International Journal of Contemporary Pediatrics
Okumuş M et al. Int J Contemp Pediatr. 2022 Jan;9(1):119-122
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: https://dx.doi.org/10.18203/2349-3291.ijcp20214949

Case Report

Massive hemorrhage after percutaneous liver biopsy in a pediatric patient with graft-versus-host disease; a successful angiographic embolization

Mustafa Okumuş[1]*, Utku Alkara[2], Barış Malbora[3], Hakan Sarbay[4], Fulya Kamit[5]

[1]Department of Pediatric Surgery, [2]Department of Radiology, [3]Department of Pediatric Hematology, [4]Department of Pediatric Oncology, [5]Department of Pediatric Intensive Care, Yeni Yüzyıl University, Faculty of Medicine, İstanbul, Turkey

Received: 11 November 2021
Accepted: 01 December 2021

***Correspondence:**
Dr. Mustafa Okumuş,
E-mail: drmustafaokumus@gmail.com

ABSTRACT

Most cases of bleeding that develop after percutaneous liver biopsies can be managed with follow-up and supportive treatment. In life-threatening situations, however, open surgery or minimally invasive methods are required. This case report describes the clinical course of an 11-year-old patient with a diagnosis of Wiskott-Aldrich syndrome who experienced a major hemorrhage following a percutaneous liver biopsy. Clinical findings, imaging, interventions, and results were evaluated. Allogeneic hematopoietic stem cell transplantation was performed without any problem. The patient's bilirubin level started to increase on the 20th day after transplantation. Profuse watery diarrhea started on the 24th day. Graft-versus-host disease of the gastrointestinal tract and liver was considered as his diarrhea continued to the 29th day. An ultrasound-guided Tru-cut® liver biopsy (Merit medical, South Jordan, UT, USA) was performed with an 18-gauge needle on the 52nd day after transplantation. In the fourth hour after the procedure, the general condition of the patient started to deteriorate. Active bleeding was detected in the patient with computed tomography, and he was hypotensive and tachycardic. The patient was urgently transferred to the angiography unit and a successful angiographic embolization was performed. Angiographic embolization is an intervention with high success rates in cases of bleeding where the patient is hemodynamically stable. However, it can also be successfully applied in selected patients who are hemodynamically unstable.

Keywords: Percutaneous liver biopsy, Hemorrhage, Angiographic embolization, Pediatrics, Stem cell transplantation

INTRODUCTION

Percutaneous liver biopsy (PLB) is a commonly used minimally invasive method due to its technical simplicity and good safety profile,[1] although it is not entirely without risks, like any invasive procedure. Traditionally, these complications can be stratified as major and minor complications, respectively, where minor complications include pain, subcapsular bleeding, infection, small bile leak or hemobilia, and arteriovenous fistula and major complications include bleeding and hemobilia requiring transfusion, hemothorax, pneumothorax, and death.[1,2] Most major complications (60%) develop within the first two hours after liver biopsy, and the majority of them are post procedure bleeding.[3] Although follow-up and supportive treatment are often sufficient for resolution, it is necessary in rare cases to intervene with minimally invasive methods or even open surgery.

Here, we present the report of a successful arterial embolization performed in a hemodynamically unstable patient due to active bleeding after a PLB. The patient also had graft-versus-host disease (GvHD) of the

gastrointestinal tract and liver, which developed after allogeneic hematopoietic stem cell transplantation.

CASE REPORT

An 11-year-old male patient with Wiskott-Aldrich syndrome was hospitalized to undergo allogeneic hematopoietic stem cell transplantation from an unrelated donor. Following the necessary preparations, the transplantation was completed without any problems. Due to a post procedure increase in the patient's bilirubin level (5.4mg/dL), however, abdominal ultrasonography was performed on the 20th day after transplantation, which revealed two to three ovoid lymph nodes compressing the portal vein in the periportal area and an increased liver size. N-acetyl cysteine infusion and methylprednisolone were added to the treatment plan. Also, a salt-free diet was initiated due to the risk of vena occlusive disease. Plasmapheresis was performed on the 22nd day due to a further increase in the bilirubin level (7.2 mg/dL). Profuse watery diarrhea began on the 24th day. Total parenteral nutrition was initiated due to malnutrition and fluid loss. GvHD of the gastrointestinal tract and liver was considered in the patient, whose diarrhea persisted to the 29th day after transplantation. The patient, whose general condition continued to deteriorate gradually, was given the necessary supportive treatment, and plasmapheresis was continued.

On the 52nd day after transplantation, an ultrasound-guided Tru-cut® liver biopsy (Merit Medical, South Jordan, UT, USA) was performed by an experienced radiologist with an 18-gauge needle (hemoglobin: 10.3 gm/dL, hematocrit: 27.9%, platelet count: 62,000/mL, total bilirubin: 16.42 mg/dL, international normalized ratio: 1.2). The patient became hypotensive and tachycardic four hours after the biopsy; abdominal ultrasonography was performed due to the persistence of hypotension despite saline loading. Since there was extensive fluid in the abdomen on ultrasonography, it was decided to perform contrast-enhanced computed tomography on the patient immediately, and the pediatric surgeon, pediatric hematologist, and interventional radiologist were present during the imaging session, where active bleeding from the liver was detected (Figure 1). The patient was urgently transferred to the angiography unit by joint decision (hematocrit: 15%, hemoglobin: 5.2 gm/dL, platelet count: 58,000/mL). Meanwhile, active blood product support (erythrocyte suspension, fresh frozen plasma, and platelet suspension) were initiated. Recombinant factor VII was prepared to be used if necessary. The operating room was prepared and the pediatric surgeon was also placed on standby in the angiography unit.

Following cleaning of the appropriate area under general anesthesia, the right common femoral artery was punctured under ultrasonography guidance and a 4-French introducer was inserted. Serial images were obtained after the 4-French cobra catheter was advanced to the common hepatic artery with the aid of a hydrophilic guidewire and contrast material was given. Active contrast extravasation was observed from the distal section of the eighth segment artery to the perihepatic area in the images taken (Figure 2). The microcatheter was advanced to the bleeding branch super-selectively with the help of a micro-guide. Embolization was performed with an Interlock™ 2-mm, 6-cm coil (Interlock™-18 Fibered IDC™ occlusion system; Boston scientific, Natick, MA, USA) and Gelfoam® (Pfizer, New York, NY, USA). As no contrast extravasation was observed on the control angiography image (Figure 3), the procedure was terminated without any complications. The intervention took 55 minutes. The patient was taken to the pediatric intensive care unit while still intubated and was extubated three hours later. With the support given, the patient's hemodynamics gradually became stable and he continued to be followed in the intensive care unit. On the fourth day after the intervention, the patient was stable on room air and was transferred to the bone marrow transplantation unit to continue his treatment.

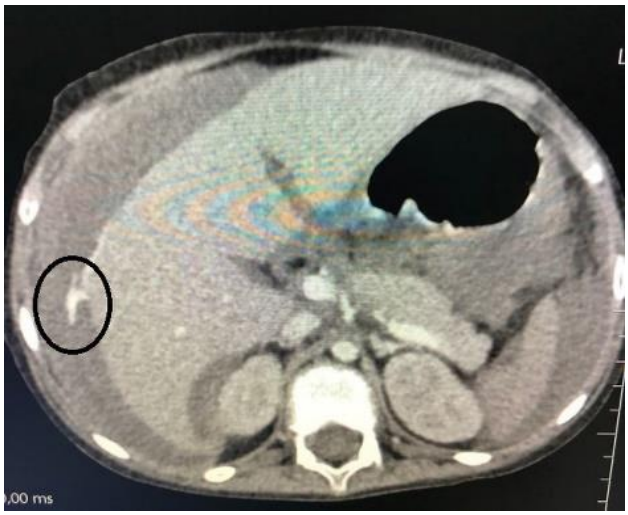

Figure 1: Active bleeding from the liver and intraperitoneal hemorrhage.

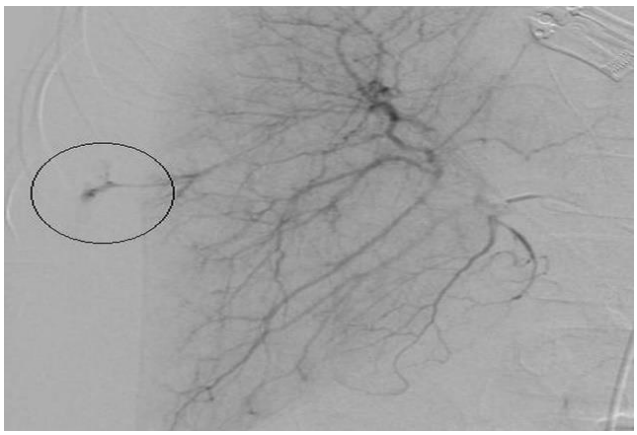

Figure 2: Active contrast extravasation from the distal section of the eighth segment artery.

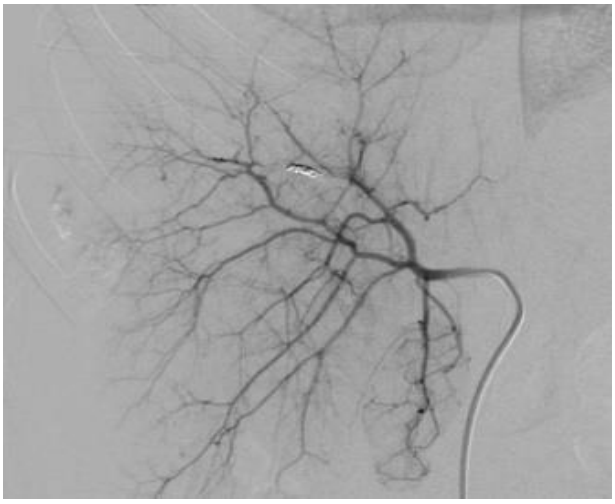

Figure 3: After embolization with coil and gel-foam.

DISCUSSION

After percutaneous liver biopsy, the incidence of minor bleeding that does not deteriorate the hemodynamics of the patient is one in 500 cases, while the incidence of major bleeding varies between one in 2,500 and one in 10,000 cases.[4] The causes of major bleeding may be divided into two groups, depending upon the patient and the procedure itself. Chronic liver disease, renal failure, and coagulation disorders are well-known etiologies of major bleeding related to the patient, while process-related factors include the experience of the operator, the size of the needle(s) used, and the number of needle passes.[2,3] Although the experience of the operator is important with respect to complications, it does not matter whether the operator performing the procedure is a gastroenterologist, hepatologist, or radiologist[2]. We also know that the risk of bleeding in biopsies performed with cutting needles is slightly higher than suction needles but it gives more information about hepatic architecture.[1]

If the patient is hemodynamically stable with resuscitation and there is no other surgical indication, the standard approach in cases of bleeding due to liver biopsy is nonoperative treatment (NOM) as is done in cases of liver and spleen injuries after abdominal trauma.[5,6] NOM is successful in 90% of cases; however, if the patient is unstable despite supportive treatment, surgical treatment is required for bleeding control. There are even cases where right hepatectomy was performed to control post biopsy bleeding.[4]

If active bleeding continues and the general condition of the patient has not deteriorated yet, the success rates of NOM can be increased by using minimally invasive methods, such as angiographic embolization (AE). Since the mid-1990s, AE has been widely used in adult patients in a variety of clinical situations.[7-9] It has also been used quite successfully in children with blunt abdominal solid organ injuries that involve the liver, spleen, or kidney as well as in those with massive gastrointestinal bleeding, where success rates vary from 80% to 97%.[7,10-13] However, there are some differences of opinion regarding its use. If the patient is stable and there is active blush on computed tomography, some authors recommend NOM.[5] However, there are also authors who contend that the failure risk of NOM in these patients can increase up to 28% and that AE should be performed if there is active blush on computed tomography[14]. The common recommendation in all AE studies is that it is an alternative technique that should be considered in hemodynamically stabilized patients with resuscitation. However, there are studies, albeit a limited number, in which successful AE has been performed in hemodynamically unstable patients.[11]

Sometimes, it can be difficult to decide whether to pursue open surgery or AE, even if the patient is unstable as in the presented case. During our case, the patient was being followed up with concerning the diagnosis of GvHD of the gastrointestinal tract and liver and was receiving total parenteral nutrition with impaired liver function. He had been on steroid therapy for a month and was also immunosuppressive. While we were providing intensive blood product support to this hypotensive patient with a hematocrit value of 15 gm/dL, we decided to perform AE, considering both the intraoperative risks associated with open surgery and the risks of postoperative wound healing and infection. Ultimately, the procedure was completed successfully and no complications developed.

We believe that the decision we made was the right one regardless of the outcome of the procedure after making the necessary preparations for emergency open surgery. Angiographic embolization can also be applied in cases where the patient is not hemodynamically stable by evaluating its need on an individual basis.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Okumuş M, Alkara U, Malbora B, Sarbay H, Kamit F. Massive hemorrhage after percutaneous liver biopsy in a pediatric patient with graft-versus-host disease; a successful angiographic embolization. Int J Contemp Pediatr 2022;9:119-22.