

## Pitfalls of the Piggyback

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**Target audience:** The target audiences are radiologists, fellows and residents interpreting abdominal MRIs.

**Purpose:** Orthotopic Liver Transplant (OLT) was traditionally performed using conventional caval reconstruction with end-to-end anastomosis. In recent years however, the piggyback technique (PB) with preservation of the recipient retrohepatic IVC and side-to-side anastomosis of the donor IVC to a cuff fashioned from the recipient hepatic veins, has gained popularity. The purpose of this study is to report the variety of MRI appearances of the donor IVC stump produced as a result of this new technique, which may cause confusion in the uninformed reader.

**Methods:** 50 patients who underwent OLT with PB technique at our institution who had MRI scans in 2013 and/or 2014 were retrospectively reviewed after being collated by the local Discovery Team. Axial and coronal T1 contrast enhanced images were assessed for donor IVC stump patency, donor IVC stump patency over time, and presence of accessory inferior hepatic vein.

**Results:** The donor IVC stump may be patent, giving rise to a 'double IVC sign' (fig 1) or thrombosed. Persistence of IVC stump patency is associated with presence of an accessory inferior hepatic vein (fig 2). Thrombosed IVC stumps tend to undergo evolution (fig 3).

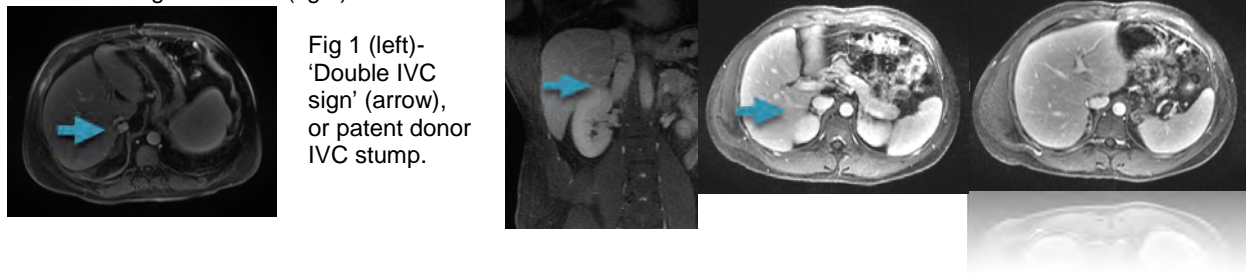
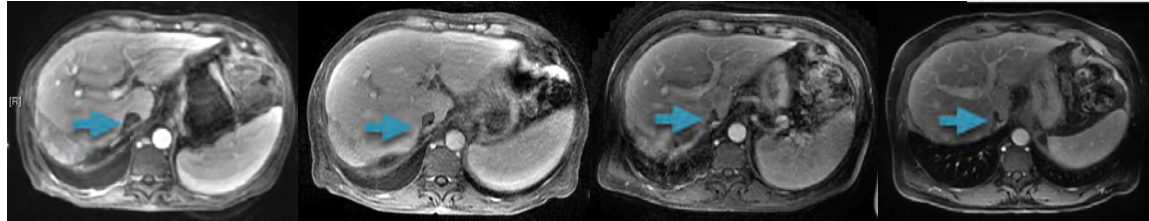


Fig 1 (left)-  
'Double IVC  
sign' (arrow),  
or patent donor  
IVC stump.

Fig 2 (above right)- Patent donor IVC stump associated with accessory inferior hepatic vein (arrow).  
 Fig 3 (below)- Evolution with gradual shrinking of thrombosed IVC stump (arrows) over 18 mths.



**Discussion and Conclusion:** The findings highlight the need for radiologists to recognize normal post-surgical anatomy in the PB OLT, and appearances of thrombosed and non-thrombosed donor IVC stumps in this increasingly popular technique. Misdiagnosis of normal post-surgical anatomy as pathology may thus be avoided. The persistence of IVC stump patency in the presence of accessory inferior hepatic vein is appreciated. The natural evolution of the donor IVC stump thrombosis is also recognised. Potential areas to expand this work will be to study IVC stumps over a longer time period and with increased numbers.

**References:** 1. Barshes NR, Lee T, Kiliç M, Goss JA. Reconstruction of the hepatic venous outflow in piggyback liver transplantation. *Exp Clin Transplant*. 2004 Jun;2(1):189-95. 2. Caiado AH1, Blasbalg R, Marcelino AS, et al. Complications of liver transplantation: multimodality imaging approach. *Radiographics*. 2007 Sep-Oct;27(5):1401-17. 3. Ferro C, Andorno E, Guastavino A, Rossi UG, Seitun S, Bovio G, Valente U. Endovascular treatment with primary stenting of inferior cava vein torsion following orthotopic liver transplantation with modified piggyback technique. *Radiol Med*. 2014 Mar;119(3):183-8. 4. Ghazaly M, Davidson BR. Conventional versus piggyback techniques: do they have different outcomes? *Prog Transplant*. 2014 Mar;24(1):51-5.