

A Possible Allergic Reaction Case to Thrombin Injected into Pseudoaneurysm After Radiofrequency Ablation

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

DEF **Lahati Ha***
B **Sze-Wa Yiu***
F **Fang-Fang Wang**
AF **Jiang-Li Han**

Department of Cardiology, Peking University Third Hospital, Beijing, P.R. China

* Lahati Ha and Sze-Wa Yiu contributed equally to this manuscript

Corresponding Author: Jiang-Li Han, e-mail: dr_hanjiangli@126.com

Conflict of interest: None declared

Patient: Female, 82
Final Diagnosis: Possible allergy to thrombin
Symptoms: Palpitation
Medication: Bovine thrombin
Clinical Procedure: Radiofrequency ablation
Specialty: Cardiac Surgery

Objective: Unusual clinical course
Background: Radiofrequency ablation is a minimally invasive treatment for arrhythmias, including frequent ventricular premature. As a complication of radiofrequency ablation, pseudoaneurysm can be treated conservatively or by ultrasound-guided thrombin injection.

Case Report: We report a case that a possible allergic reaction to thrombin injected into pseudoaneurysm after radiofrequency ablation.

Conclusions: We hope that the report of successful management of the allergic reaction in this case may be of help to other doctors; we also emphasize the importance of checking the patient's history of allergies to thrombin when considering treating pseudoaneurysm with thrombin injection.

MeSH Keywords: Aneurysm • Catheter Ablation • Hypersensitivity • Thrombin

Full-text PDF: <https://www.amjcaserep.com/abstract/index/idArt/916949>



Background

Radiofrequency ablation is a minimally invasive treatment for arrhythmias, including frequent ventricular premature. As a complication of radiofrequency ablation, pseudoaneurysm can be treated conservatively or by ultrasound-guided thrombin injection.

Case Report

An 82-year-old female patient was accepted to our hospital to undergo radiofrequency ablation for the treatment of frequent ventricular premature contractions. The Holter monitor (24 hours) indicated 31 325 ventricular premature beats, which accounted for 31.7% of the total number of heartbeats. Presurgical examination found no clear contraindications. Electrocardiographic (ECG) examination revealed ventricular premature beats coming from the left ventricle, and the culprit tissue was ablated with catheter via the right femoral artery. The operation of radiofrequency ablation was successful as shown by ECG examination.

The bandage compressing the puncture site was removed 24 hours later, no hemorrhage or murmur was observed. Forty-eight hours later, the patient complained about pain in her right lower limb artery puncture site. The physical examination revealed swelling in her right lower limb with ecchymosis, and a murmur could be detected at the femoral artery puncture site. A follow-up blood routine showed a decrease of hemoglobin. Color Doppler ultrasound indicated the formation of pseudoaneurysms in the right femoral artery. Because the treatment of compression using bandage was not effective in achieving pseudoaneurysm thrombosis, the patient was subjected to ultrasound-guided bovine thrombin injection. After percutaneous injection of thrombin directly into the pseudoaneurysmal sac under real-time ultrasound guidance, successful thrombosis was confirmed immediately with Doppler imaging.

One hour after the thrombin injection, the patient presented with nausea, tremble, chest tightness, high fever (38.9°C), and drop in blood pressure. The blood test showed a critical decrease in leukocyte (WBC $0.87 \times 10^9/L$), progressive decrease in hemoglobin and platelet, progressive elevated in fibrin/fibrinogen degradation products (FDP) and D-dimer, and liver dysfunction (alanine aminotransferase: 409 U/L). The ECG showed ST-segment depression and T-wave inversion in leads V4–V6. Further examinations including blood gas analysis, urinalysis, echocardiography, and abdominal ultrasound were normal.

In view of the aforementioned symptoms, an allergic reaction to thrombin was considered and the patient was treated accordingly. Under ECG, blood pressure and SpO₂ (peripheral

capillary oxygen saturation) monitoring, the patient received oxygen inhalation, fluid infusion, dopamine, dexamethasone, suspension red blood cell, fresh frozen plasma, supportive liver protection therapy, and other symptomatic treatments. Finally, the vital signs of the patient became stable and the results of blood tests, including routine blood tests, coagulation function test, and liver function tests improved.

Discussion

An acute pseudoaneurysm is a lacuna filled with blood from a ruptured artery, encompassed by fibromuscular tissues, and intercommunicates with the artery by means of a narrow neck. The puncture-site femoral pseudoaneurysm can occur due to procedures such as cardiac catheterization and peripheral artery angiography. Pseudoaneurysm is commonly treated by non-invasive ultrasound-guided compression. However, this time-consuming procedure brings discomfort to both the patient and the operator, and its effectiveness for large pseudoaneurysms and patients on anticoagulation therapy is limited. Surgical repair might be required for some patients. As a substitution to compression therapy, ultrasound-guided thrombin injection gives better results in the treatment of pseudoaneurysm [1–4].

A series of reports suggested that complete thrombosis in the pseudoaneurysm sac was accomplished in more than 90% of patients receiving bovine thrombin injection; thrombin injection has also been used when compression is unsuccessful [5,6]. A case control study in 30 patients showed that thrombin injection is more effective than pure compression [7].

Allergic reaction caused by thrombin is rare and is probably due to the generation of antibodies to bovine thrombin in the human body which renders cross-reaction with factor V. The presence of human blood coagulation inhibitors may induce abnormal bleeding and interfere with clotting measurements. Platelet infusions, fresh frozen plasma, and activated prothrombin complex concentrates have been used in the management of acute hemorrhagic complications, though often with limited effect. Treatment with corticosteroids, cyclosporine, antineoplastics, intravenous immunoglobulin, and plasmapheresis can be applied to reduce the antibody titer [8,9].

Conclusions

For the case presented here, it was highly suspected that an allergic reaction to thrombin occurred after thrombin injection. The successful management of the patient's symptoms with symptomatic treatment to the allergic reaction to thrombin also supported the conjecture. In view of this, we think it

is important to check a patient's history of allergies to thrombin when considering treating pseudoaneurysm with thrombin injection; a skin prick test is recommended when necessary.

References:

1. Tisi PV, Callam MJ: Treatment for femoral pseudoaneurysms. *Cochrane Database Syst Rev*, 2013; (11): CD004981
2. Paulson EK, Sheafor DH, Kliewer MA et al: treatment of iatrogenic femoral arterial pseudoaneurysms: Comparison of US-guided thrombin injection with compression repair. *Radiology*, 2013; 215(2): 403–8
3. Kuma S, Morisaki K, Kodama A et al: Ultrasound-guided percutaneous thrombin injection for post-catheterization pseudoaneurysm. *Circ J*, 2015; 79(6): 1277–81
4. Mishra A, Rao A, Pimpalwar Y: Ultrasound guided percutaneous injection of thrombin: Effective technique for treatment of iatrogenic femoral pseudoaneurysms. *J Clin Diagnostic Res*, 2017; 11(4): TC4–6
5. Olsen DM, Rodriguez JA, Vranic M et al: A prospective study of ultrasound scan-guided thrombin injection of femoral pseudoaneurysm: A trend toward minimal medication. *J Vasc Surg*, 2002; 36(4): 779–82
6. Hofmann I, Wunderlich N, Robertson G et al: Percutaneous injection of thrombin for the treatment of pseudoaneurysms: the German multicentre registry. *Euro Intervention*, 2007; 3(3): 321–26
7. Lönn L, Olmarker A, Geterud K et al: Treatment of femoral pseudoaneurysms: Percutaneous US-guided thrombin injection versus US-guided compression. *Acta Radiol*, 2002; 43(4): 396–400
8. Ortel TL: Clinical and laboratory manifestations of anti-factor V antibodies. *J Lab Clin Med*, 1999; 133(4): 326–34
9. Streiff MB, Ness PM: Acquired FV inhibitors: A needless iatrogenic complication of bovine thrombin exposure. *Transfusion*, 2002; 42(1): 18–26

Conflict of interest

None.