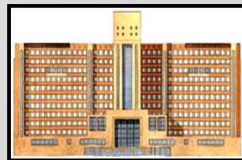


# Management of Portal Vein Thrombosis Before Transplantation

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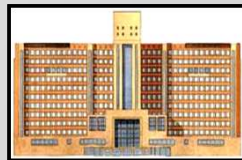


# Portal vein thrombosis: not uncommon in candidates for transplantation

Author	Year	Patients	Prevalence of PVT (%)	Partial/complete PVT (%)
Yerdel MA	2000	779	8	-
Manzanet G	2001	391	7	12/4
Molmenti EP	2002	1546	5	-
Llado L	2005	355	12	-
Francoz C	2005	251	8	7/1
Tao YF	2009	465	9	-
Dumortier J	2010	548	8	7/1
Ravaioli M	2011	889	10	6/4

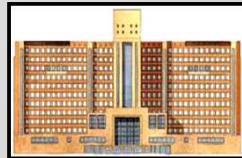
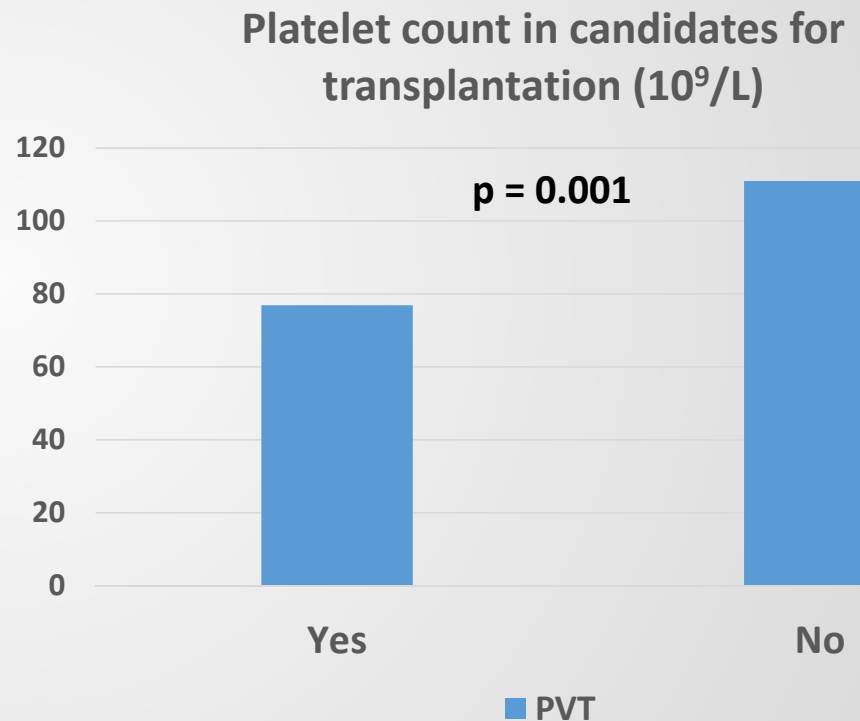
**+ 5-10% of patients who develop new PVT during waiting time**

Francoz C et al. GUT 2005; 54: 691.

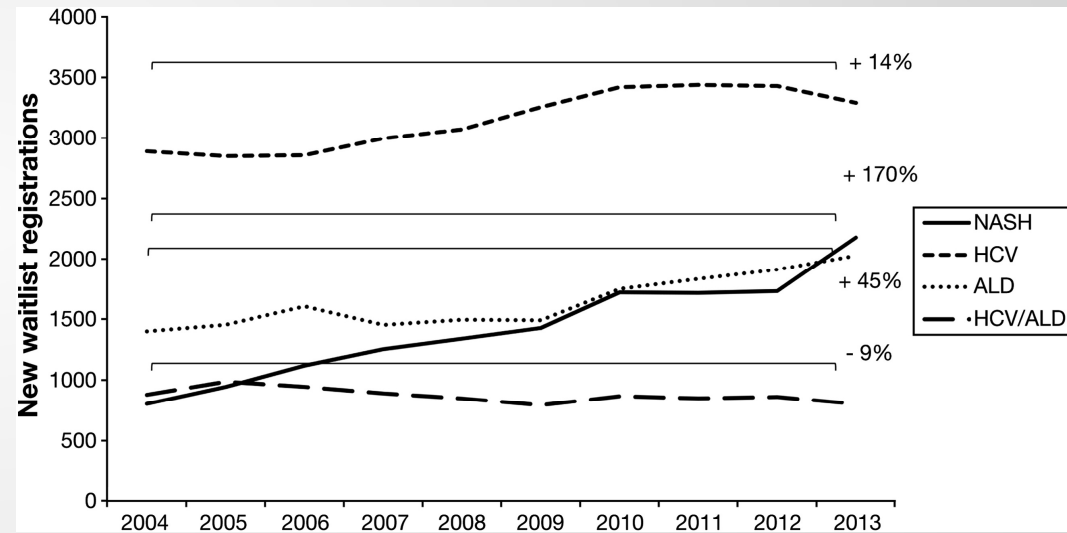
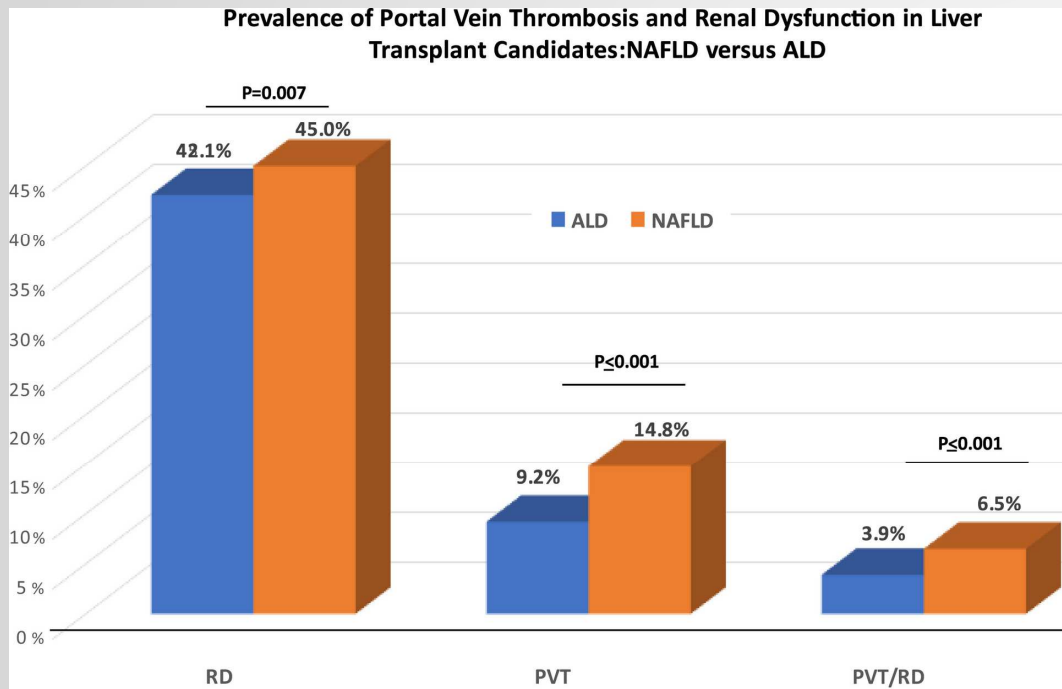


# Risk factors for PVT in candidates for transplantation

- **High MELD score (>13)**
- **Hepatofugal portal blood flow**
- **Low platelet count**
- **HASH cirrhosis**

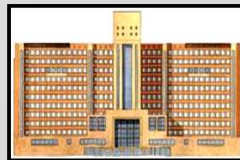


# Portal vein thrombosis and NASH-related cirrhosis



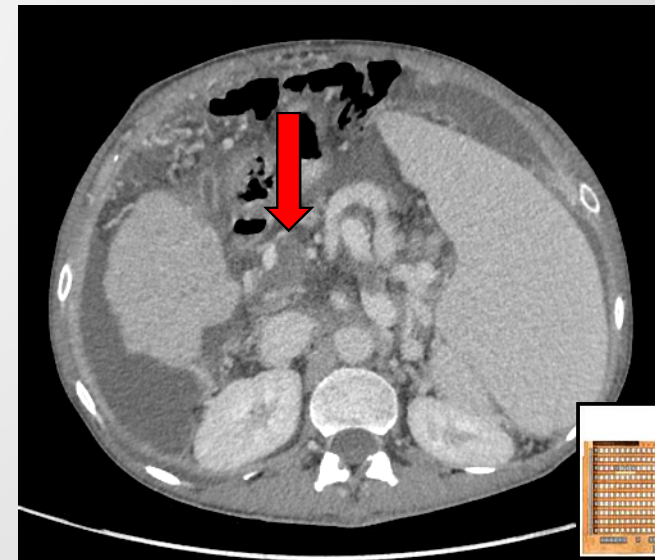
Molinari M et al. Transplant International 2021; 34: 1105.

Wong RJ et al. Gastroenterology 2015; 148: 547.



# Objectives: ensure adequate portal flow to the graft


- **Partial portal vein thrombosis:**
  - ✓ Prevent progression to obstructive thrombosis
- **Complete portal vein thrombosis**
  - ✓ Achieve recanalization
- **Pay attention to mesenteric vein patency**
  - ✓ Jump graft with donor's portal vein
- **Avoid cavo-portal/reno-portal anastomosis**
  - ✓ High morbidity and mortality



# Partial PVT: anticoagulation during waiting time

Author	Year	Patients	Anticoagulation	Recanalization (%)	Extension (%)
Francoz C	2005	19	LMWH / VKA	42	0
Senzolo M	2009	26	LMWH	50	10
Delgado MG	2012	55	LMWH / VKA	60	20
Werner KT	2013	28	VKA	82	3
Cui SB	2015	65	LMWH	78	15
Chen H	2016	30	VKA	50	13
Kwon J	2018	91	LMWH	62	21
La Mura V	2018	63	VKA	70	36
Nagoaki Y	2018	20	DOACs	90	15
Hanafy AS	2019	40	DOACs	85	0

# Low molecular weight heparin vs vitamin K antagonists vs direct oral anticoagulants

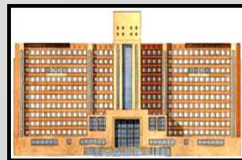
	LMWH	 VKA	DOACs
<b>Pros</b>	<ul style="list-style-type: none"> <li>• Short acting</li> <li>• Does not affect MELD</li> </ul>	<ul style="list-style-type: none"> <li>• Urinary excretion</li> <li>• Easy to reverse with FFP</li> </ul>	<ul style="list-style-type: none"> <li>• No monitoring</li> </ul>
<b>Cons</b>	<ul style="list-style-type: none"> <li>• SC administration</li> <li>• Decreased efficacy if low antithrombin</li> </ul>	<ul style="list-style-type: none"> <li>• Artificial increase in the MELD score</li> <li>• Difficult to monitor</li> </ul>	<ul style="list-style-type: none"> <li>• Should be avoided in Child B-C</li> <li>• Unpredictable impact on INR and MELD</li> <li>• Difficult to reverse</li> </ul>

# Impact of VKA on the MELD score

**57-year-old patient with alcohol related cirrhosis, encephalopathy, ascites and non occlusive PVT**

	Baseline	On VKA
Bilirubin ( $\mu\text{mol/L}$ )	60	60
Creatinine ( $\mu\text{mol/L}$ )	110	110
INR	1.1	2.7
MELD score	14	24

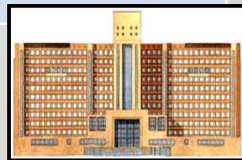
- **Factor V is independent of VKA**
- **Prothrombin index (%) without VKA  $\approx$  Factor V (%)**
- **$\text{INR} = (\text{factor V} / 94.88)^{-0.8}$**





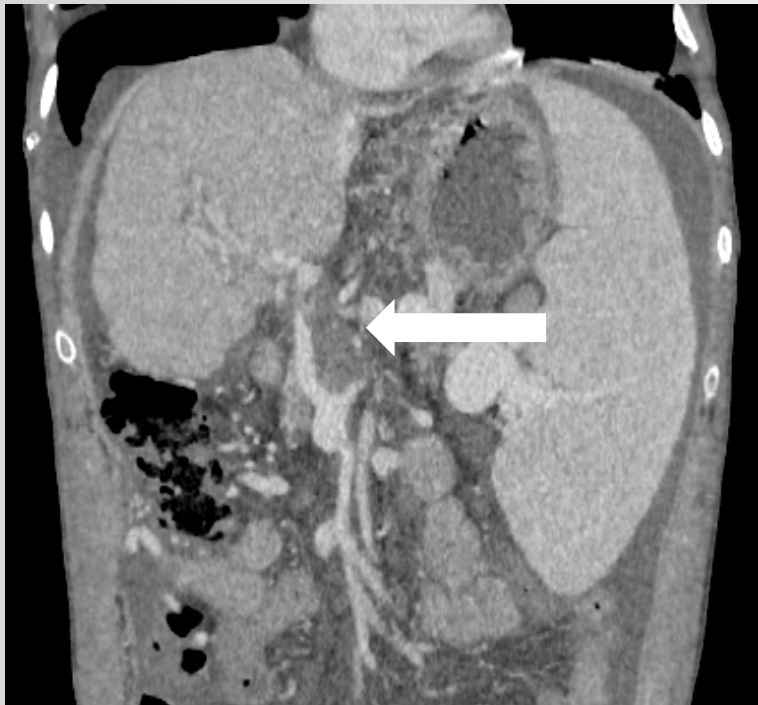
# Complete portal vein thrombosis: TIPS

Author	Year	Patients	MELD	Complete thrombosis	Recanalization (%)
Han G	2011	57	7	22/57	100
Luca A	2011	70	8	24/70	60
Luo X	2015	37	9	13/37	65
Rosenqvist K	2016	19	8	15/21	74
Wang Z	2016	64	7	37/64	78
Lv Y	2017	24	7	8/24	91
Thornburg B	2017	61	-	35/61	92



# Complete portal vein thrombosis and TIPS

Candidate for transplantation with obstructive portal vein thrombosis



**Evaluation**



**Pre-transplant TIPS**

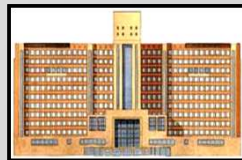
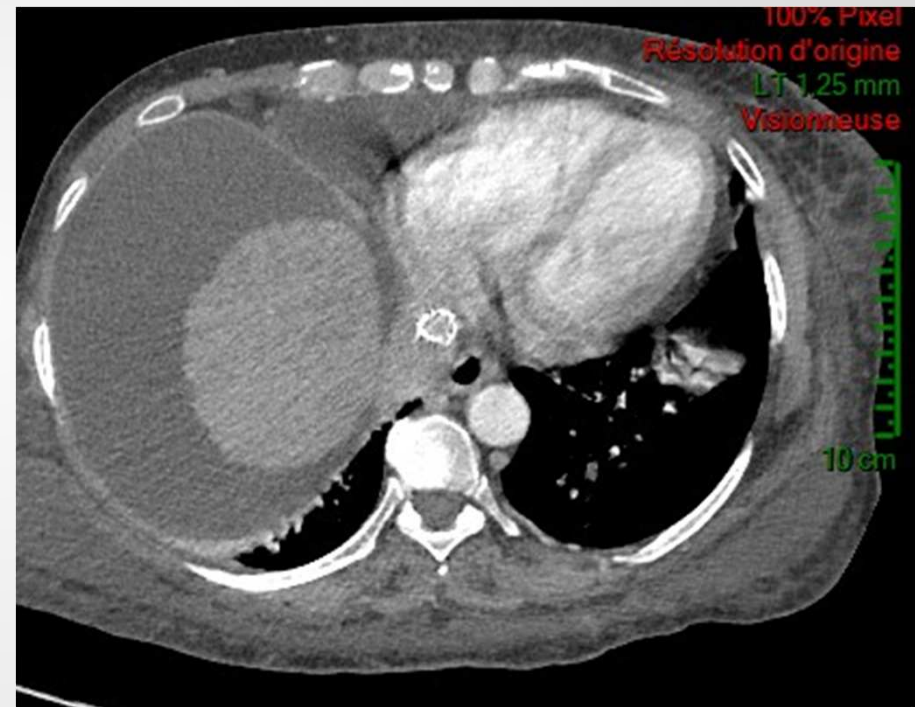


**End-to-end portal  
anastomosis**

# TIPS before transplantation: Limitations and pitfalls

- **Advanced cirrhosis: further deterioration in liver function**
  - ✓ MELD limit  $\approx$  17
- **Risk of encephalopathy**
  - ✓ Especially in high MELD score
- **Technical difficulties if misplacement**
- **Mesenteric vein thrombosis**
  - ✓ Major difficulty

**Anticoagulation preferred to TIPS in patients with partial thrombosis**



# Conclusions

- **PVT: not uncommon in candidates for transplantation**
  - ✓ Growing incidence of PVT with growing incidence of NASH
- **De novo PVT on the waiting list: not uncommon**
  - ✓ Consequence of long waiting time
  - ✓ Need for careful screening
- **Objective: prevent/restore PVT patency**
- **Anticoagulation: first line option for partial PVT**
  - ✓ VKA are the reference
  - ✓ TIPS is an alternative
- **TIPS must be considered in patients with complete PVT**
  - ✓ Further deterioration in patients with end stage cirrhosis
  - ✓ Technical difficulties if misplacement
- **Mesenteric vein thrombosis: a challenging issue**

