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LETTER TO THE EDITOR

Mechanical hemolysis after transjugular intrahepatic portosystemic shunt can occur with covered stent

KEYWORDS
Transjugular intrahepatic portosystemic shunt;
Complication;
Hemolysis

Transjugular intrahepatic portosystemic shunt (TIPS) is an efficient therapy for complications of portal hypertension. After insertion, the most frequent medical complication of TIPS is portosystemic encephalopathy (new or worsened), that has been reported in 7 to 35% of the patients [1]. The first case of traumatic, stent-related hemolysis related to TIPS insertion was reported in 1992 after exclusion of other possible causes of hemolysis [2]. Thereafter, the same authors reported that TIPS-induced hemolysis could occur in approximately 10% of subjects, but was usually self-limited and rarely requires intervention [3]. During the most recent years, it can be hypothesized that the generalization of covered stents use led to a dramatic reduction of the risk of such mechanical hemolysis. We report here the case of a patient who presented a symptomatic hemolysis after TIPS insertion using PTFE-covered stent, needing TIPS revision, with favorable outcome.

A 66-year-old man was referred to our department because of refractory hepatic hydrothorax with mild ascites complicating alcoholic cirrhosis. Significant biological parameters were as follows:

- total bilirubin 27 (mol/l (normal: 3—21);
- indirect bilirubin 18 μmol/l (normal: 3—21);
- hemoglobin 117 g/L (normal: 120—180);
- albumin 2.6 g/dl (normal: 3.5—5.0);
- INR 1.37.

Abbreviation: TIPS, transjugular intrahepatic portosystemic shunt.

Abdominal Doppler ultrasound showed a cirrhotic liver with hepatic and portal veins patency. The MELD score was 14. The decision of TIPS placement was made in the absence of contra-indication. A TIPS PTFE-covered stent (60 mm total length, 8—10 mm diameter, Viatorr®, Gore, Flagstaff, AZ, USA) was placed in the regular position (between right hepatic vein and right branch of portal vein) without any initial complication in January 2019. The postoperative course was uneventful. During the weeks after TIPS placement, hydrothorax did not recur. Biological follow-up disclosed rapid increase in total and direct bilirubin. In addition, hemoglobin level decreased. In May 2019, the patient was referred again because of jaundice, anemia and hyperammonemic encephalopathy. Significant biological parameters were as follows:

- total bilirubin 103 (mol/l (normal: 3—21);
- indirect bilirubin 76 μmol/l (normal: 3—21);
- hemoglobin 77 g/L (normal: 120—180);
- albumin 2.8 g/dl (normal: 3.5—5.0);
- ammonemia 82 μmol/l (normal: 18—72);
- INR 1.40.

Encephalopathy was reversible after initiation of lactulose. Peripheral smear examination showed evidence of intravascular hemolysis with anisocytosis, poikilocytosis with many schistocytes. Further evaluation showed a reticulocyte count of 13% and a negative Coombs test. The diagnosis of traumatic TIPS-induced hemolysis was suspected; Doppler ultrasound disclosed great turbulences of flow at the portal side (uncovered) of the stent, probably in relation with an angulation of the stent. A second PTFE-covered stent (80 mm total length, 8—10 mm diameter, Viatorr®, Gore, Flagstaff, AZ, USA) was placed inside the first one without any initial complication in June 2019 (Figs. 1 A—C). During the post-interventional period, indirect bilirubin rapidly decreased to a minimum of 16 μmol/l (normal: 3—21) in one week, and this decrease was maintained (17 μmol/l in August 2019). In addition, hemoglobin level remained stable (107 g/L in September 2019). Encephalopathy did not recur.

TIPS is the first-line treatment for patients with cirrhosis and recurrent ascites, since the procedure is associated

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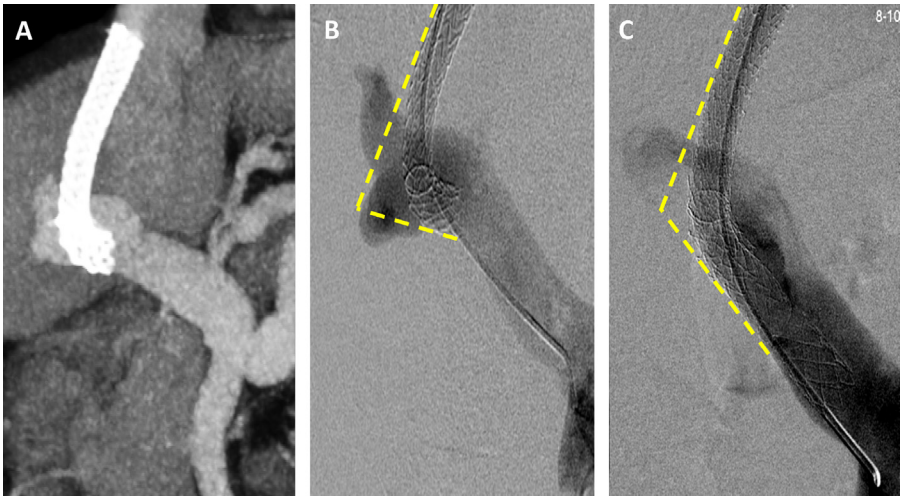

Figure 1 A: CT-scan (coronal) showing the plicated stent after TIPS insertion. B: angiography during TIPS revision showing the plicated stent. C: angiography during TIPS revision showing reduction of plicature after second stent insertion.

with significantly better transplantation-free survival [4]. Traumatic, stent-related hemolysis related to TIPS is a rare complication initially described in the 90s, at the time of uncovered stent [2,3,5]. This was usually diagnosed early after TIPS insertion, from 2 to 29 days [6]. No case was reported in the literature during the past 20 years, when covered stent replaced uncovered stent. Nevertheless, ''covered'' stent are not entirely covered, and a significant portion of the portal versant of the stent remains uncovered (2 cm length (out of 8 cm) for the Viatorr® stent used in our case). We hypothesize that particular conformation of the stent, with plicature of the portal versant of the stent, led to major turbulence of venous flow, and therefore mechanical hemolysis. This was resolved when a second stent was inserted into the first one to cover its plicated part. In more benign case, progressive endothelialization of uncovered (totally or partially) stent wires probably reduces hemolysis.

In conclusion, even it is probably now very rare when using covered stent, traumatic, stent-related hemolysis related to TIPS can occur and be severe, with significant anemia and jaundice, requiring TIPS revision.

Authors' contributions

J.D. and P.J.V. clinically managed the patient and wrote the manuscript; B.M., N.B. and G.B. clinically managed the patient. All authors read and approved the final version of the manuscript.

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Disclosure of interest

The authors declare that they have no competing interest.

References

[1] Ripamonti R, Ferral H, Alonzo M, Patel NH. Transjugular intrahepatic portosystemic shunt-related complications and practical solutions. Semin Intervent Radiol 2006;23:165—76.
[2] Sanyal AJ, Freedman AM, Purdum 3rd PP. TIPS-associated hemolysis and encephalopathy. Ann Intern Med 1992;117:443—4.
[3] Sanyal AJ, Freedman AM, Purdum PP, Shiffman ML, Luketic VA. The hematologic consequences of transjugular intrahepatic portosystemic shunts. Hepatology 1996;23:32—9.
[4] Bureau C, Thabut D, Oberti F, et al. Transjugular intrahepatic portosystemic shunts with covered stents increase transplant-free survival of patients with cirrhosis and recurrent ascites. Gastroenterology 2017;152:157—63.
[5] Riggio O, Ricci G, Zullo A, et al. Intravascular hemolysis and transjugular intrahepatic portosystemic stent shunt. J Hepatol 1994;20:152—3.
[6] Conn HO. Hemolysis after transjugular intrahepatic portosystemic shunting: the naked stent syndrome. Hepatology 1996;23:177—81.

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