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Case Report

A Case of Huge Scrotal Hematoma during Mechanical Thrombectomy

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Objective: We report a case of huge scrotal hematoma during emergency mechanical thrombectomy.
Case Presentation: An 85-year-old man presented with sudden aphasia and right-sided hemiplegia. He was diagnosed with cerebral infarction due to left M1 occlusion and underwent an emergency mechanical thrombectomy. The treatment was completed with full recanalization, but when replacing the long sheath in the right femoral artery with a short sheath, the patient flexed his leg. The sheath could not be replaced, resulting in a massive scrotal hematoma. Shortly after, the patient went into cardiopulmonary arrest but recovered spontaneous circulation after cardiopulmonary resuscitation. The puncture site was treated hemostatically with manual compression, and the scrotal hematoma was not enlarged. He was transferred to another hospital with a modified Rankin Scale score of 5.
Conclusion: Scrotal hematoma is a rare but potentially fatal puncture site complication that should be considered during neuro-endovascular treatment.

Keywords scrotal hematoma, mechanical thrombectomy, ischemic stroke

Introduction

Scrotal hematoma is a rare and little-known but potentially fatal complication of femoral artery puncture. In this report, we describe a case of a large scrotal hematoma during mechanical thrombectomy.

Case Presentation

The patient was an 85-year-old man. He experienced sudden right-sided hemiparesis and was transported to our hospital 1 hour and 30 minutes after onset. On arrival, neurological findings were global aphasia, left conjugate deviation, manual muscle test (MMT) 1/5 paralysis of the right upper limb, MMT 2/5 paralysis of the right lower limb, and a National Institutes of Health Stroke Scale score of 25. Head MRI showed left M1 occlusion and diffusion-weighted imaging-Alberta stroke program early CT score (DWI-ASPECTS) was 8 points (**Fig. 1**). Emergency mechanical thrombectomy was performed because of large DWI–clinical mismatch.

A 9-F long sheath (25 cm) was inserted into the right femoral artery. The 9-F OPTIMO (Tokai Medical Products, Aichi, Japan) was placed in the left cervical internal cerebral artery (ICA) using the balloon-inflation anchoring technique[1)] with a system comprising 9-F OPTIMO + 6-F JB2 (Medikit, Tokyo, Japan) + Radifocus E type 0.035 (Terumo, Tokyo, Japan). Occlusion of the left M1 was confirmed by angiography. We guided a system comprising Catalyst 6 (Stryker, Kalamazoo, MI, USA) + Phenom 27 (Medtronic, Minneapolis, MN, USA) + Traxcess 0.014 (Terumo) through the occlusion site; however, Phenom 27 failed to pass through the lesion, so we replaced it with Trevo Trak 21 (Stryker). The lesion was quickly crossed. Catalyst 6 was crimped to the clot and Embotrap II (Cerenovus, Raynham, MA, USA) was deployed from M2. After 90s, both devices were removed while applying suction using Dominant Flex Pump (Medela, Dietersheim, Germany). Complete recanalization was achieved with one pass (**Fig. 2**). However, mild stenosis was observed in the left distal M1. Angiography was performed every 5 min,

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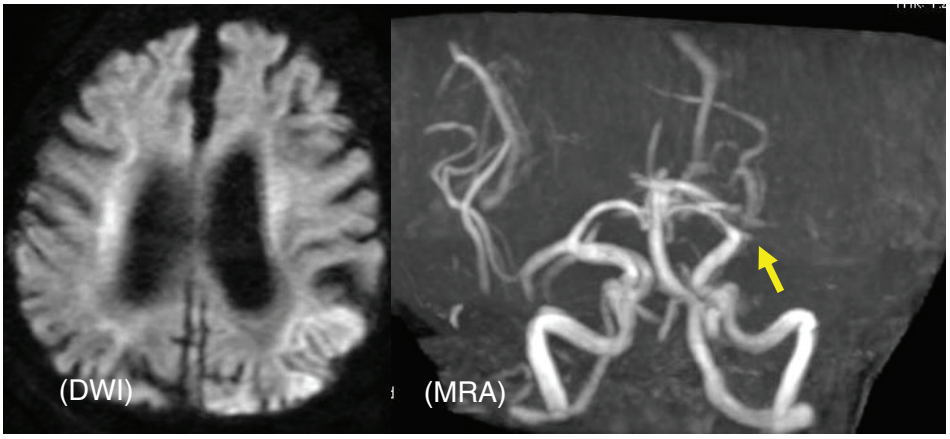

Fig. 1 Head MRI showed cerebral infarction due to left M1 occlusion. DWI-ASPECTS was 8 points. DWI-ASPECTS: diffusion-weighted imaging-Alberta stroke program early CT score

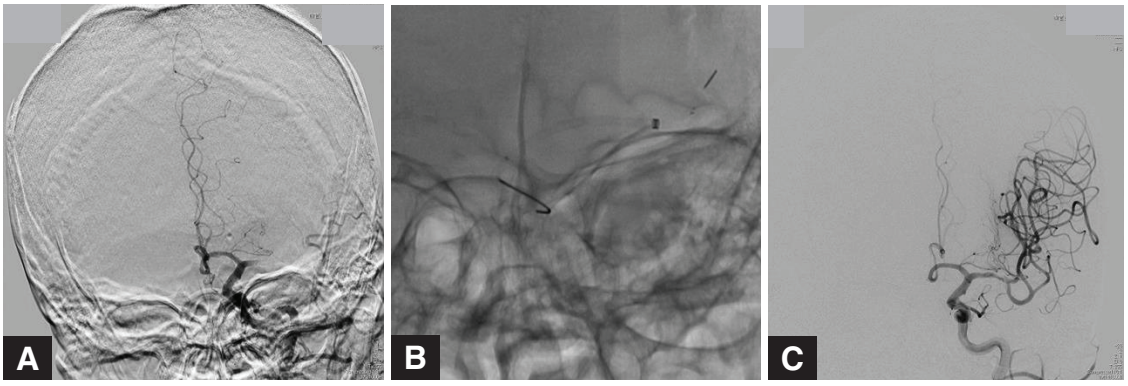

Fig. 2 **(A)** Occlusion of the left M1 was confirmed by angiography. **(B)** Combined technique with Catalyst 6 and Embotrap II. **(C)** Complete recanalization with one pass.

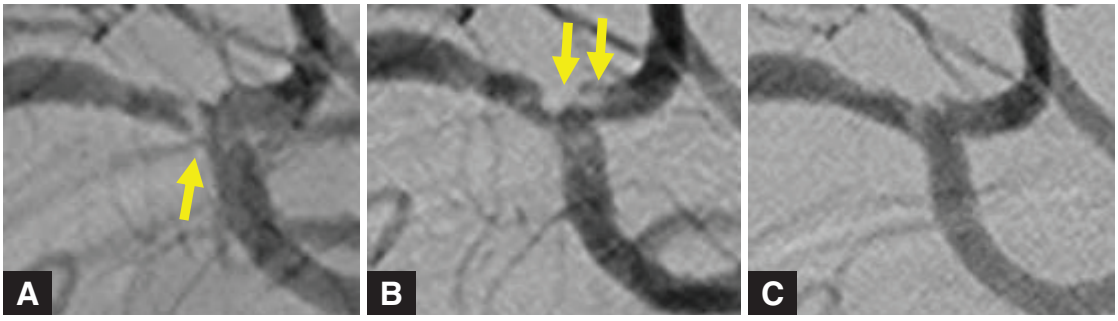

Fig. 3 **(A)** New thrombus formation at left distal M1 due to endothelial damage caused by the stent retriever. **(B)** The thrombus increased gradually. **(C)** The thrombus almost completely disappeared after administration of aspirin 200 mg, clopidogrel 300 mg, and ozagrel 80 mg.

and a new thrombus, which gradually increased, was observed at that site (**Fig. 3A** and **3B**). Considering thrombus formation due to endothelial damage caused by the stent retriever, aspirin 200 mg and clopidogrel 300 mg were administered via a nasogastric tube, and ozagrel sodium 80 mg was administered via rapid intravenous infusion. After approximately 40 min, the thrombus almost completely disappeared (**Fig. 3C**). The patient was scheduled to enter the intensive care unit (ICU) after replacement of the 9-F long sheath (25 cm) in the right femoral artery with a 9-F short sheath (10 cm). However, the long sheath was removed, and immediately before the short sheath was inserted along the wire, the patient flexed his right lower limb strongly. We attempted to insert the short sheath again by extending his lower limb but were not able to insert it into the femoral artery due to high resistance. A short time

Fig. 4 A large scrotal hematoma was observed.

Fig. 5 Head CT on the third hospital day showed extensive infarction in the left MCA region. MCA: middle cerebral artery

later, the blood pressure dropped to a systolic blood pressure (SBP) of 70 mmHg. Manual compression of the puncture site was initiated after the sheath and wire were removed. When the drape was removed, a large scrotal hematoma was observed (**Fig. 4**). The patient was diagnosed with hemorrhagic shock, and massive intravenous infusion was initiated; however, he went into cardiac arrest with pulseless electrical activity, and cardiopulmonary resuscitation was initiated. After the return of spontaneous circulation, a dopamine-induced increase in blood pressure was initiated. An abdominal CT scan showed no active bleeding but a large scrotal hematoma. Postoperatively, hemoglobin dropped from 12.8 g/dL to 8.4 g/dL, requiring a total of 6 units of red blood cell transfusion. Postoperative antithrombotic therapy for the cerebral infarction was not administered because of concerns about rebleeding due to the presence of a large scrotal hematoma; however, head CT on the third hospital day showed extensive infarction in the left middle cerebral artery (MCA) region (**Fig. 5**). As no postoperative antithrombotic therapy was administered, it was speculated that the left MCA might have re-occluded due to thrombus formation caused by endothelial damage. The scrotal hematoma was treated conservatively with antibiotics and shrank spontaneously. He was transferred to another hospital with a modified Rankin Scale score of 5.

Discussion

We encountered a case of a large scrotal hematoma as a puncture site complication during neuroendovascular treatment. In this case, it is thought that the patient flexed the lower limb strongly during sheath replacement, which kinked the wire. As a result, the sheath could not be inserted into the femoral artery. The sheath was repeatedly pushed and pulled while applying light manual compression to the puncture site. Inadequate compression is thought to have caused a large amount of bleeding in a short period of time. Because light manual compression was applied, subcutaneous swelling did not occur and bleeding could not be confirmed. On the CT scan, the scrotal hematoma was 13 × 13 × 11 cm in size, and the estimated hematoma volume was approximately 930 mL. Hemorrhagic shock occurs with a rapid loss of approximately 20% or more of the total circulating blood volume, and since the total circulating blood volume in this case was approximately 4600 mL (body weight 60 kg ÷ 13), a loss of 920 mL or more would have caused shock. Thus, we concluded that the patient was in hemorrhagic shock due to scrotal hematoma. Regarding the cause of scrotal hematoma, Ishibashi et al. reported a case in which the inguinal canal penetrated during femoral artery puncture, extravasation was observed in the inguinal canal, and bleeding flowed into the inguinal canal, resulting in a large scrotal hematoma.[2)] Similarly in the present case, we considered it possible that during puncture or sheath replacement, the inguinal canal was penetrated, and bleeding flowed into the inguinal canal, causing scrotal hematoma. Usually, the femoral artery puncture position is marked at the center of the femoral head to avoid puncture in the

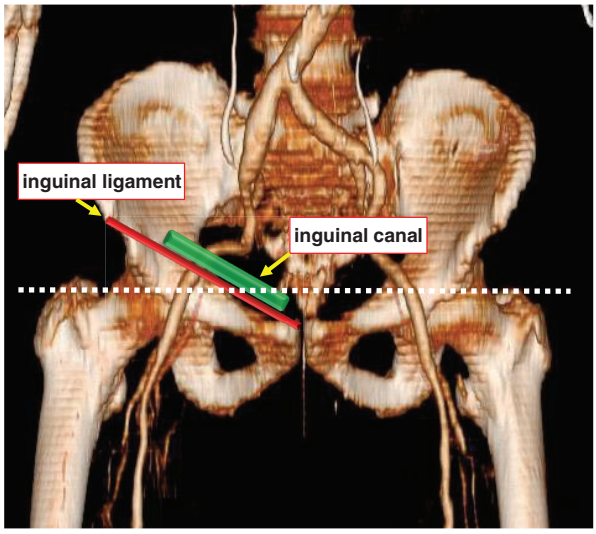

Fig. 6 3D-CTA of this patient after mechanical thrombectomy. The inguinal ligament is on the line connecting the superior anterior iliac spine and the pubic symphysis. The inferior wall of the inguinal canal is composed of the inguinal ligament. White dotted line shows the position line at the middle of the femoral head. Usual puncture point and inguinal canal are close in this case.

retroperitoneum. If punctured cephalad of the inguinal ligament, it can cause serious complications such as retroperitoneal hematoma. Anatomically, the inferior wall of the inguinal canal is composed of the inguinal ligament, meaning that a puncture just cephalad of the inguinal ligament could penetrate the inguinal canal, and if bleeding from the puncture site flows into the inguinal canal, it can cause scrotal hematoma. To avoid scrotal hematoma, the artery puncture position should be more caudal than the inguinal ligament. In this case, however, the usual puncture point and the inguinal canal were so close that a slight cephalic shift of the puncture point could lead to penetration of the inguinal canal (**Fig. 6**). Puncture site complications of catheterization include bleeding, hematoma formation, pseudoaneurysm, arteriovenous fistula, arterial dissection, arteriovenous thrombosis, and infection. Among these, active bleeding is sometimes fatal. In particular, retroperitoneal hematomas are difficult to confirm from outside the body, thus delaying their detection. In addition, it is difficult to stop bleeding by compression from the body surface, which can easily become serious. Many recent studies investigating puncture site complications in the femoral approach have compared vascular closure devices (VCDs) and manual compression hemostasis. According to the ISAR-CLOSURE randomized clinical trial,[3] the largest randomized control study (RCT) among them, major bleeding related to the puncture site (retroperitoneal hemorrhage with hemoglobin decreased by more than 3 g/dL, any bleeding with hemoglobin decreased by more than 4 g/dL, or bleeding requiring more than 2 units of blood transfusion) was reported as 0.1% in the VCDs group and 0.2% in the manual compression group. Although scrotal hematoma is not mentioned in this report, it is a rare complication with a lower prevalence rate. There have been two reports of massive scrotal hematoma during percutaneous angioplasty[4,5] and three reports of massive scrotal hematoma in patients who underwent cardiac catheterization using the femoral artery approach.[6–8] Kumar et al. reported a case in which the puncture site of the right femoral artery achieved hemostasis using a VCD (Angio-Seal) after cardiac catheterization, and the procedure was completed uneventfully; however, the patient developed a massive scrotal hematoma after discharge. The patient was transported in a state of shock, and manual compression was applied to the puncture site. The patient required blood transfusion and was treated conservatively.[7] Polavarapu et al. similarly reported a case in which a VCD was used after cardiac catheterization, but a huge scrotal hematoma developed 12 hours later.[8] Ultrasound examination revealed a pseudoaneurysm following the puncture site of the right femoral artery causing scrotal hematoma. Emergency surgery was performed, and the plug of the hemostatic device was dislodged and found at the level of the deep fascia. The puncture site of the femoral artery was repaired and a large hematoma was aspirated. To the best of our knowledge, there are no reports of scrotal hematoma as a complication of neuroendovascular treatment. Treatment of scrotal hematoma is usually conservative if hemostasis is achieved, but in cases where persistent bleeding is suspected, surgical treatment may be performed.[9]

Conclusion

Scrotal hematoma is a rare but potentially fatal puncture site complication that should be considered during neuroendovascular treatment.

Acknowledgments

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Disclosure Statement

All authors declare that they have no conflicts of interest.

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