**VANGUARD FEATURED SYMPOSIUM : Managing a Recipient with Diffuse Portal Vein Thrombosis**

**A.** Pre transplant evaluation and management of a patient with diffuse PVT on the waiting list: staging, medical management, anticoagulation ***Eleonora De Martin, Villejuif, France***

**B.** Converting untransplantable patients with chronic obliterative PVT and cavernoma to transplantability using trans-splenic portal vein recanalization TIPS. ***Riad Salem, Chicago, United States***

**C.** Outcomes of LT in a recipient with diffuse PVT: True survival benefit and implications for organ donation ***Prashant Bhangui, New Delhi, India***

**D.** Debate Diffuse PVT: LT Inflow types vs. Multivisceral transplant

***Daniel Azoulay: LT - Surgical options***

***Rodrgio Vianna – Multivisceral Transplant (MVT)***

The prevalence of portal vein thrombosis (PVT) in patients undergoing liver transplantation (LT) ranges from 5 to 14% in more recent reports. Several classifications, such as the one by Yerdel’s, describe PVT based on site and extension. However the timing of thrombosis, distinguishing between acute and chronic onset, is also important, Dr De Marin stated. This distinction is challenging, as cavernoma, and clinical symptoms can be found in both settings. Sarin’s classification has the merit of taking into account the functional aspect of thrombosis, and also proposes medical management. However, none of the classifications elaborate on the surgical management of PVT during transplant. Although up to 45% of patients can recanalize the PV spontaneously, it has been demonstrated that thrombosis can progress if left untreated. Studies are heterogeneous, and often report both partial and complete thrombosis. It seems that PVT does not impact the wait list mortality, but the early post transplant mortality is significantly higher in patients with complete compared to partial thrombosis. Therefore anticoagulation is indicated and should be continued until transplant to permit/facilitate LT, and reduce post transplant mortality. If anticoagulation is contraindicated or inefficacious, a TIPS should be considered. The best anticoagulant therapy has not been established yet. It is important to check for varices, and perform an adequate prophylaxis before starting the treatment, and also keep in mind that there is a risk of bleeding, which correlates well with platelets count lower than 50x109/L.

Dr. Salem presented experience of the Northwestern School of Medicine in management of cirrhotic patients with PV obliteration (Yerdel Grade II or III PVT) requiring future liver transplantation. Traditionally, surgical options for these patients included restoration of physiological or non-physiological portal vein flow during LT. It has been shown that re-establishment of physiological PV flow at the time of the transplantation results in improved post-transplant outcomes; however, presence of PVT during the transplantation in itself is associated with inferior post-transplant outcomes. The IR technique demonstrated by Dr.Salem was aimed to repair portal cavernoma prior to the transplantation. He presented his updated case series of 61 patients with large varices and cavernous transformation of the portal vein who underwent PV recanalization. In the setting of a patent intraparenchymal splenic vein, the procedure starts with TIPS approach, wedge venogram and identification of the portal cavernoma. The splenic vein is accessed through the intraparenchymal puncture and the wired catheter technique is utilized to pass through chronic PVT. Once the sheath is advanced into the open segmental portal vein, short TIPS is placed in preparation for the future transplant. Anti-coagulation is not used following the procedure; small residual clot within the system following the procedure is absorbed over time and does not require extraction. In their series, 60 out of 61 patients were successfully recanalized, 24 underwent a successful liver transplant with physiological end-to-end portal vein anastomosis in 23 patients. The technique is also successfully applied to non-cirrhotic patients with chronic PVT and cavernous transformation. In the absence of cirrhosis, longer TIPS may be utilized since transplant is not the subsequent therapy. Based on the experience of IR team from Northwestern, recanalized chronically occluded PV will behave like a normal portal vein and will allow re-establishment of the normal physiological portal flow at the time of the transplantation.

When speaking on the true outcomes of LT in patients with diffuse PVT, Dr Bhangui alluded to the fact that none of the nine currently proposed classifications are directed towards surgical decision-making; as regards choice of inflow to the graft during LT in patients with diffuse PVT. He proposed that patients with Grades 3 and 4 PVT according to classifications by Jamieson and Charco, and Grade 4 according to Yerdel’s classification could be together classified as “complex PVT”, those in whom a porto-portal anastomoses is difficult to achieve during LT. Outcomes (especially immediate post operative outcomes) in patients with complex PVT are worse compared to those with Grade 1-3 Yerdel PVT. In complex PVT, portal reconstruction can be considered “physiological” when the splanchnic blood is somehow redirected to the graft, thus resolving the pre-existing PHT. Hence, patients with a portosystemic shunts decompressing the porto-mesenteric system directly (coronary vein/collateral transposition) or indirectly (renoportal) transposition) contribute to the hepatic inflow and should be categorised as physiological. In published studies, patients patients with PVT and a MELD <12, the post LTx mortality has been shown to be higher post LT than on the waitlist. Similarly those with a MELD between 13 and 30 had no extra benefit on being prioritised, hence there has beem no firm consensus on the need to prioritise low MELD patients with PVT for LT. Advantage is however seen in patients with PVT and high MELDs, if they are transplanted early before progressing to complex or diffuse PVT; this latter group may indeed benefit from prioritization for LT.

According to Daniel Azoulay, the only place for preoperative TIPS in Grade 3 PVT was when the thrombus was progressing on anticoagulation, or when anticoagulation was contraindicated in a patient with a new PVT. In all other cases, he was a strong proponent of a SMV jump graft to be used as an inflow during LT. Dr.Azoulay proposed that the choice for portal inflow in complex PVT depends upon the presence of large spontaneous (spleno-renal being most common), or previously surgically created portosystemic shunts. Reno-portal anastomosis is the reconstruction of choice in case of a pre-existing spleno-renal shunt. Cavoportal transposition has poorer outcomes, and complications including AKI, PHT and persistent limb edema, and may be indicated in case of portocaval shunt that cannot be dismantled, or an intraoperative surprise of diffuse portomesenteric thrombosis with no other existing options of management. Portal vein arterialization is a last resort. Diligent management of portal hypertension before, and after LT is key. Anticoagulation should be applied after LT to prevent thrombosis of the portal reconstruction. LT in patients with complex PVT should be performed in highly experienced centers, Dr. Azoulay said..

Dr Vianna emphasized that the aim of MVT is to restore the physiology not just anatomy. Indications for MVT include multiple previous surgeries in association with end stage organ failure in patients with good functional status and social support. MVT in the setting Grade 4 portomesenteric thrombosis is a valid technique when all the other techniques are exhausted. Abu-Elmagd et al. classification of complete PVT incorporating MVT as a surgical option, includes extension of thrombus, liver and intestinal function. Type 1: Cirrhosis with thrombus confined to the PV Type 2 Short gut syndrome due to mesenteric thrombosis 2a: Patent PV 2b: Cavernomatous transformation Type 3: Extensive Portomesenteric thrombosis 3a: preserved liver function 3b: Decompensated liver function