Is There a Role for Desmopressin in Liver Transplantation? A Case Report

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ABSTRACT

Living donor liver transplantation reduces time and mortality on the waiting list. Bleeding is a serious complication; however, "overcorrection" of coagulopathy may lead to hepatic artery thrombosis. We report a case where desmopressin (DDAVP) was used in the management of persistent postreperfusion bleeding (44 red blood cell units transfused). After 1 dose of DDAVP, bleeding improved significantly and the recipient had an unremarkable recovery. DDAVP should be considered for persisting bleeding after correcting common coagulation abnormalities where complexity of the anastomosis may preclude the use of more aggressive procoagulant drugs in liver transplantation.

LIVER TRANSPLANTATION (LT) is a life-saving therapy for end-stage liver disease (ESLD). The scarcity of deceased donors (DD) has led to living donor liver transplantation (LDLT) becoming an option to decrease waitlist mortality. Bleeding is one major complication; however, thrombotic events also may be catastrophic, the worst being hepatic artery thrombosis (HAT). ABO-incompatible grafts, complex arterial reconstruction, retransplantation, low recipient weight, prolonged operation time, polytransfusion (>7 RBCs), CMV mismatch, and liver neoplasia are risk factors associated with HAT [1–3]; furthermore, data have established an increased incidence of HAT in LDLT when compared to deceased donor liver transplantation (DDLT) [4].

There is a wide variation among centers on the prevention and management of bleeding perioperatively in LT [5,6]. Pharmacological therapies (e.g. recombinant activated factor VII [rFVIIa]) failed to reduce transfusion requirements in LT when evaluated in randomized controlled trials [7,8]. Moreover, the incidence of arterial thrombotic events was higher when compared to controls [9].

Desmopressin (DDAVP) is established as 1 of the key therapies for prevention and treatment of bleeding in patients with mild hemophilia A (HA), von Willebrand disease (vWD), cirrhosis, and uremia. However, its clinical efficacy in reducing blood loss perioperatively is unclear [10–15]. In this report, we document a bleeding complication in an LDLT that was corrected with DDAVP. Written consent for publication was provided by the patient.

CASE DESCRIPTION

A 53-year-old Caucasian male was referred to our center. He had ESLD secondary to alcohol and chronic hepatitis C virus infection (genotype 3-treatment naïve), complicated by hepatocellular carcinoma within Milan criteria (2 lesions treated with transarterial chemoembolization). His biological MELD was 14 (appealed score of 25) (Table 1). His sister, a 54-year-old healthy Caucasian female, was approved as his donor. Volumetric computer tomography demonstrated a 35% remaining liver volume for the donor and a 1.1% graft-to-body weight ratio for the recipient (Fig 1).

Donor surgery was uneventful. During the recipient hepatectomy (anhepatic phase 47 minutes), dissection led to diffuse bleeding. The right lobe allograft was transplanted with an iliac vein graft connecting the segment V and VIII veins to the recipient common trunk of the middle and left hepatic veins. Initially the patient tolerated the reperfusion well. However, soon after he went into ventricular tachycardia with no hemodynamic instability, reverting back spontaneously to normal sinus rhythm shortly thereafter. Finally, both the arterial (right donor hepatic artery and recipient proper hepatic artery) and biliary anastomosis (donor right hepatic duct and recipient common hepatic duct) were completed. Total cold ischemia time was 92 minutes. Continuous oozing persisted; several minor bleeding points were controlled, drains were placed, and the abdomen was closed. The estimated blood loss was 4600 mL and received 20 red blood cell units (uRBCs), 6

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Table 1. Laboratory Tests Prior to Transplantation

	Value	Units
CBC		
Hemoglobin	10.8	g/dL
Hematocrit	32.2	%
Erythrocytes	2.88	$\times 10^{12}$/L
MCV	11.8	fL
Leukocyes	3.3	$\times 10^{9}$/L
Platelets	74	$\times 10^{9}$/L
Coagulation		
Fibrinogen	272	mg/dL
PT	15.1	sec
INR	1.3	
aPPT	34	sec
Blood Chemistry		
Sodium	126	mmol/L
Potassium	4.2	mmol/L
Alkaline phosphatase	252	U/L
AST	86	U/L
ALT	40	U/L
Bilirubin total	3.8	mg/dL
Creatinine	0.8	mg/dL
Albumin	2.6	g/dL

autologous uRBCs, 18 units of platelets (uPlts), 10 units of fresh frozen plasma (uFFPs), 5 L of 5% albumin, and 5 units of cryoprecipitate (uCryo). See thromboelastogram (TEG) findings on Table 2.

The patient was then transferred to the intensive care unit (ICU). High bloody output was obtained from the drains (3500 mL) and progressive abdominal distention was evident. Hemoglobin levels ranged between 6.7 and 7.1 g/dL. Due to these findings, a massive transfusion protocol was activated. During his stay in the ICU, he received 14 uRBCs, 5 uFFPs, and 2 uCryo.

After 5 hours of failed medical management, the patient returned to the operating room (Fig 2). The incision was reopened and 4 L of mixed blood and clots was removed. No significant bleeding points were identified other than generalized oozing and hemostasis could not be achieved by mechanical or local measures. Multiple blood products were transfused (10 uRBCs, 2 uPlts, and 7 uFFPs).

Given this case scenario, a decision was made to use single low-dose of DDAVP (24 mμ). The patient tolerated the infusion and the coagulation profile improved. The operative field improved significantly, no more bleeding was observed. Hemoglobin levels stabilized. We then placed drains and closed the abdomen.

Again, the patient was transferred to ICU for postoperative management. On examination the abdomen was soft and non-distended. Drain output markedly improved. Repeated hemoglobin levels were in acceptable ranges. No more RBCs were transfused. Importantly, body temperature as well as calcium levels were continuously monitored (both surgeries - ICU) and corrected as needed. After 6 hours in the ICU he was successfully extubated. His postoperative course was uncomplicated and he was discharged from the hospital on postoperative day 6.

DISCUSSION

LDLT has been the subject of much interest in transplantation, given its complex and challenging nature. It also is a well-known option to decrease waitlist mortality. Perioperative bleeding is a serious complication of LDLT. There is always the concern of coagulation "under-correction," facing persisting bleeding and massive

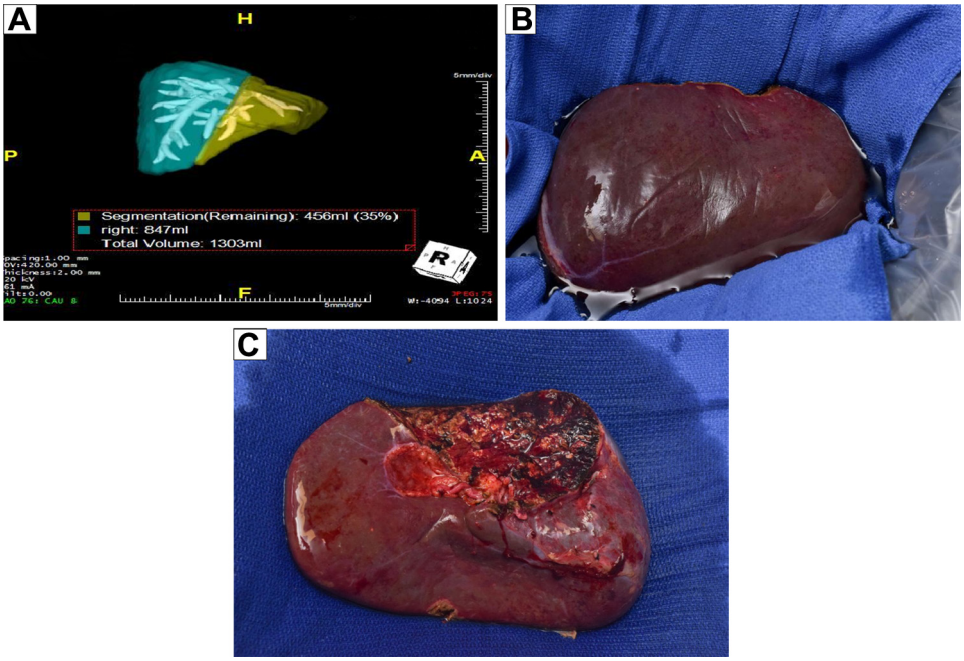

Fig 1. Right lobe liver allograft. (**A**) Volumetric computer tomography demonstrated a 35% remaining liver volume for the donor and a 1.1% graft-to-body weight ratio for the recipient. (**B**) Anterior surface of the right lobe liver allograft. (**C**) Posterior surface of the right lobe liver allograft.