Portal Vein Embolization: My Top 5 Technical Pearls

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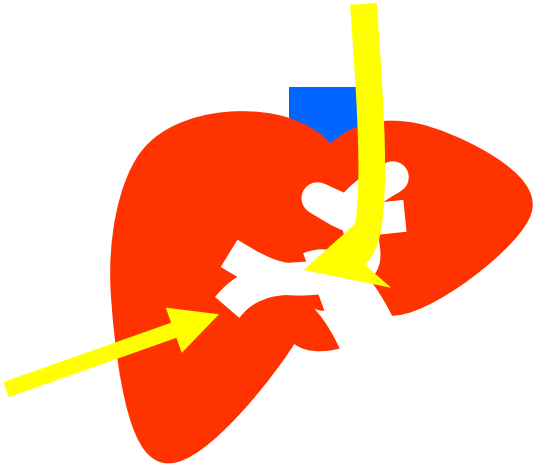
Disclosure

Consultant for: Terumo, Cook, Neuwave

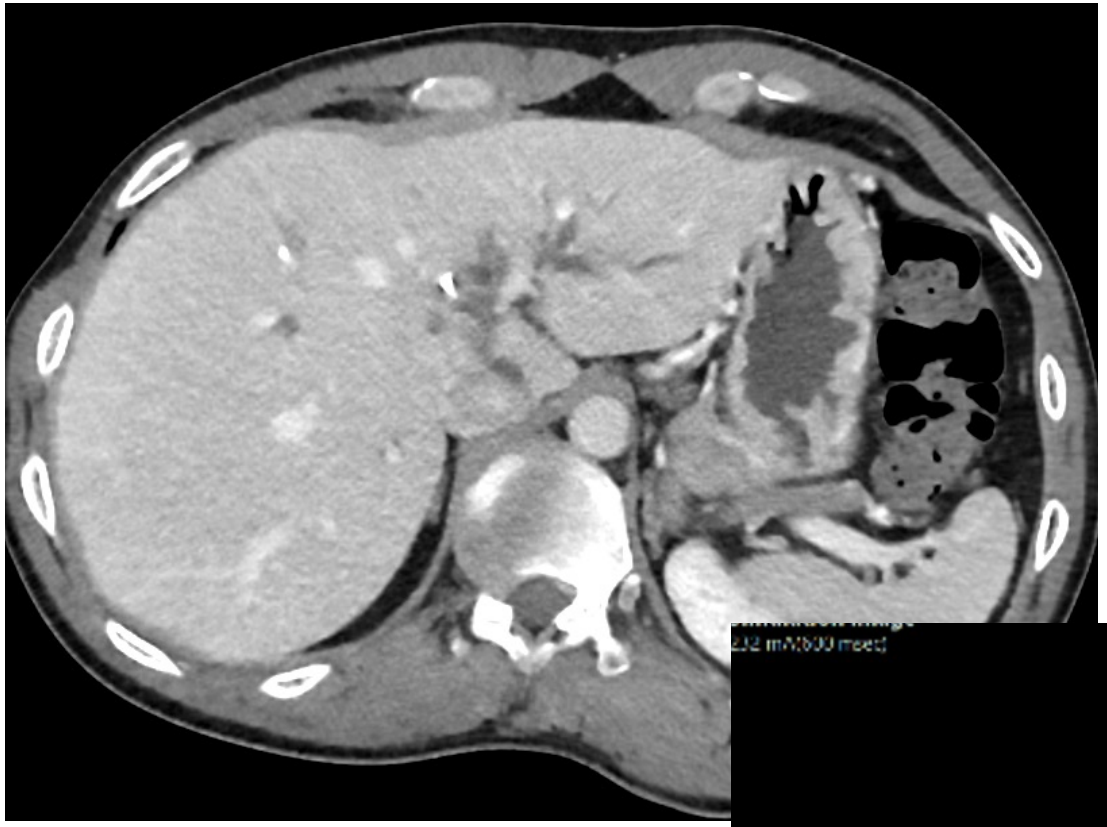
Brand names are included in this presentation for participant clarification purposes only. No product promotion should be inferred.

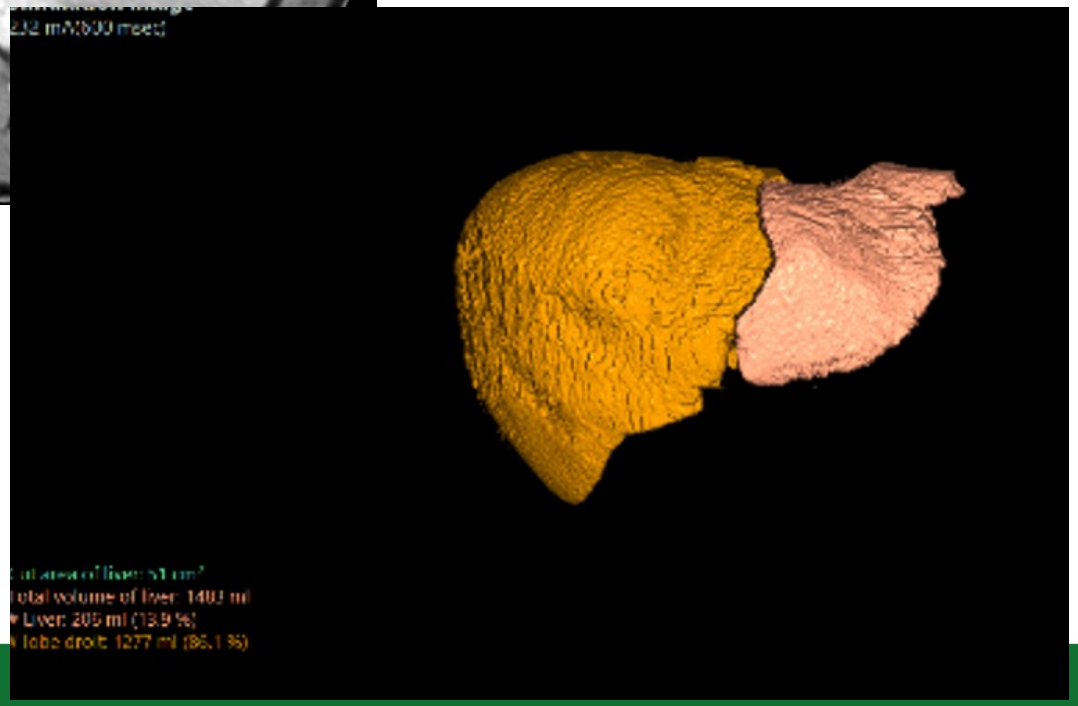
Pearl 1 :access route tips and tricks….

- Indications for both exists
  - Contralat mandatory in case of Klatskin tumors
  - Ipsi depending on the embolic material

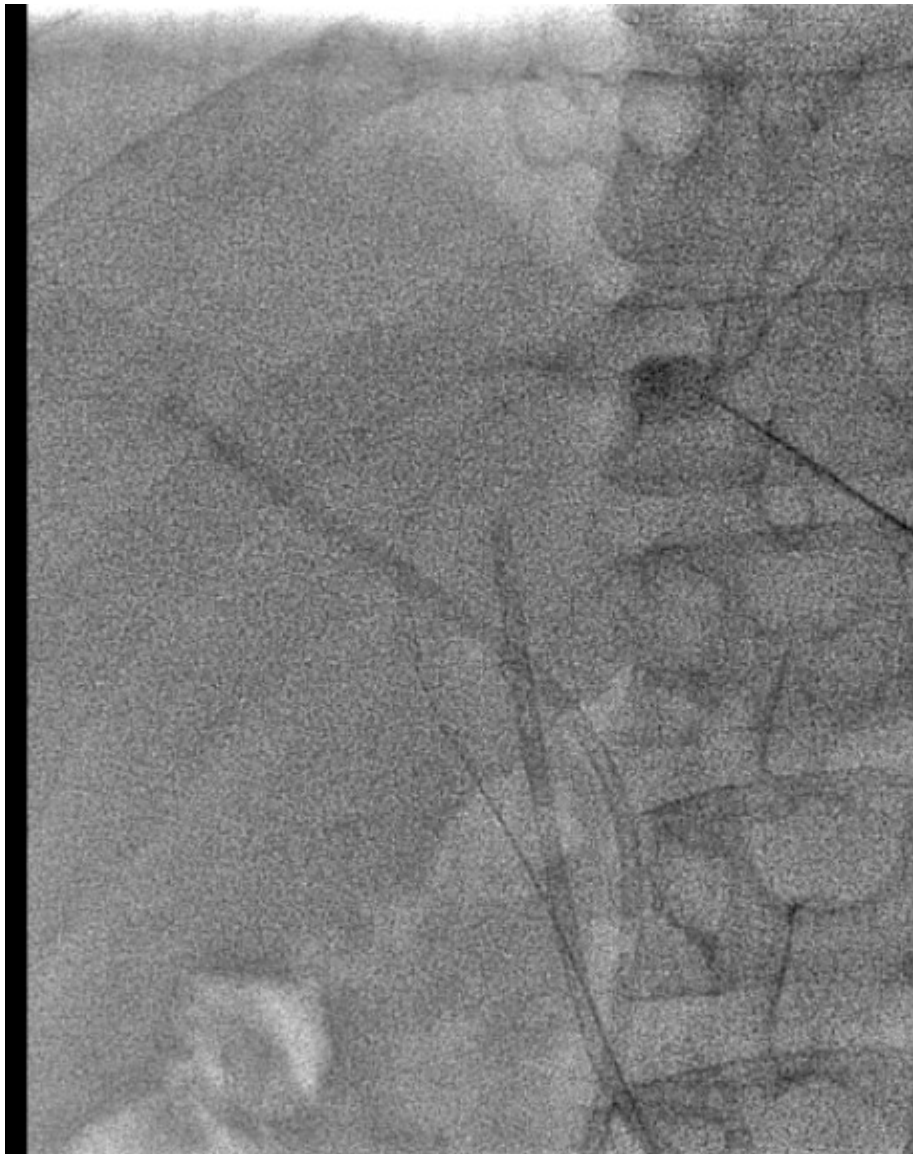


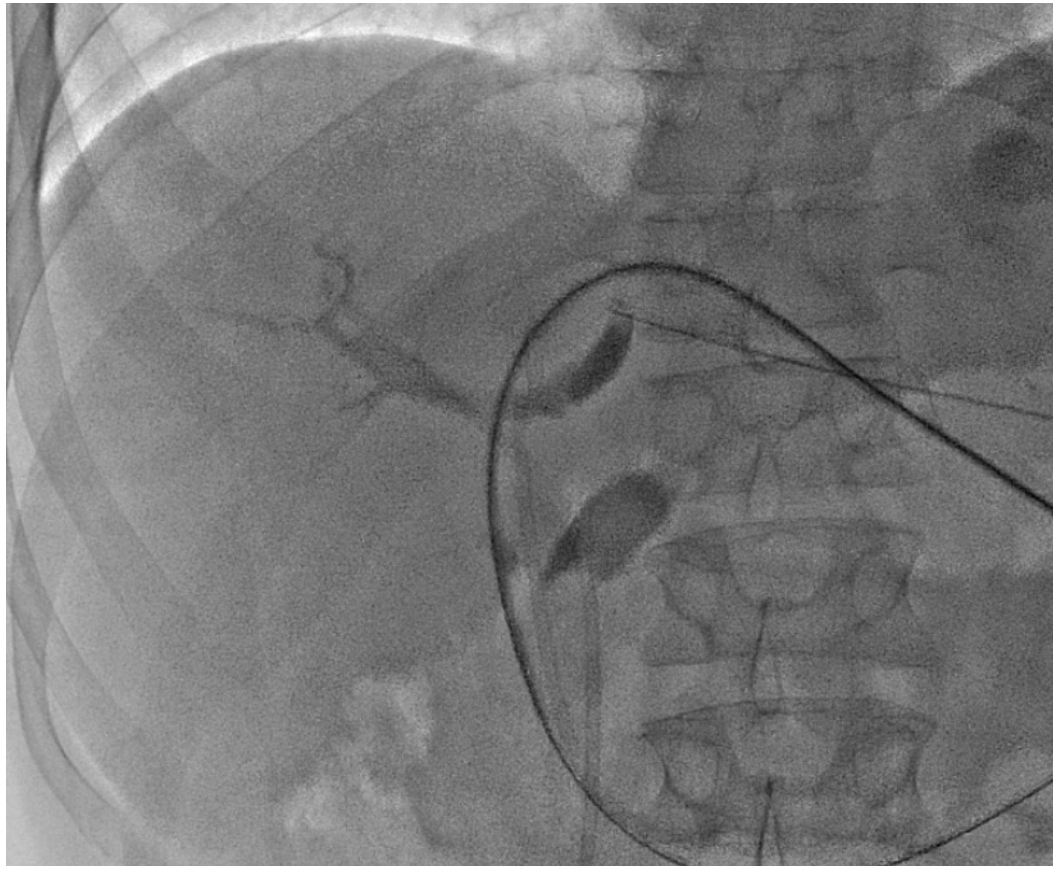
	Controlateral route	Ispsiateral route
pros	Catheterism easier Final control easier Dose reduction ? Use of glue	No risk for FRL Easy puncture Access to segt 4 branches
Cons	Risk of complications of FRL (increased by PH)	Catherism more complex Use of glue more tricky Final control hard to achieve

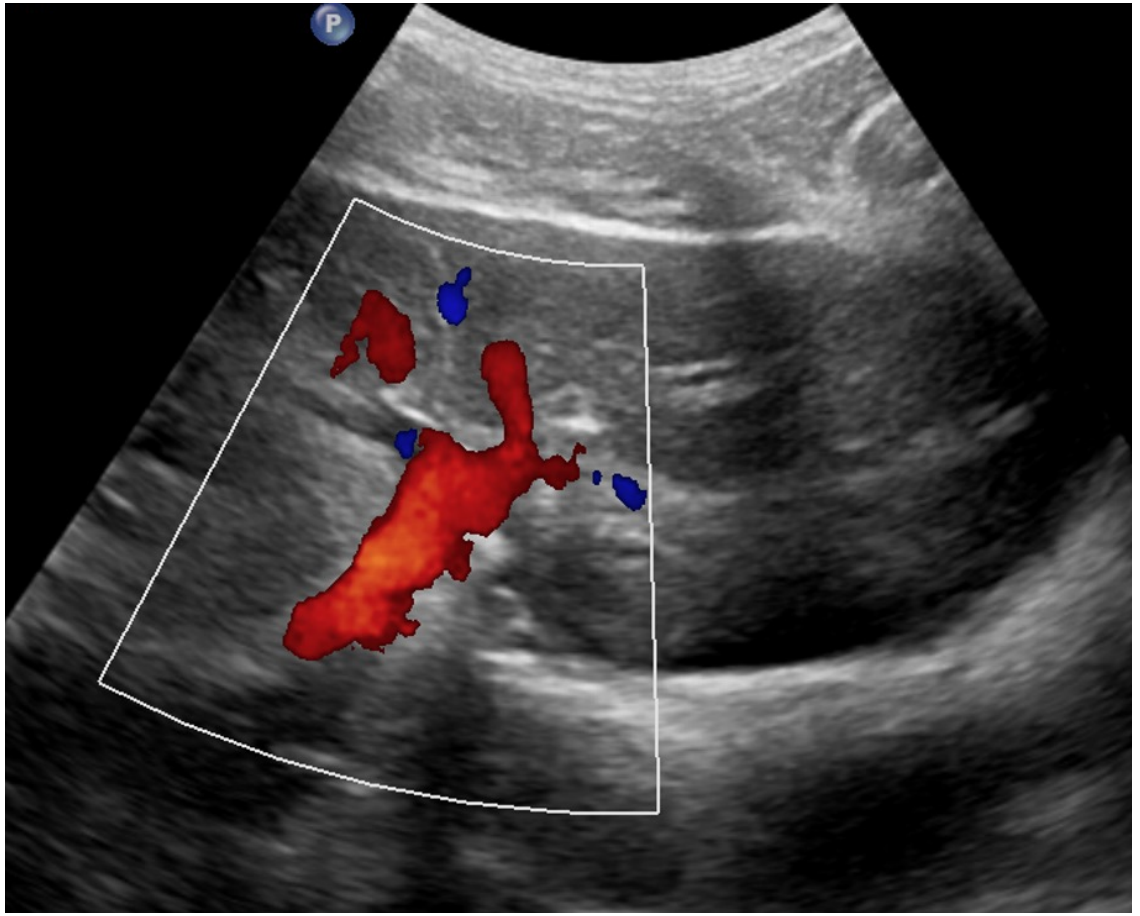




Klatskin IIIA
Left lobe volumetry: FRL 18%
Need for left lobe drainage, right PVE +LVD



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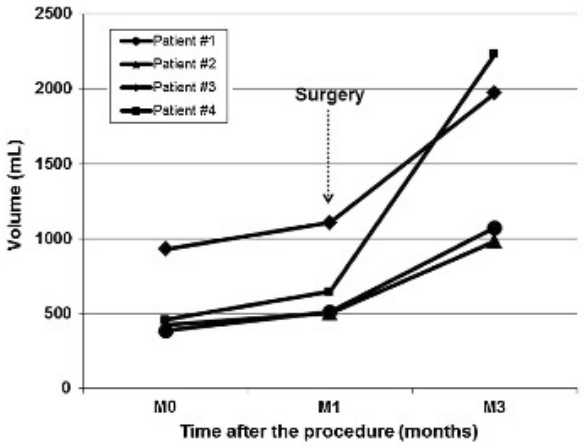
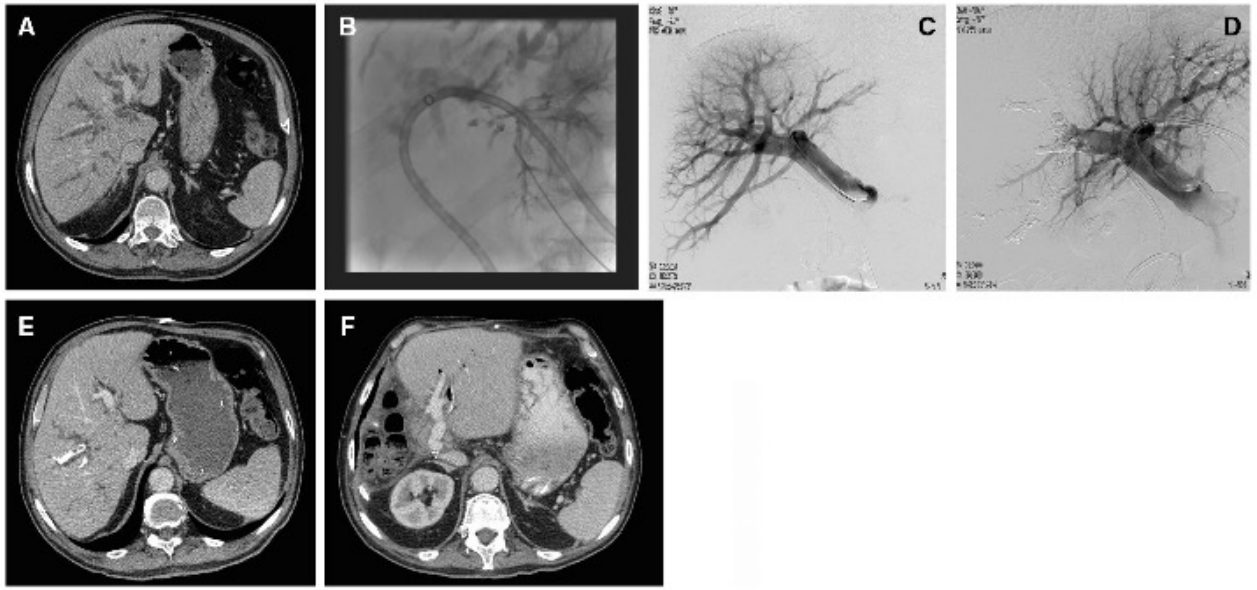
Pearl 2 combine PVE and PCBD in the same procedure

Perform PVE and biliary drainage in the same procedure





Cardiovasc Intervent Radiol (2014) 37:698–704
DOI 10.1007/s00270-013-0699-7

CIRSE

CLINICAL INVESTIGATION INTERVENTIONAL ONCOLOGY

Simultaneous Biliary Drainage and Portal Vein Embolization Before Extended Hepatectomy for Hilar Cholangiocarcinoma: Preliminary Experience

Boris Guiu · Pierre Bize · Nicolas Demartines · Mickaël Lesurtel · Alban Denys

Klatskin tumor: why should liver preparation be faster?

- 494 pats treated for biliary cancer received PVE
  - Mean delay diagnosis and surgery unknown
  - But 2 steps strategy biliary then PVE
  - 24.7% did not receive resection due to tumor progression…..
    - More frequent in gallbladder cancer than with klatskin tumor

Dig Surg. 2012;29(1):23-9. doi: 10.1159/000335718. Epub 2012 Mar 15.

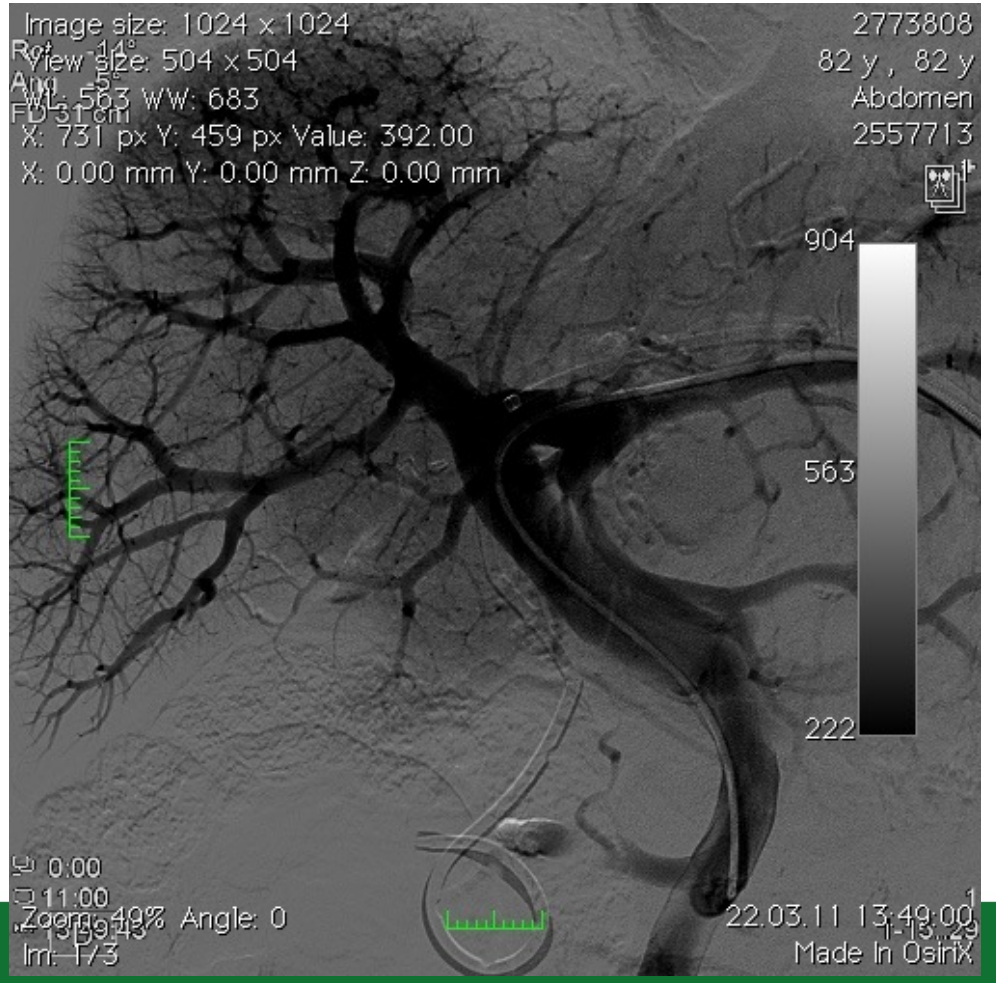
Portal vein embolization before extended hepatectomy for biliary cancer: current technique and review of 494 consecutive embolizations.

Ebata T[1], Yokoyama Y, Igami T, Sugawara G, Takahashi Y, Nagino M.

Delay between tertiary center consultation and treatment is 74 days in amsterdam series (Rhuys AT HPB 2014)
Delay from biliary decompression to PVE in US series between 55 to 61 days followed (Walter T JVIR 2013)

Pearl 3 Use a mixture of Glue and Lipiodol

- Try first the most tricky portal branches close to the portal bifurcation and move to the easy ones
- Dilute one to 2 in the first injections to embolize distally and then 1 to 1 finally

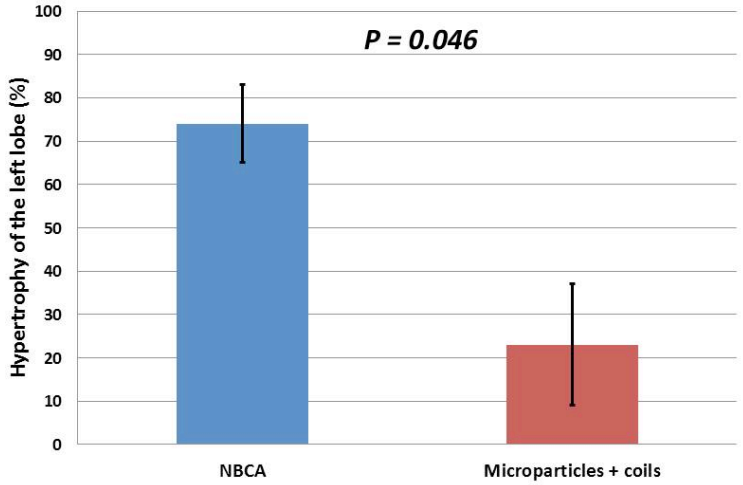


Why Glue?

	NBCA	Microparticles+coils	*P value*
Age	68±12	67±9	>.05
Sex ratio (W/M)	5/9	4/10	>.05
Cirrhosis/metastases	5/9	5/8	>.05
Total liver volume	1978±1352	1692±391	>.05
Left lobe volume	470±210	495±191	>.05
FRL ratio	0.027±0.11	0.29±0.06	>.05

Much less contrast for Glue than coils and particles (164 vs 262)
Similar rate of complications
Lower cost (Europe)

Guiu, Denys et al CVIR 2013



Pearl 4 : Prepare your table with G5% NO SALINE…..

Pearl 5: embolize the hepatic veins as well….

Eur Radiol. 2017 Aug;27(8):3343-3352. doi: 10.1007/s00330-017-4744-9. Epub 2017 Jan 18.

Extended liver venous deprivation before major hepatectomy induces marked and very rapid increase in future liver remnant function.

Guiu B[1,2,3], Quenet F[4], Escal L[5], Bibeau F[6], Piron L[5], Rouanet P[4], Fabre JM[7], Jacquet E[8], Denys A[9], Kotzki PO[10,11], Verzilli D[12], Deshayes E[10,11].

Initial experience with patients candidate to resection with FRL <25% or FRL function <2.69%/min/m2 at mebubronin scintigraphy (VanGulik criteria)
PVE + Right AND middle hepatic vein simultaneous embolization
Etiology: 8 liver mets CRC (, Klatskin 1, GB carcinoma 1)

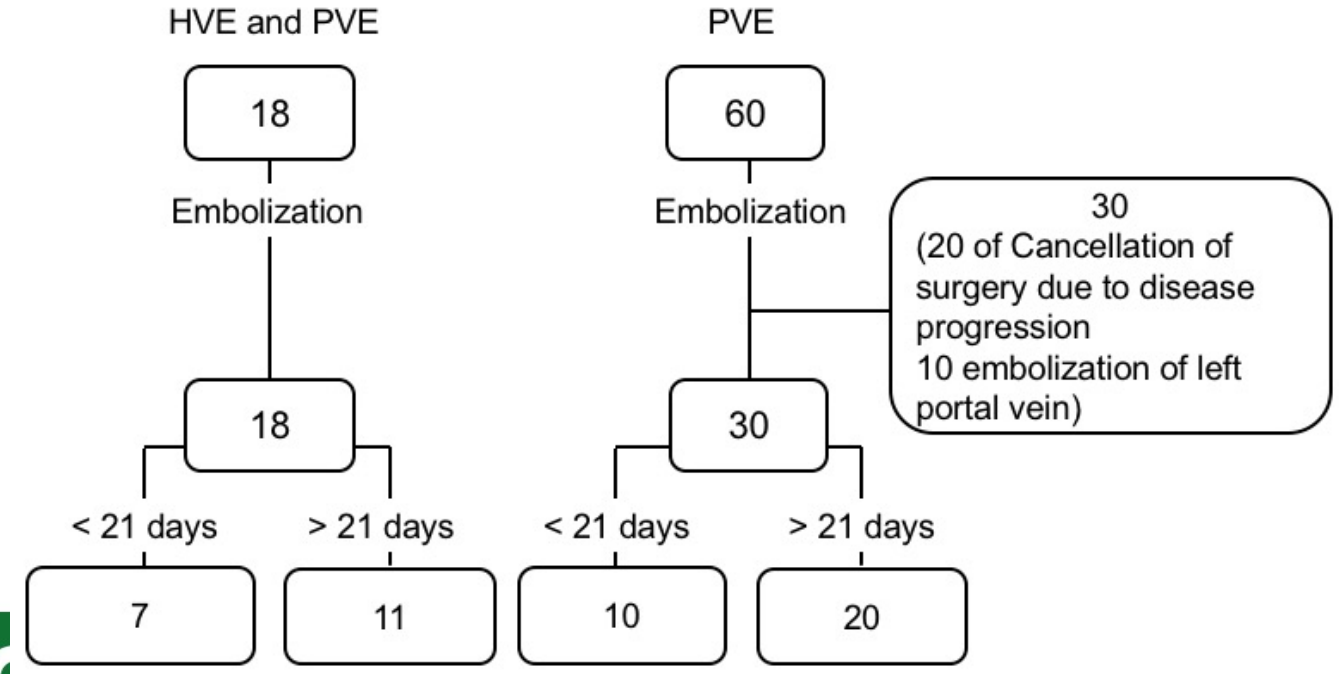
Results:

FRL function increased by 64% (range 28-107%) at day 21
Maximal liver function gain was at day 7 (+65+/-16%)
Maximal FRL volume increased by 53% at 7 days (25+/-8 days a week)

Opens the gate for earlier resection between 1 and 2 week

Comparison to PVE

- 1 randomized trial starting in France in 2019
- Lausanne experience 6 years



Surgery 167 (2020) 917–923

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journal homepage: www.elsevier.com/locate/surg

Liver venous deprivation compared to portal vein embolization to induce hypertrophy of the future liver remnant before major hepatectomy: A single center experience

Kosuke Kobayashi, MD[a], Takamune Yamaguchi, MD[a], Alban Denys, MD[b], Lindsay Perron, MD[b], Nermin Halkic, MD[a], Nicolas Demartines, MD[a,*], Emmanuel Melloul, MD[a]

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Table 1. Patients' characteristics			
Variables	HVE and PVE (n=18)	PVE (n=30)	p value
Age, year	66 (31-85)	64 (41-75)	0.975
Sex, male : female	10 : 8	19 : 11	0.594
BMI, kg/m²	23.4 (18.9-35.6)	23.8 (17.1-32.5)	0.624
Total bilirubin, μmol/dl	6.5 (3-348)	10 (3-62)	0.499
PT, %	100 (65-150)	100 (60-120)	0.081
AST, U/l	36 (18-189)	46 (14-217)	0.390
ALT, U/l	41 (15-241)	45 (12-522)	0.644
Preoperative drainage of bile duct	6 (33.3%)	2 (6.7%)	0.016
ERCP / percutaneous	2 / 4	1 / 1	
Embolization			
RPV + P4/ RPV	1 / 17	3 / 27	
RHV / RHV and MHV	13 / 2	-	-
Diagnosis			
Colorectal metastasis	9 (50.0%)	26 (86.7%)	0.006
Hepatocellular carcinoma	2 (11.1%)	2 (6.7%)	0.590
Cholangiocarcinoma (K IIIa)	7 (38.9%)	2 (6.7%)	0.006

Table 3. Volumetric analysis and outcome

Variables	HVE and PVE n=18	PVE n=30	p value
Volumetric analysis of pre-operation			
TLV, ml	1592 (1203-2328)	1650 (959-2605)	0.831
SLV, ml	1278 (1007-1520)	1281 (1071-1557)	0.865
FRL volume, ml	530 (334-989)	523 (288-1032)	0.774
FRL / TLV, %	34.3 (24.4-44.6)	32.9 (17.4-58.3)	0.749
FRL / SLV, %	39.4 (25.5-65.1)	38.9 (24.9-96.3)	0.949
Spleen volume	206 (82-401)	211 (70-451)	0.932
Volumetric outcome of post-embolization			
Days between embolization and CT, days	23 (13-35)	26 (15-72)	0.277
TLV, ml	1859 (1373-2424)	1620 (1014-2314)	0.045
FRL volume, ml	721 (555-1186)	696 (317-1086)	0.360
FRL / TLV, %	42.7 (30.1-55.8)	43.0 (30.4-71.4)	0.733
FRL / SLV, %	58.1 (42.0-78.0)	51.3 (29.1-101.4)	0.131
Spleen volume, ml	257 (89-449)	207 (78-521)	0.418
Post-TLV – Pre-TLV, ml	**128 (-92-585)**	**12 (-337-439)**	**0.002**
Post-FRL volume – Pre-FRL volume, ml	**195 (80-442)**	**109 (11-463)**	**0.009**
Post-FRL% / Pre-FRL% of TLV, %	121.0 (108.3-216.3)	122.9 (97.6-202.8)	0.966
Post-FRL% / Pre-FRL% of SLV, %	**134.7 (112.0-232.3)**	**124.3 (98.4-203.4)**	**0.039**
Post-Spleen / Pre-Spleen, %	**123.1 (96.2-173.3)**	**110.3 (45.0-181.0)**	**0.048**

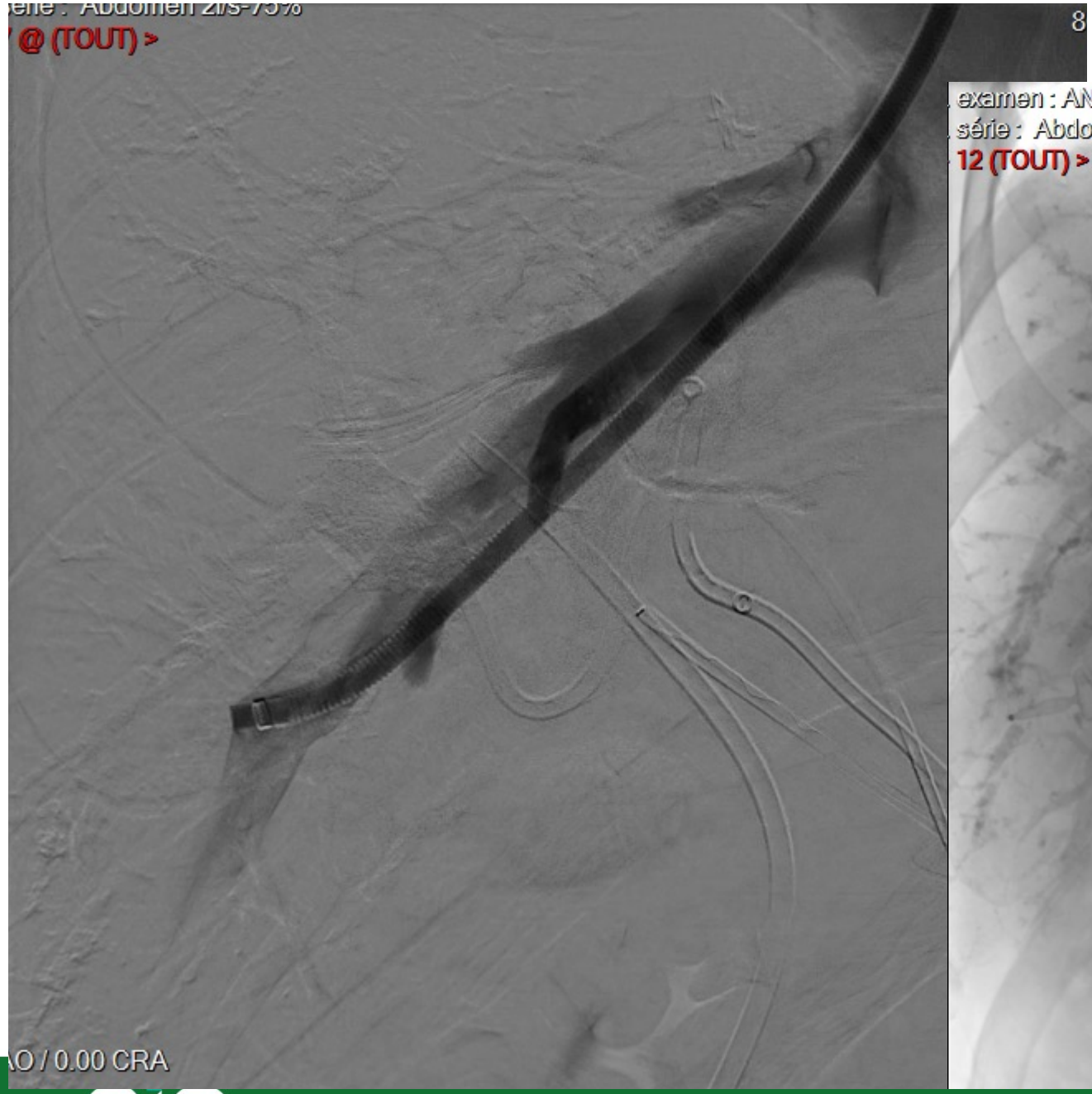
Data are presented as median (range) or n (%).
Abbreviations: TLV, total liver volume; SLV, standard liver volume; FRL, future remnant liver

Doubling of the FLR vs PVE
Increase in spleen size

Variables	HVE and PVE (n=18)	PVE (n=30)	p value
Intraoperative outcomes			
Days between embolization and operation, days	36 (23-109)	35 (20-181)	0.924
Right Hepatectomy	8 (44.4%)	19 (63.3%)	0.202
Extended Right Hepatectomy	10 (55.6%)	11 (36.7%)	0.202
Operative time, min	363 (274-577)	344 (210-554)	0.198
Estimated blood loss, ml	850 (600-2500)	1000 (200-2600)	0.716
Pringle maneuver	18 (100%)	29 (97.0%)	0.434
Postoperative morbidity			
Morbidity	11 (61.1%)	15 (50.0%)	0.455
Clavien-Dindo classification I or II	4 (22.2%)	6 (20.0%)	0.854
Clavien-Dindo classification > III	7 (38.9%)	11 (30.0%)	0.527
Comprehensive Complication Index	16.6 (0-100)	4.4 (0-57)	0.364
Mortality	0	0	
Postoperative length of stay, days	14 (6-57)	11 (5-69)	0.086

Data are presented as median (range) or n (%).
Abbreviations: BMI, body mass index; PT, prothrombin time; AST, aspartate aminotransferase; ALT, alanine aminotransferase

No difference in blood loss despite the »Budd-Chiari « effect
No difference in operative outcome despite more extended right hepatectomies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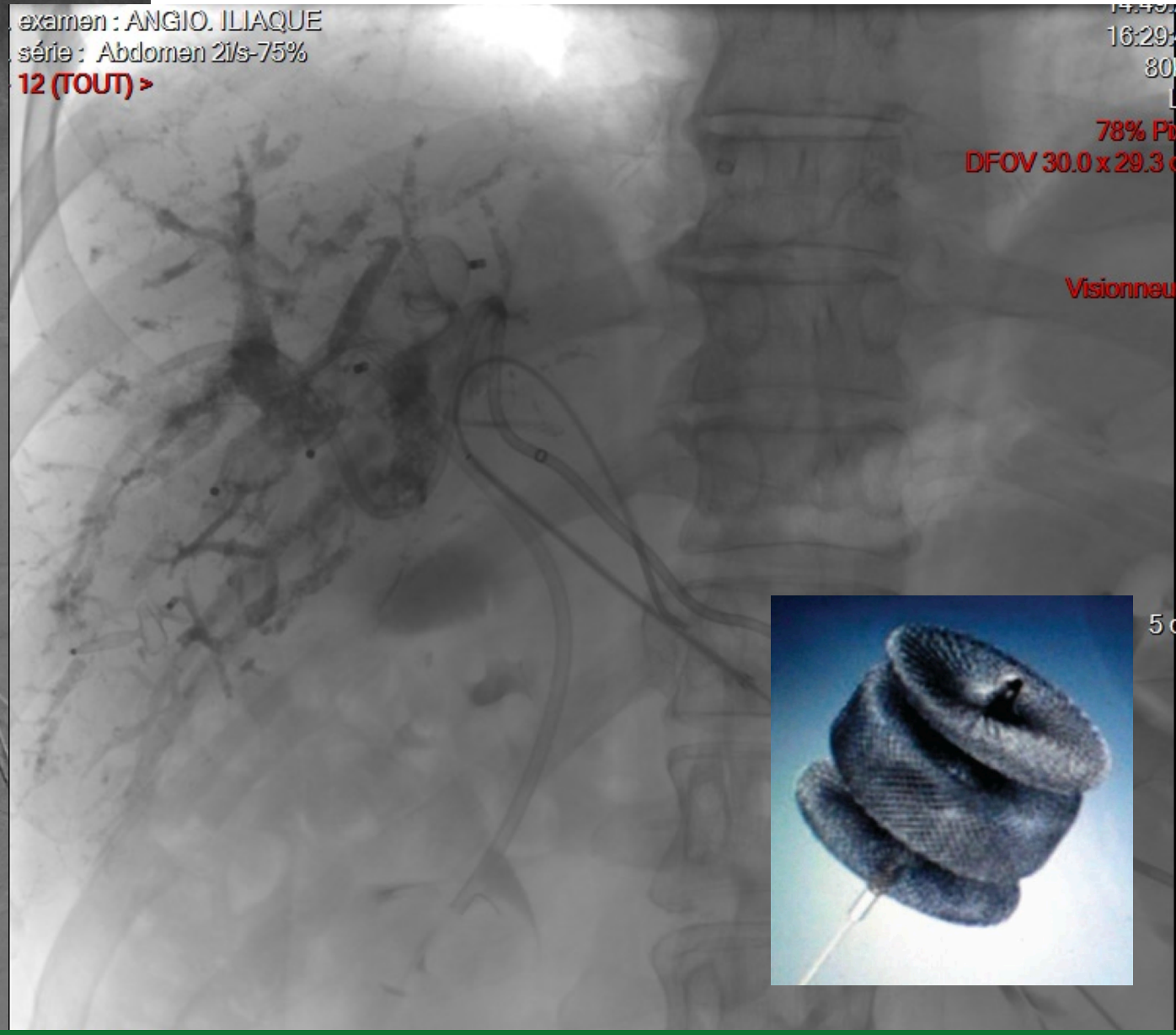
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série : Abdomen 2i/s-75%
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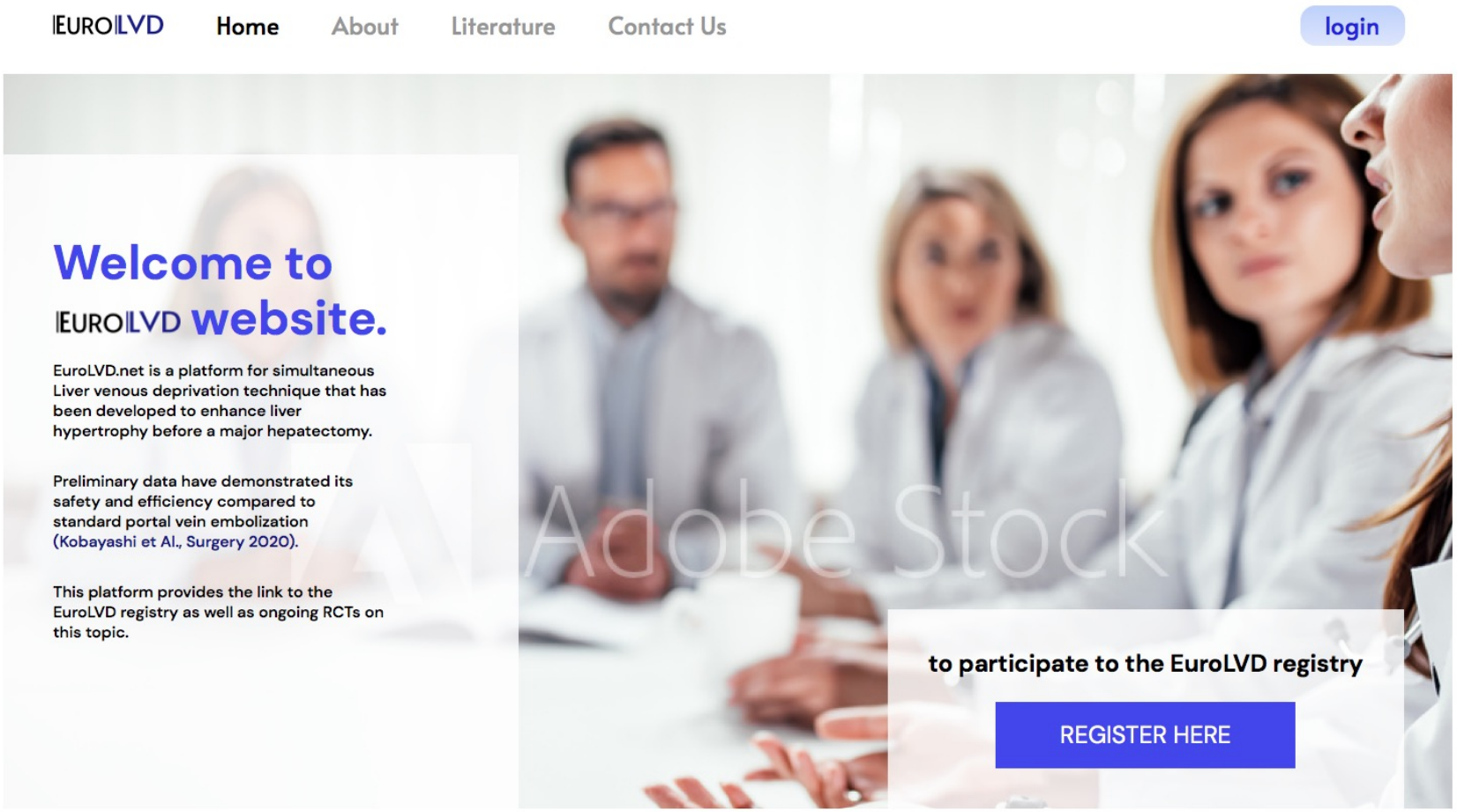
Embark in EuroLVD adventure



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