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Anticoagulation Overdose when Receiving Anticoagulant Therapy Vitamin K Antagonists Who Have Use of the Coenzyme Q10: A Review of the World's Medicine

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ABSTRACT

Coagulation disorders in patients receiving vitamin K antagonist anticoagulants (VKAs) when treating patients with cardiovascular diseases that cause blood clots. The world has had several studies on the effects of the somes combined supplementations to have coagulation disorders as well as bleeding complications, but there are still many angles that need further research, especially the effects of the Coenzyme Q10 supplementation. Study on 3 cases of mechanical artificial heart valve surgery, atrial fibrillation, heart failure who were receiving anticoagulant therapy by VKAs drugs and had use of the Coenzyme Q10 supplements that can cause anticoagulation overdose. Clinical cases were found to have hemorrhagic bleeding with a high International Normalized Index (INR) and they were acutely managed with timely resuscitation and return the coagulation index to normal. It is recommended that patients who are receiving vitamin K antagonist anticoagulants should not take with the Coenzyme Q10 supplements to avoid possible coagulation disorders or bleeding may happen.

Keywords: Coenzyme Q10, Anticoagulant overdose, vitamin K antagonist

INTRODUCTION

Coagulation disorders in patients receiving vitamin K antagonist anticoagulants (vitamin K antagonists are coumarin derivatives, including warfarin, Acenocoumarol, Phenprocoumon, and Ethyl-biscoumacetate) when treating patients with cardiovascular diseases that cause blood clots [1], [2], [3], [4], [5]. When complications occur, it is a medical emergency accounting for about 11% of cases [6] or more [2], [3]. Many cases of late arrival or late detection can lead to severe blood loss, hemodynamic instability, hemorrhagic shock, and even hemorrhagic stroke [7], [8] requiring both resuscitation and intervention and/or emergency surgery [1], [2], [6].

In recent years, Hai Phong-Vinh Bao International General Hospital in Vietnam has been established 2020, put into operation, and has quickly provided medical examination and treatment to serve people in the community from many domestic areas and international regions. The increasing number of patients coming to medical examination and treatment including specialized specialties is also thanks to a team of medical specialists, including emergency, internal medicine, and cardiology. Over the past time, there have been many cases of medical examination and treatment in the state of coagulation disorders requiring timely emergency treatment, in which the majority of patients taking anticoagulants with vitamin K antagonists stem from many causes. The different causes or factors that lead to coagulation disorders, in which there are several cases when using the Coenzyme Q10 supplementation, there are blood clotting disorders as well as bleeding complications; Therefore, we proceed to report some typical cases and the above are only 3 cases out of many detected cases.

RESULTS

In terms of general characteristics, all three cases admitted to the hospital (HaiPhong-VinhBao International General Hospital in 2022) showed bleeding symptoms with a high International Normalized Index (INR) when

they were medical examination at HaiPhong-VinhBao International General Hospital in 2022. All three patients were a man of middle age and two females of elderly age.

The first case is a 51-year-old, female patient with the main disease is the mechanical mitral valve and heart failure with an ejection fraction (EF) of 49%, ischemic heart disease, overweight and obesity with a Body Mass Index (BMI) of 27.5, the patient was admitted to the hospital with slight bleeding under the skin, blood pressure's 116/60 mmHg, heartbeat is 99 heartbeat/min and Platelet (PLT) is 187 G/L, increased INR test (INR = 7.07); Recently, this patient have a habit of using the Coenzyme Q10 supplements and was admitted to the hospital because of signs of bleeding under the skin in many places, we conducted to emergency treatment, resuscitation and intravenous vitamin K treatment for anticoagulation overdose, after treatment, the patient's coagulation disorder has been stabilized [2].

The second case is a 77-year-old, female patient, the test found that the INR was high (INR: 12.84), had sinus tachycardia 126 heartbeat/min, blood pressure's 90/54 mmHg, and Platelet is 388 G/L with the main disease is the atrial fibrillation, heart failure improved (EF: 66%) and coronary artery stents, BMI's normal (BMI: 22.0); The exploiting information in the history shows the patient used the Coenzyme Q10 supplements in a long time and was admitted to the hospital because of signs of bleeding under the skin in many places. We conducted emergency treatment, resuscitation, and intravenous vitamin K treatment for anticoagulation overdose, after treatment, the patient's coagulation disorder has been stabilized [2].

The third case is an 83-year-old, female patient who was admitted to the hospital because of bruises under the skin, the main disease is atrial fibrillation and heart failure improved (EF: 68%) on the background of hypertension, mitral valve regurgitation, and aortic regurgitation grade's 2/4, BMI's normal (BMI: 18.5), heart rate of 93 beats/min, blood pressure's 124/70 mmHg. The patient with an anticoagulation overdose has an INR of 11.85 and Platelet is 246 G/L; However, this patient had a habit of often using Coenzyme Q10 supplements. The patients with atrial fibrillation, there is an indication for vitamin K anticoagulation drugs and the INR target must range from 2-3 levels. After resuscitation with intravenous vitamin K treatment for anticoagulation overdose, the patient's coagulation disorder has been stabilized [2], [3].

DISCUSSION

The patient was prescribed vitamin K antagonist anticoagulants with mechanical mitral valve, atrial fibrillation, heart failure, and prosthetic aortic valve, respectively. The results showed that the INR test index of all 3 cases above of coagulation disorder with bleeding complications, all three patients had a high INR index in the group with high bleeding risk with INR > 5 (INR are 7.07, 12.84, and 11.85, respectively). These patients all had the habit of self-using food containing combined supplementation of Coenzyme Q10 Coenzyme Q10 at home for a long time but did not report it to the doctor every time they went to the doctor [1], [2].

The pathophysiological causes of the increased risk of bleeding events are multifactorial [3]. Vitamin K is a group of fat-soluble vitamins that are structurally similar and play an important role in the regulation of blood clotting, which is necessary for the assistance of blood clotting. The function of vitamin K as a coenzyme for carboxylase is dependent on vitamin K, an enzyme required for the synthesis of proteins involved in hemostasis (blood clotting) and bone metabolism, and diverse physiological functions. is different. Prothrombin (clotting factor II) is a plasma vitamin K-dependent protein directly involved in blood clotting. Therefore, patients who are taking these anticoagulants need to maintain a consistent intake of vitamin K to avoid coagulation disorders [2], [6]. The study by Eichinger S (2016) in Austria reported that complications of anticoagulation overdose had a bleeding rate of about 11% [6], in addition, a study by Karen EG (2004) showed that the rate of bleeding can be up to 10% but up to 25% of patients are likely to bleed at least once per year [4]. A study by Connolly SJ et al. (2009) showed that the dangerous level of complications when the rate of hemorrhagic stroke occurred was 3.36% and the mortality rate was 4.13% per year in the warfarin group [1].

In fact, it is an effective antioxidant both on its own and in fusion with vitamin E and is fundamental in powering the body's energy production ATP cycle. The effect on clinical is not immediate and may take up to some weeks, It is an effective antioxidant and is fundamental in powering the body's energy production ATP cycle, So the coenzyme Q10 supplement has many health benefits, therefore this product is widely used in the hospital or pharmacy for the patient. However, much research is concluded that Coenzyme Q10 (ubiquinone/ubiquinol) is a fat-soluble quinone with a structure similar to vitamin K (phytonadione), it will lead to drug interactions with each other, Coenzyme Q10 supplementation reduces the effect of vitamin K antagonists anticoagulants [9], [10], which invisibly leads to the need to increase the dose of vitamin K antagonists anticoagulants to achieve the dose or adjust the increase or decrease erratically depending on the INR test index, this is more difficult to control in the adjustment of anticoagulants dose; when there is a state of the imbalance of Coenzyme Q10 that is easy to cause coagulation disorders, including bleeding complications with high INR index. It is worth noting that the above 3 cases of patients all have complicated diseases and when carefully exploited, many patients have a habit of using some functional foods combined with Coenzyme Q10 supplementation, so they are easy to cause drug interactions and bleeding disorders.

In principle, if there is any sign of bleeding with an increase in INR of any value, Warfarin must be stopped immediately with 10 mg of vitamin K1 intravenously and can be re-injected vitamin K1 after 12 hours. Blood transfusion, fresh frozen plasma transfusion depending on the clinical condition. For cases with coagulation disorders but no signs of bleeding, depending on the level of INR, we treat differently: In cases with INR < 5, the dose of warfarin can be reduced or stopped 1 warfarin dose and dose adjustment; With an index of 5 < INR < 9 usually stop 2 doses of warfarin and then retest and adjust the dose again; With an INR > 9 but no bleeding, warfarin is usually discontinued a dose of 10 mg vitamin K1, then re-evaluation and dose adjustment [2]. All cases of coagulopathy, especially hemorrhagic events are treated quickly and promptly stabilized by anticoagulation to bring INR back to normal, depending on the patient's condition as well as the degree of bleeding to choose the time to re-use Vitamin K antagonist anticoagulants or other anticoagulants to ensure safety and stable treatment. When the INR index is stable, continue to be monitored periodically every 4 weeks and control the INR test > 3.5 for patients with prosthetic heart valves and INR > 3 in the rest.

CONCLUSION

The clinical cases of coagulation disorders who patients receiving anticoagulant therapy with vitamin K antagonists anticoagulation when using combined supplementation of Coenzyme Q10 can be caused by coagulation disorders and an increased risk of anticoagulation overdose and hemorrhagic complications, therefore further research is needed into risk factors of combined supplementation of Coenzyme Q10 in coagulation disorders with a larger sample to confirm that these side effects for patients when they using vitamin K antagonists anticoagulants drugs. We can completely handle the situation in time and control the situation.

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