Role of Recombinant Activated Factor VIIa (rFVIIa) in Bleeding Mycotic Aneurysm of the Abdominal Aorta

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ABSTRACT

Mycotic aortic aneurysm is an infective disease of the aorta with high mortality rate despite surgical repair. Recombinant activated factor VIIa (rFVIIa) is approved for the treatment of bleeding in hemophilia and used (off-labeled) in acute bleeding related to the trauma, cardiac surgery, and intracranial bleed. A 38-year female was admitted with abdominal pain, and was subsequently diagnosed with bleeding mycotic aneurysm of the abdominal aorta. She was given rFVIIa and the bleeding stopped successfully. We recommend further evaluation of the role of rFVIIa in bleeding mycotic abdominal aortic aneurysm, as it can bring a novel change in the management of this devastating disease.

Key Words: *Mycotic aortic aneurysm, Factor VIIa (rFVIIa), Abdominal aorta, Bleeding.*

How to cite this article: Bibi S, Ahsan I, Makki K, Rauf S. Role of Recombinant Activated Factor VIIa (rFVIIa) in Bleeding Mycotic Aneurysm of the Abdominal Aorta. *J Coll Physicians Surg Pak* 2022; **32(09)**:1209-1211.

INTRODUCTION

Mycotic aneurysm of aorta, when complicated with rupture, may have devastating outcomes and carry 40% mortality rate despite surgical repair. Recombinant activated factor VIIa (rFVIIa) is officially approved for various bleeding disorders.[1-6] We tried rFVIIa (off-label) in a 38-year female patient with leaking mycotic aneurysm of abdominal aorta and achieved success in bleeding control. Successful use of rFVIIa may prove to be of great help in the patients with ruptured aortic aneurysms and can bring a great change in the management of this life-threatening condition.

CASE REPORT

A 38-year female, married, was a known case of diabetes for one year (well-controlled on insulin) with a past surgical history of cholecystectomy (2 years back), subtotal thyroidectomy (8 years back secondary to multi-nodular goiter), caesarian section four times, and medical history of tuberculous meningitis for which she was treated with oral anti-tuberculous therapy (ATT) for 2 years and tested negative for clearance at the end of therapy with repeat CSF studies. Her ATT was completed 2 months back. She presented to the emergency department with the complaints of the right-sided flank pain for 1 week and nausea for 1 day.

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Received: May 17, 2020; Revised: November 15, 2020; Accepted: December 16, 2020
DOI: https://doi.org/10.29271/jcpsp.2022.09.1209

The pain was mild to moderate in intensity, getting worse at night and on lying down, initially localised to the right flank only but then was radiating to the epigastrium. One day before admission, she started having nausea but no vomiting. When she landed in the emergency department, she was awake, conscious, and communicative, looking in mild distress due to the pain; otherwise, she was vitally stable with blood pressure of 130/80 mmHg, pulse rate (PR) of 90 beats/min (regular and of normal volume and character), respiratory rate (RR) of 18 breaths/min, and O_2 saturation (SIO_2) of 98% on room air. On further examination, her abdomen was distended, tense, and the umbilicus was centrally placed and inverted. There was mild tenderness and fullness in the epigastric region, but no visceromegaly was noted.

Gut sounds were audible. No aortic pulsations were appreciated. Her laboratory parameters showed hemoglobin (Hb) of 8.0 g/dl with low mean corpuscular volume (MCV) and a total leukocyte count (TLC) of 8,000 cells/mm^3 and platelet count of 330,000/mm^3. Ultrasound abdomen showed abdominal aortic aneurysm. On day 2 of her hospital stay, her repeat complete blood count (CBC) showed a drop in Hb from 8.0 g/dl to 7.6 g/dl and on the same day, repeat Hb in the evening showed Hb of 6.9 g/dl (Table I). She complained of worsening in abdominal pain but otherwise, she remained stable. An urgent CT scan abdomen with contrast was done which showed an irregular lobulated saccular aneurysm approximately measuring 2.9×2.4 cm with the neck of 1.0 cm arising from the right lateral aspect of the abdominal aorta just above the level of celiac axis. Keeping in view the leaking aneurysm, the patient was immediately transferred to the intensive care unit (ICU). Combined meeting of vascular surgery and ICU team was arranged, and

possible treatment options were discussed. Available options for bleeding mycotic aneurysm of the abdominal aorta were surgical repair with graft placement, for which the required graft was not readily available. A combined meeting with the family was also arranged, and whole scenario was explained. Till day 3, the patient remained clinically stable, but she was constantly dropping her Hb (Table I). We reviewed literature about the role of rFVIIa in the setting of acute bleeding and after combined consensus of all the included disciplinary teams, gave rFVIIa to the patient at a dose of 90 µg/kg with the total of 2 doses, each 12 hours apart, with a total of 4 packed cell volume (PCV) transfusions. We decided this dose from the available literature on the use of the drug in cardiovascular surgery.[7] Following administration of rFVIIa, we performed serial twice daily monitoring of Hb, which remained static at around 11 g/dl. On around day 8 of ICU stay, we repeated her CT abdomen with contrast, which showed the same mycotic aneurysm with no active bleeding and organisation of the previous hematoma. We then discharged her with advice to follow-up with vascular surgery.

Table I: Pattern of hemoglobin.

Time	Hemoglobin (Hb) (g/dl)
On admission	8
On 2nd day morning	7.6
On 2nd day evening	6.9
On 3rd day and onwards	11

DISCUSSION

rFVIIa is a new advancement in the management of acute bleeding. It is approved for hemophilia patients with bleeding.[4] It has been studied in both congenital and acquired hemophilia A and B.[1] The studied dose is up to 270 µg/kg in hemophilia with inhibitors. Mayer *et al*. reported for the first time the useful role of rFVIIa in patients of acute intracranial hemorrhage (ICH).[5] Multiple studies have been conducted to define the role of rFVIIa (off-label use) in a number of clinical situations including conditions like platelet disorders, warfarin therapy, antiplatelet therapy, liver disease, Trauma,[2] cardiovascular surgery, and to decrease blood loss during the perioperative period after major surgery. However, the optimal dose for off-label use of rFVIIa needs to be defined in mentioned scenarios, and there is an estimated 1.4% risk of thromboembolic side effects with its use under off-label use.[6] Moreover, enhancement in prothrombic effects has been reported when rFVIIa is used in combination with tissue factor (TF).[3] In cardiac surgery, dose of 1.2 µg (less than 90 µg/kg) was found effective in severe bleeding of cardiac surgery.[7] Mycotic aneurysm of the abdominal aorta is a rare entity. It is basically a metastatic infection of aorta most of the time for which some primary focus of infection is identified but some cases have been reported in the literature where no primary focus could be documented, and the aneurysm was labelled as being mycotic on the basis of peroperative findings. It is a catastrophic disease with a very high-mortality rate even with surgical repair (40%).[8] Higher mortality was found in the settings of spontaneous pre-surgical rupture of aneurysm. The management of the condition is mainly surgical resection.[9] Various adjunctive techniques are opted to avoid complications associated with surgery, for example, application of omental or pedicle muscle flap, open dressing with delayed closure,[10] application of biological homo grafts and venous grafts, and similarly, placement of antibiotic-soaked grafts. Unfortunately, we do not have any expertise available in our city to perform such repair in mycotic abdominal aortic aneurysm. Also, we do not have any of above mentioned adjunctive techniques available. Successful use of rFVIIa can provide great hope in patients with ruptured aortic aneurysms and can bring a great change in the management of this life-threatening condition.

PATIENT'S CONSENT:

This case report is being submitted after informed consent taken from the patient. She was assured about the maintenance of confidentiality.

COMPETING INTEREST:

The authors declared no competing interest.

AUTHORS' CONTRIBUTION:

SB: Has written the whole paper including the original case and discussion.
IA: Helped in case writing.
KM, SR: Reviewed the final paper.
All the authors have approved the final version of the manuscript to be published.

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