Case Studies

A Case of Posterior Circulation Ischemic Stroke Caused by Heparin-Induced Thrombocytopenia after Detaining Hepatic Arterial Infusion Catheter

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In Japan, hepatic arterial infusion chemotherapy (HAIC) using reservoir system is recommended for patients with hepatocellular carcinoma (HCC) whose hepatic spare ability is favorable. Arterial infusion catheter is commonly detained in hepatic artery via femoral or brachial artery. In our hospital, catheter is often inserted by puncturing the left subclavian or brachial artery considering the patient's activities of daily living (ADL) during long-term detaining. However, it rarely causes posterior circulation ischemic stroke because of the left vertebral artery branches on the path of catheter. We herein report a case of posterior circulation ischemic stroke caused by heparin-induced thrombosis (HIT) after detaining hepatic arterial infusion catheter. A 63-year-old man who is under HAIC treatment for HCC was introduced to the department of neurological surgery because of vertigo and vomiting. Magnetic resonance imaging revealed sporadic fresh cerebral infarction in the bilateral cerebellar hemisphere. Carotid ultrasonography detected a floating thrombus around the part of the left vertebral subclavian artery bifurcation. Detained catheter was removed and continuous heparin administration was started immediately. However, thrombocytopenia occurred 5 days after the injection. Because 4T's score was 6 points, HIT was strongly suspected. We stopped heparin injection immediately and observed the patient's physical status strictly. After that, platelet value improved naturally. At the late date, antibodies specific for platelet factor 4/heparin complexes were positive and he was diagnosed with HIT.
Key Words: Heparin-induced thrombosis—arterial infusion catheter—posterior circulation ischemic stroke—hepatocellular carcinoma.

Introduction

Hepatic arterial infusion chemotherapy is widely performed in Japan for nonresectable primary, metastatic hepatic cancer or an adjuvant therapy after hepatectomy for HCC. Arterial infusion catheter is commonly detained in hepatic artery via femoral or left subclavian artery. Ischemic stroke occurs as a rare complication associated with catheter placement, and the internist performing the treatment might need to consult to the neurosurgeon.

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However, arterial infusion catheter is coated with heparin in the vicinity, which might lead to heparin-induced thrombocytopenia (HIT). HIT is a rare, but potentially severe, complication of heparin therapy; symptoms of HIT result from the development of arterial and venous thrombosis and are correlated with the severity of thrombocytopenia. However, many neurosurgeons have low recognition of HIT, and they might use heparin against ischemic stroke or systemic embolism associated with HIT.

We herein report a rare case of posterior circulation ischemic stroke caused by HIT. This is the first report describing the relation between ischemic stroke caused by arterial infusion catheter and HIT.

Case History

A 63-year-old man visited our hospital (department of internal medicine) because of anorexia, diarrhea, and fever. He had a history of hypertension and hepatitis C. Abdominal contrast computed tomography showed contrast mass lesion in liver parenchyma, and he was diagnosed with hepatocellular carcinoma (Fig 1A). Radiation therapy and hepatic arterial infusion chemotherapy (5-fluorouracil plus cisplatin: FP therapy) started. Left brachial artery was punctured, and arterial infusion catheter was inserted in the right hepatic artery via left subclavian artery (Fig 1B). After 7 days of catheter detaining, he had dizziness and nausea. Magnetic resonance imaging examination was performed immediately and showed abnormal findings in the cranium. Therefore, he came to our department after being introduced by a physician.

Diffusion-weighted imaging revealed sporadic fresh cerebral infarction in the bilateral cerebellar hemisphere (Fig 2A). Intracranial artery stenosis and occlusion were not seen on the magnetic resonance angiography (Fig 2B). Echocardiography did not detect intracardiac thrombus and electrocardiogram showed sinus rhythm. Carotid ultrasonography detected a 17-mm floating thrombus around the part of left vertebral-subclavian artery bifurcation (Fig 2C). From the previously mentioned findings, we considered that thrombus associated with detained catheter had caused ischemic stroke. Continuous anticoagulant (heparin) injection was immediately started and adjusted to control the activated partial thromboplastin time of 1.5- 2 times the normal value. Arterial infusion catheter was carefully removed. There was no thrombus around the catheter.

Seven days after starting heparin (14 days after detaining the catheter), a marked declining of platelet value was observed. In addition, the patient suffered hemorrhagic complication such as gluteus hematoma, subarachnoid hemorrhage, and continuous hemorrhage of the puncture site. With his 4T's score being 6 points, he was suspected of HIT clinically. Immediately stopping all heparin injections, which include heparin catheter flashes, we have observed the patient's physical status strictly. Since echo reexamination showed disappearance of thrombus, other anticoagulants, such as argatroban and FXa inhibitor, were not administered. After that, hematoma did not expand and platelet value improved naturally. The symptoms, dizziness and nausea, were improved and radiation therapy resumed 3 days after stopping heparin. At the late date, antibodies specific for platelet factor4/heparin complexes were positive and he was diagnosed with HIT.

Discussion

HIT is caused by platelet-activating immunoglobulin G antibodies, which are binding the neoepitopes of platelet factor 4-heparin complexes.[1] Given the high mortality and morbidity associated with ongoing heparin use in patients with HIT, immediate treatment must be changed in cases of suspected or confirmed HIT. If a patient was confirmed to be having HIT or moderate-to-high clinical suspicion of having HIT, then all heparin products should be discontinued, and all heparin-containing devices (e.g. heparin flashes of arterial line) should be removed. If anticoagulant therapy is required for thrombosis, direct thrombin inhibitors, such as argatroban and FXa inhibitor, are often used instead of heparin.[2,3]

Despite high frequency of thrombocytopenia in patients with HIT, bleeding complications are extremely rare. Furthermore, recent study indicated that platelet transfusions may be safe. However, routine platelet transfusions should be avoided because of concern for an increased

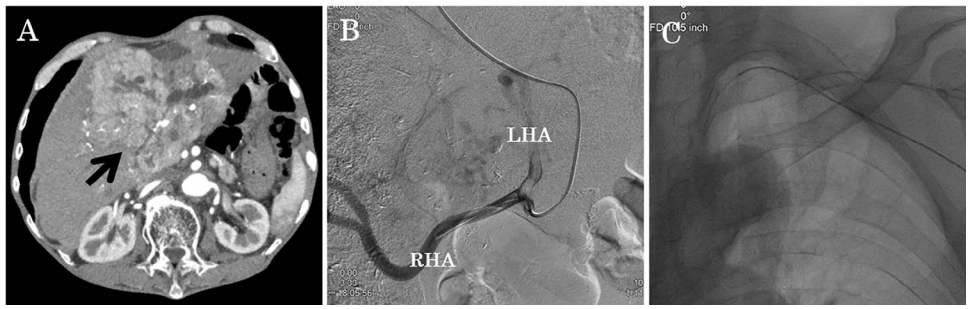

Figure 1. *A) Abdominal contrast computed tomography demonstrated contrast lesion in the liver parenchyma (arrow). (B and C) Arterial infusion catheter was inserted in the right hepatic artery via left subclavian artery. Abbreviations: LHA, left hepatic artery; RHA, right hepatic artery.*