

# Hepatic Subcapsular Hematoma after Dual Antiplatelet Therapy using Ticagrelor

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## ABSTRACT

Subcapsular liver hematoma is a rare condition defined as an accumulation of blood between Glisson's capsule and the liver parenchyma, due to coagulation disorder, neoplasm, pregnancy, trauma, and iatrogenic causes. However, the etiopathogenesis of spontaneous hematoma is still unclear. Patients who undergo coronary intervention are especially vulnerable to bleeding complications due to use of dual antiplatelet agents. We report a case of 62-year-old man with subacute hepatic subcapsular hematoma that occurred after percutaneous coronary intervention; the patient was receiving dual antiplatelet therapy that included ticagrelor. Percutaneous drainage resulted in good outcomes in this patient. The coronary interventionist should watch for rare complications including acute bleeding in patients undergoing coronary intervention who are using dual antiplatelet therapy in order to significantly decrease morbidity and mortality.

**Key words:** Ticagrelor, Hematoma, Cardiac arrest, Percutaneous coronary intervention.

## INTRODUCTION

Subcapsular liver hematoma is a rare life-threatening complication that may occur due to several causes such as coagulation disorder, neoplasm, pregnancy, trauma, and iatrogenic etiologies. However, the etiopathogenesis of spontaneous hematoma is still unclear. This condition is defined as an accumulation of blood between Glisson's capsule and the liver parenchyma. Patients who undergo coronary intervention are vulnerable in terms of bleeding complication due to use of dual antiplatelet therapy (DAPT). Herein, we report a case of subacute hepatic subcapsular hematoma that occurred after percutaneous coronary intervention; the patient was receiving DAPT that included ticagrelor.

## CASE HISTORY

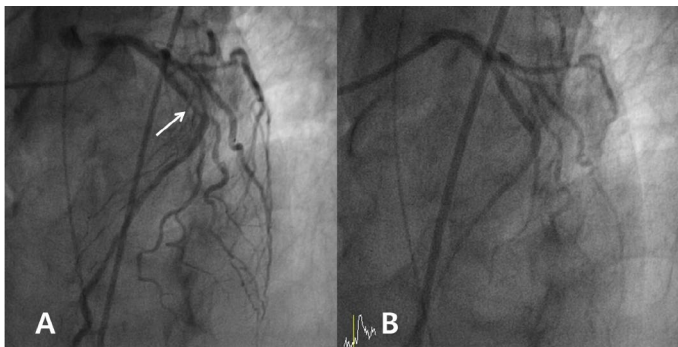
A 62 year-old man was referred to the emergency room because of a sudden change in his mental state. Cardiopulmonary cerebral resuscitation (CPCR) was applied for approximately 5 minutes with one-time cardioversion before arrival. The patient was in a return of spontaneous circulation (ROSC) status with a stable blood pressure of 120/70 mmHg. Initial electrocardiography (ECG) showed a normal sinus rhythm with pathologic Q wave and 1 mm ST elevation in lead V1-3. Soon after arrival, another cardiac arrest occurred after non-enhanced brain computed tomography (CT) followed by one cycle of CPCR. After ROSC was attained, coronary angiography was performed which revealed significant focal discrete stenosis at the proximal left anterior descending (LAD) artery (Figure 1A). An intra-aortic balloon pump was primarily inserted via the left femoral artery due to the shock status with a setting of 2:1. Orsiro (Biotronik) 2.75×15 mm was successfully implanted in the proximal to mid LAD lesion without any acute procedural complication (Figure 1B). Aspirin 300 mg with ticagrelor 180 mg were initially administered, and maintenance with aspirin 100 mg and ticagrelor 90 mg twice daily was commenced. The patient received supportive care for aspiration pneumonia for several days; however, the hemoglobin level steadily decreased from 15.1 to 7.7 g/dL within 8 days without a definite sign of gastrointestinal bleeding or

hypovolemic shock. The patient did not have any offending symptom. We performed abdominal CT to search for other bleeding foci and discovered a large subcapsular hematoma in the liver sized 20×11×5 cm, and a retroperitoneal hemoperitoneum (Figure 2). The coagulation profile was rapidly checked and showed a normal platelet count (144×10<sup>9</sup>/L), prothrombin time (12.4 s), international normalized ratio (1.10), and activated partial thromboplastin time (38.8 s). We ceased ticagrelor and only maintained aspirin. Percutaneous drainage (PCD) was performed since the bleeding could lead to liver necrosis due to a mass effect (Figure 3). The hemoglobin level was stabilized after PCD. We restarted clopidogrel without additional loading 9 days later and maintained the dose. PCD was retained for 40 days. The liver hematoma and hemoperitoneum decreased after 1-month follow-up as evidenced by CT (Figure 4). Nearly total absorption of the hematoma was observed via abdominal CT performed 5 months later.

## DISCUSSION

In the present case, the patient had hemoperitoneum in the retroperitoneal space and subcapsular hepatic hematoma without symptoms. We could think of several possible explanations of the causes in this patient: trauma after chest compression, DAPT usage, or both. However, a traumatic cause seemed less plausible considering the radiologic finding of CT showing hematoma under the hepatic capsule without parenchymal hemorrhage, liver laceration, or juxtahepatic venous injuries, which are the main findings of blunt liver injury<sup>1</sup>. Further, there was no evidence of rib dislocation that could lead to internal organ damage. If the bleeding derived from acute trauma, it would have been massive with unstable vital signs since the patient was taking DAPT.

Bleeding events related to DAPT have been well-recognized for a long time and well-demonstrated through previous large randomized studies. However, standard therapy using DAPT for the prevention of thrombosis after stent implantation was inevitable in the present case. Ticagrelor is a novel P2Y<sub>12</sub> inhibitor that does not require metabolic activation and has a more rapid onset and more overt platelet inhibition



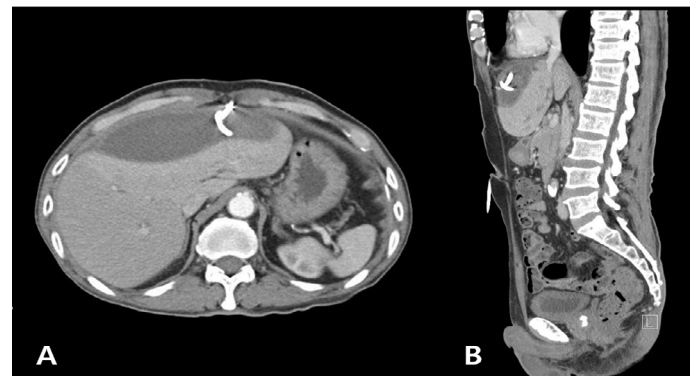
**Figure 1:** (A, Arrow) Initial angiography of left anterior descending (LAD) artery before revascularization, (B) Final angiography after revascularization.



**Figure 2:** Computed Tomography (CT) finding of large hepatic subcapsular hematoma with small amount of hemoperitoneum (Arrow). (A) Coronal section, (B) Sagittal section.



**Figure 3:** Fluoroscopy of percutaneous drainage.



**Figure 4:** One month Follow up CT showing decreased size of hepatic subcapsular hematoma (A) Coronal section, (B) Sagittal section.

than clopidogrel<sup>2</sup>. Ticagrelor in combination with aspirin is associated with fewer major adverse cardiac events compared to clopidogrel in combination with aspirin<sup>3</sup>. Potential P2Y<sub>12</sub> blockers without additional aspirin may have sufficient therapeutic antiplatelet effect in which DAPT is still standard care<sup>4</sup>. Among patients undergoing elective coronary artery bypass surgery using a saphenous vein graft, the application of ticagrelor with aspirin compared with aspirin alone significantly increased graft patency after 1 year<sup>5</sup>.

In patients with all clinical features, compared with short-term DAPT including clopidogrel, long-term DAPT can lead to an increased risk of major bleeding and non-cardiac death. Furthermore, the recommended duration of DAPT was associated with a higher risk of any type of bleeding. It is important to contemplate individualized ischemic and bleeding risks while taking DAPT; one study recommended that short-term DAPT may be considered after coronary intervention using drug-eluting stent based on the combination of evidences from both direct and indirect comparisons<sup>6</sup>. Another previous study suggests that disposition to bleeding and ischemic events in East Asians is different from that in the western population in which prolonged DAPT may have no pronounced anti-ischemic effect, but may increase significant bleeding risks<sup>7</sup>.

Subcapsular hepatic hematoma without underlying liver diseases is rare and stems from a build-up of blood between Glisson's capsule and the liver parenchyma; it commonly occurs around the right hepatic lobe<sup>8</sup>. Most of the complications are coagulation-related, oncologic, pregnancy-associated, traumatic, and iatrogenic<sup>9</sup>. However, the etiopathogenesis of spontaneous hematoma is unclarified. One hypothesis suggests the possibility of thrombus formation within the hepatic arteries and sinusoid capillaries which later leads to the necrosis of the periportal system and finally results in intrahepatic hemorrhage followed by subcapsular hematoma<sup>10</sup>. Subcapsular hepatic hematoma may advance into two phases: rupture or absorption. In a case of rupture, it is generally associated with hemodynamic instability. The patient may either have no symptom or may experience nausea, vomiting, abdominal pain, and dyspnea<sup>11</sup>. Laboratory tests are not helpful for detecting such a condition except for a linear decline in hemoglobin level. CT and ultrasound are the gold standards for diagnosis and for monitoring treatment progression<sup>12</sup>. Conservative management with prophylactic antibiotics should be considered when the patient is in a stable condition. In the case of unstable patients, intervention or surgery may be urgently considered since hemoperitoneum may develop and is associated with an overall mortality rate of 75%<sup>8</sup>. In the

present case, our patient had a gradually decreased hemoglobin level that implied ongoing active bleeding along with hemoperitoneum. To prevent further complication, we performed PCD which resulted in good outcomes. The coronary interventionist should be watchful for rare complications including acute bleeding since majority of cases involved the use of dual antiplatelet agents. Early diagnosis with assertive management could significantly decrease procedure-related morbidity and mortality.

## SUMMARY

Increased bleeding tendency in patients with significant coronary disease may lead to a higher frequency of fatal bleeding complications. Early diagnosis with proper management may significantly reduce procedure-related morbidity and mortality.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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