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Life Threatening Splenic Rupture Due to Rivaroxaban: A Rare Case

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Abstract
Rivaroxaban is a direct oral anticoagulant that selectively inhibits factor Xa by blocking thrombin production. It is mainly indicated for the treatment and prevention of venous thromboembolism and in patients with non-valvular atrial fibrillation. We present a 74- year-old female patient with complaints of abdominal pain, nausea, and 3 episodes of non- bilious vomiting and dyspnea. She is a known case of type 2 DM, SHTN, HFpEF, and paroxysmal atrial fibrillation, for which she has been taking tablet Rivaroxaban 15mg for 3 years. Computed tomography of the abdomen demonstrated a splenic hemostasis, due to which an emergency splenectomy was conducted without stopping rivaroxaban, which led to a major complication during the surgery.

Keywords: spleen hematoma, Rivaroxaban, spleen hemorrhage, ssplenic rupture, DOAC, case report

1. Abbreviations:

VKA: vitamin K antagonist, H/O: History of; C/O: Case of; Type 2DM: type 2 dia- betes mellitus, SHTN: sustained hypertension, HFpEF: heart failure with preserved ejection fraction, BP: blood pressure, RR: Respiratory Rate, CVS: Cardio Vascular System, S1S2: Sound 1 Sound 2, RS: Respiratory System, BLAE: bilateral air entry; CNS: central nervous system; NFND: Neurocognitive Function Non-Decline; DOAC: Direct Oral Anti-coagulants

2. INTRODUCTION:

A splenic rupture frequently occurs following severe trauma. Most cases of non-traumatic spleen ruptures result from splenic diseases or from circumstances such as coagulopathy, neo- plasms, and infections. Non-traumatic rupture is uncommon, but when it does occur, the fatality risk is approximately 12% [1]. It has been widely accepted that direct oral anti- coagulants (DOACs) might cause bleeding problems. Their correlation with non-traumatic splenic rupture, a potentially lethal condition, is, however, little understood. The non-VKA oral anticoagulant (NOAC) rivaroxaban is a selective inhibitor of the activated coagula- tion factor X, which has an excellent dose-response relationship, few drug-drug interactions, and no drug-food interactions; no routine coagulation monitoring is required, and patients can be treated with fixed-dose [2]. We present a case of spontaneous splenic rupture in a rivaroxaban-treated patient. The published studies on the incidence

of rivaroxaban-induced bleeding are rare when compared with vitamin K antagonists.

3. CASE PRESENTATION

History:

A 74-year-old female patient came to the emergency room with complaints of on-and- off dull, aching abdominal pain, nausea, and three episodes of non-bilious vomiting and dyspnea. She had h/o constipation in the last week with difficulty passing stools. She is a known case of type 2 DM, SHTN, HFpEF, and paroxysmal atrial fibrillation, for which she has been taking the tablet Aspirin 75mg OD for the past 9 years, which was later changed to the tablet Rivaroxaban 15mg OD after undergoing cataract surgery 3 years ago. Other medications at the time of admission include tablet Diltiazem SR 60mg OD, tablet Telmisartan 80mg OD, and tablet Atorvastatin 10mg OD.

Examination findings:

BP: 130/80 mmHg; HR: 102 bpm; RR: 16/min; Afebrile. Spo2- 98%. PA: distended, diffuse tenderness present; bowel sounds heard. No organomegaly, CVS-S1S2 heard, no murmurs, RS-BLAE+ve, CNS-NFND, pallor present.

Investigations:

(type of investigation done) A large subcapsular hematoma was noted in the spleen with compressed normal splenic tissue infero-medially. The hematoma measures ~ 11.5x8.5x9.1cm. There is active extravasation of IV contrast noted within the hematoma, which changes in shape, size, and attenuation in all three phases. Minimal ascites were also noted.

OUTCOME AND FOLLOW-UP:

An emergency open splenectomy for splenic hemorrhage with sub-capsular hematoma was done. As this was an emergency surgery, Rivaroxaban could not be stopped as per guidelines, so the last dose of Rivaroxaban taken by the patient was 10 hours prior to surgery. This causes an active bleed from a branch of the splenic artery during the surgery with a ruptured splenic capsule, hemoperitoneum, and blood clots of approximately 400–500 ml. Postoperatively, she was shifted to the ICU for monitoring. Her hemoglobin levels were closely monitored for any further drops. She was slowly initiated on oral feeds and tolerated them well. On the 5th day of post-surgery, she was found to have an acute AF, for which she was shifted to the CCU for management of arrhythmia, and she was started on the tablet apixaban 2.5mg. After 9 days of hospitalization, she was discharged with the advice of a post-splenectomy vaccination after 2 weeks.

4. DISCUSSION:

Rivaroxaban is a direct oral anticoagulant (DOAC) medication used to treat and prevent blood clots. The use of rivaroxaban was approved by the US FDA on November 4th, 2011 for reducing stroke risk in patients with non-valvular atrial fibrillation. The recommended usual dose of rivaroxaban for stroke prevention in patients with non-valvular atrial fibrilla- tion is 20mg OD as per the ACC, AHA, and HRS guidelines [3]. It has a half-life of 5–9 hours, while in elderly patients, the half-life is 11–13 hours [4]. There have been reports of rivaroxaban-induced splenic hemorrhage, in which some of the cases have increased rivarox- aban effects from concomitant drug administration [5]. In this case, the concomitant drugs prescribed were Diltiazem SR, atorvastatin, and telmisartan. Diltiazem increases the levels of rivaroxaban by affecting the hepatic and intestinal enzyme CYP3A4 metabolism [6].

Rivaroxaban is intended to prevent blood clots, but it can potentially raise the risk of bleeding episodes.

This emergency case of rivaroxaban-induced bleeding is noteworthy since it is unusual and serious. In addition to this, rivaroxaban was not discontinued prior to surgery, which led to bleeding complications during the surgery.

There is conflicting information about the link between atraumatic splenic rupture and reported usage of DOACs. Although the exact mechanism is yet unknown, some research indicates that Xa inhibitors may raise the risk of bleeding by escalating splenic microtraumas that are not yet identified [7].

5. CONCLUSION:

We describe a case where rivaroxaban was shown to be the primary cause of splenic hemorrhage, with the risk of bleeding being increased by Diltiazem SR. Maintaining a high level of speculation for splenic rupture in a traumatic patient and resuscitation of patients with life-threatening bleeding while on a DOAC remains an ongoing challenge. Primary concern should be hemodynamic stability; nevertheless, in situations where splenic function is affected or there is an underlying malignancy, complete splenectomy should be considered as a first-line treatment.

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