CORRESPONDENCE

Therapeutic Plasma Exchange (TPE) for Liver Transplant Associated-Thrombotic Microangiopathy (TA-TMA) in a 5 Month Old Infant

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Received: 4 November 2019 / Accepted: 21 February 2020 / Published online: 3 March 2020
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Dear Editor,

Transplant Associated TMA (TA-TMA) can occur after hematopoietic stem cell transplant as well as solid organ transplant; the former being more common. Solid organ TA-TMA is more commonly seen as a complication of renal transplant but cases after liver transplant have also been reported [1]. As per the American Society For Apheresis (ASFA) guidelines, TA-TMA is category III indication for TPE [2]. In this correspondence, we present a case of an infant who was successfully managed with TPE for TA-TMA.

A one-month old male infant with extrahepatic biliary atresia underwent living donor liver transplant at the age of four months. On post –operative day 32, he started developing jaundice, abdominal distension, mouth ulcers along with fever. The child was immediately admitted for management. He was hypertensive, his Liver Function Tests (LFT) and Renal Function Tests (RFT) were grossly

deranged with proteinuria and hematological evaluation revealed anemia with schistocytes in peripheral blood smear along with thrombocytopenia (Table 1). In TA-TMA, unlike idiopathic thrombotic thrombocytopenic purpura (TTP), plasma ADAMTS13 protease level is not severely deficient nor is ADAMTS13 inhibitor activity detectable [2]. On the basis of clinical features and laboratory investigations, a probable diagnosis of TA-TMA was made. TA-TMA is associated with a high degree of morbidity or mortality and can result in loss of the graft and hence the gastrointestinal and hepatobiliary sciences team discussed this case with the department of Transfusion Medicine and agreement upon the potential benefit of TPE in this case helped in initiating TPE early in the disease. The management was mainly symptomatic in addition to TPE.

Therapeutic Plasma Exchange (TPE)

All procedures were performed on Com.Tec continuous flow cell separation device (Fresenius Kabi, Germany) using PL1 plasma exchange kit and femoral venous access with dialysis type double lumen catheter. Fresh Frozen Plasma (FFP) was the preferred replacement fluid and Acid Citrate Dextrose (ACD) was the preferred anticoagulant. Special care during catheter handling was taken to maintain asepsis and the lines were flushed with saline and heparin (10 IU/ml) to maintain patency.

The two major concerns were small size of the infant with a body weight of 3.5 kg and thrombocytopenia with a platelet count of $21 \times 10^3/\text{cumm}$. All procedures were performed in the pediatric transplant intensive care unit under direct supervision of a Transfusion Medicine physician. For small size of the infant, the kit was primed with 200 ml of group specific, fresh, crossmatch compatible, leukodepleted packed red cells before initiating the procedure and the flow rate was kept at 10 ml/min. To

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Table 1 Laboratory evaluations before and after TPE sessions considering pre-procedure as Day 0 and first procedure as Day 1

Day	Total bilirubin*	Direct Bilirubin**	SGOT***	SGPT****	GGT*****	ALP^	Blood Urea^^	Serum creatinine^^^	LDH ^^^^	Platelet ~	Hemoglobin ~ ~
Day 0	26	24	150	97	276	168	118	2.5	1400	21	6.1
Day 1	22.21	20.63	141	82	263	141	112	2.23	976	24	7.3
Day 2	22.69	20.47	130	79	201	113	106	2.0	974	33	7.9
Day 3	17.51	15.48	126	75	182	102	100	1.96	737	50	8.2
Day 4	14.18	12.59	100	72	163	99	93	1.88	665	62	9.4
Day 5	13.55	11.28	95	70	144	95	86	1.67	577	76	10.2
Day 6	11.93	9.36	88	69	126	86	75	1.55	523	83	10.3
Day 7	8.88	6.32	79	68	99	74	62	1.36	502	85	10.6
Day 8	6.63	4.25	63	63	87	67	60	1.32	500	97	10.1
Day 9	4.28	2.23	61	58	79	56	56	1.29	453	98	10.8
Day 10	2.22	0.63	57	54	75	52	49	1.28	426	110	10.7

Reference range, abbreviations and units

Parameter	Range	Parameter	Range
*Total bilirubin	0.2–1.3 mg/dl	^^Blood urea	11–39 mg/dl
**Direct bilirubin	0.0–0.4 mg/dl	^^^Serum creatinine	0.66–1.25 mg/dl
***SGOT (Serum glutamic oxaloacetic transaminase)	17–59 IU/l	^^^^LDH (Lactate Dehydrogenase)	120–246 IU/l
****SGPT (Serum glutamic pyruvic transaminase)	21–72 IU/l	~ Platelet count	150–450 × 10 ³ /cumm
*****GGT (Gamma glutaryl transferase)	15–73 IU/l	~ ~ Haemoglobin	11.1–14.1 g/dl
^ALP (Alkaline phosphatase)	44–147 IU/l		

avoid loss of platelets in the thrombocytopenic setting, the centrifuge speed was set to maximum to avoid loss of platelets.

The patient remained stable throughout the procedures in every session. Mean plasma volume processed was 174.6 ± 14.14 ml and mean ACD infused to the patient was 33.8 ± 5.3 ml. After three sessions, there was a significant improvement clinically and laboratory parameters also started showing a response. After the fifth session, the patient was symptomatically better and was maintaining good platelet counts without transfusion support. Hence, to avoid complications due to sepsis, a decision to discontinue TPE was taken by both the teams and the infant was observed closely for the next 48 hours which were uneventful. Gradually the patient started improving and on day 16 of admission, he was shifted from transplant ICU to ward. Table 1 summarises the laboratory evaluations during treatment with TPE.

There are many complications of liver transplant. The most frequent medical complication being renal dysfunction. TA-TMA is an important complication which is rare but if not identified timely can lead to poor prognosis. Cyclosporine and Tacrolimus are highly nephrotoxic. Turner et al. [3] and Furmanczyk et al. [4] have reported similar cases which required TPE. TPE in neonates can be challenging due to their low weight and less plasma volume. Belousova et al. [5] reported a case in which TPE was performed for a 3.4 kg premature baby and concluded that use of TPE should be considered in babies for such cases who are not candidates for standard treatment options. Nishi et al. [6] studied the effect of TPE in 18 such cases and concluded that survival of LDLT recipients with late-onset TMA treated with TPE was poor. With the help of the present correspondence, the authors want to highlight feasibility and role of TPE in small size patients for TA-TMA.

Funding None.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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