic examination was unremarkable.

Her complete blood count showed hemoglobin: 6.5gm/dl, MCV: 102 fl, white cell count: 8,500/cumm and platelets: 302,000/cumm. Her reticulocyte count was 0.6%. Peripheral blood film revealed macrocytes along with right shift neutrophils. Bone marrow aspirate was consistent with megaloblastic anemia. Her serum B12 and red cell folate levels were found to be 39.9 pg/ml (normal range: 200-950) and 188.2 ng/ml (normal range: 175-700) respectively. A diagnosis of megaloblastic anemia secondary to vitamin B12 deficiency was made. Her serum intrinsic factor antibody was found to be negative. Schilling's was not done as this is not available in Pakistan.

She was offered both oral and injectable forms of vitamin B12. She preferred intramuscular injection of vitamin B12, therefore, therapy with injection cyanocobalamin 1000 mcg intramuscularly was started. No adverse effects were observed after receiving three injections on alternate days. Her hemoglobin levels also improved and after a week it was 8.9gm/dl. After a week fourth dose was given with no complaints.

She developed generalized urticaria with pruritis, shivering, nausea, vomiting, abdominal cramps, swelling on tongue and bronchospasm after five minutes of receiving her fifth dose the next week. Her vitals revealed blood pressure of 70/50 mmHg, pulse 110/min and respiratory rate was 32 /min. On auscultation of chest there was bilateral wheeze. She was immediately given epinephrine subcutaneously with intravenous hydrocortisone and antihistamines which relieved her signs and symptoms. Then she was offered oral cyanocobalamin and no adverse event was reported. We document an anaphylactic reaction in our patient secondary to an intramuscular injection of cyanocobalamin.

Discussion

The purpose of this case report is to draw attention to the possibility, though rare, of hypersensitive reaction to

injectable forms of vitamin B12. Only a few case reports have been published regarding the anaphylactic reaction due to injection of vitamin B 12 and none have been reported from our part of the world.

There are four forms of cobalamin - cyanocobalamin, hydroxycobalamin and two coenzyme forms i.e. methylcobalamin and adenosylcobalamin.² The reported hypersensitivity reactions to vitamin B12 range from urticaria and other skin rashes to severe anaphylactic reactions leading to circulatory collapse and even death.³

Published literature suggests that allergic reactions to vitamin B12 can be either due to the preservatives added in the injectable form or due to the molecule of the vitamin itself. Lagerho et al reported a case of hypersensitivity to benzyl alcohol added as preservative in vitamin B 12 injections resulting in urticaria.⁵ Patients have also reacted to specially prepared highly purified hydroxycobalamin and other cobalamins, which might suggest that patients were sensitized to the vitamin B12 molecule itself.⁴ Further research would decide whether a polypeptide bound to the vitamin or a carry-over polypeptide is the antigen present in such cases.

Another proposed mechanism of anaphylactoid reaction to intramuscular hydroxycobalamin is said to be Ig E mediated reaction.⁶ This was demonstrated by in-vitro release of histamine by basophils in patients receiving hydroxycobalamin. It was however, noted that IgE mediated reaction is not seen with the administration of cyanocobalamin.

Apart from the injectable forms of the vitamin B12, hypersensitivity reaction has been reported in patients given the drug orally.⁷ Marmite is a dark brown colored food item extracted from yeast which is at times fortified with vitamins. There is a report of sensitized patient reacting to Marmite fortified with cyanocobalamin.³

In our patient the anaphylactic reaction occurred after the intramuscular injection of fifth dose of cyanocobalamin whereas, there was no reaction to the first four injections and she also tolerated the oral form of cyanocobalamin well. In the published literature, one case of anaphylactic reaction after the third dose of intramuscular cyanocobalamin is reported and later this patient with pernicious anemia was given oral vitamin B12 with no adverse reactions.⁴ In another case report, a patient with pernicious anemia was treated with intramuscular cyanocobalamin for eight years; it was given to her again after eight years. She experienced an anaphylactic reaction.⁷ Later this patient was also changed to the oral route. The authors in both these reports, however, were skeptical to the oral vitamin B12 in patients with pernicious anemia.

The reason for the absence of any adverse reaction in the initial doses could not be explained in these case reports. The assumption for tolerating the oral preparation could be the presence of substances used as preservative in injectable form of this vitamin.⁴ However, further explanation is required in this regard.

We concluded that anaphylactic reaction to vitamin B12 is a rare but serious side effect and it should be kept in mind while the drug is being administered to the patient, especially via the parental route.

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