

# **MANEJO DE LA ARTERIA HEPÁTICA COMPLEJA**

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# Factores que influyen en la definición de arteria hepática compleja

## 1.- DEPENDIENTES DEL RECEPTOR:

VARIANTES ANATÓMICAS: Varias arterias , todas finas.....

TACE: Rigidez, intimas gruesas..... desinserción intima

TROMBOSIS PORTAL: Hígados arterializados , arterias hipertróficas.....

ARTERIOESCLEROSIS: Arterias calcificadas con ostiums impracticables.....

## 2.- DEPENDIENTES DEL DONANTE

TIPO: Cortas, finas, etc.

NÚMERO: Testar la dominante, necesidad de sacrificar alguna.....

## 3.- DEPENDIENTES DE LA TÉCNICA QUIRÚRGICA

DISCREPANCIA DE CALIBRES

MATERIAL: Clamp, Satinsky, Bulldog, Digital, Pinzas, Lupas, Microcirugia .....

TECNICA: Puntos sueltos, continua, cara anterior, cara posterior.....

## 4.- FACTORES AMBIENTALES

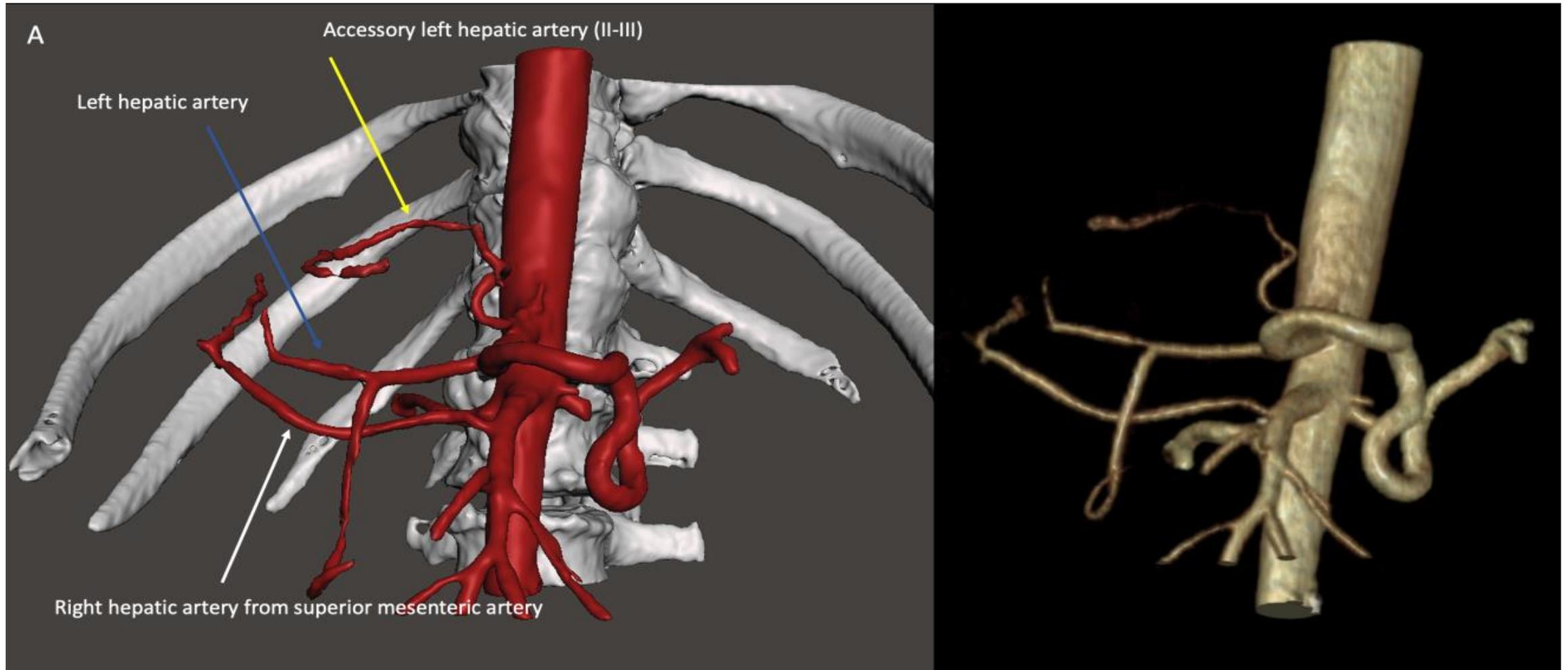
Profundidad de campo, la movilidad del campo, orientación.....



# CASO CLÍNICO

VARÓN. 50 AÑOS DE EDAD. CIRROSIS VHB + ALCOHOL. MELD 23

INSUFICIENCIA RENAL LEVE + DM. FUMADOR.



# OPCIONES

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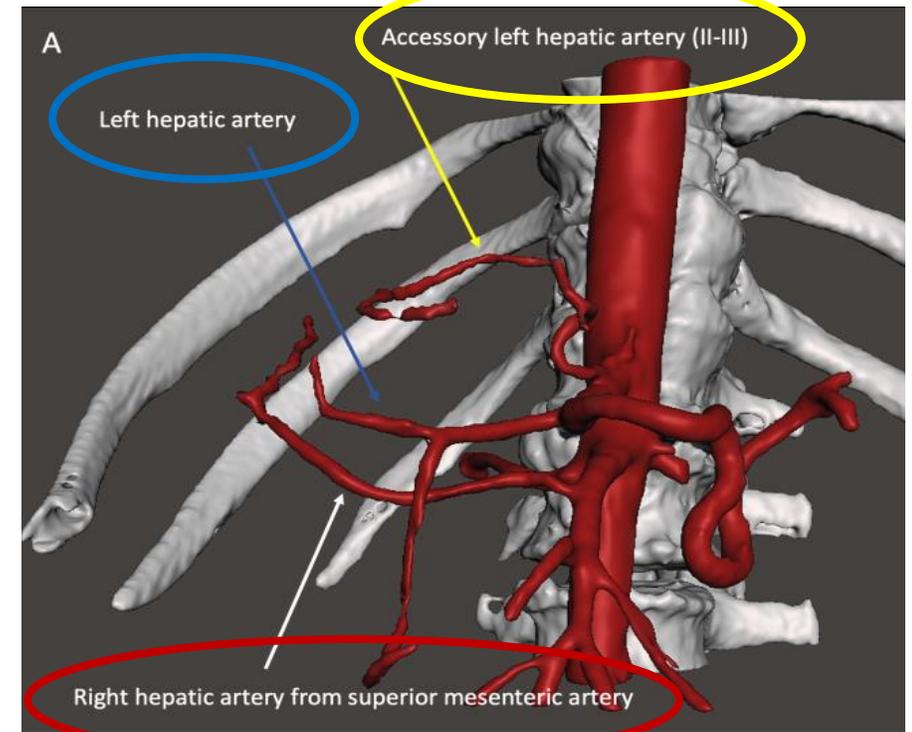
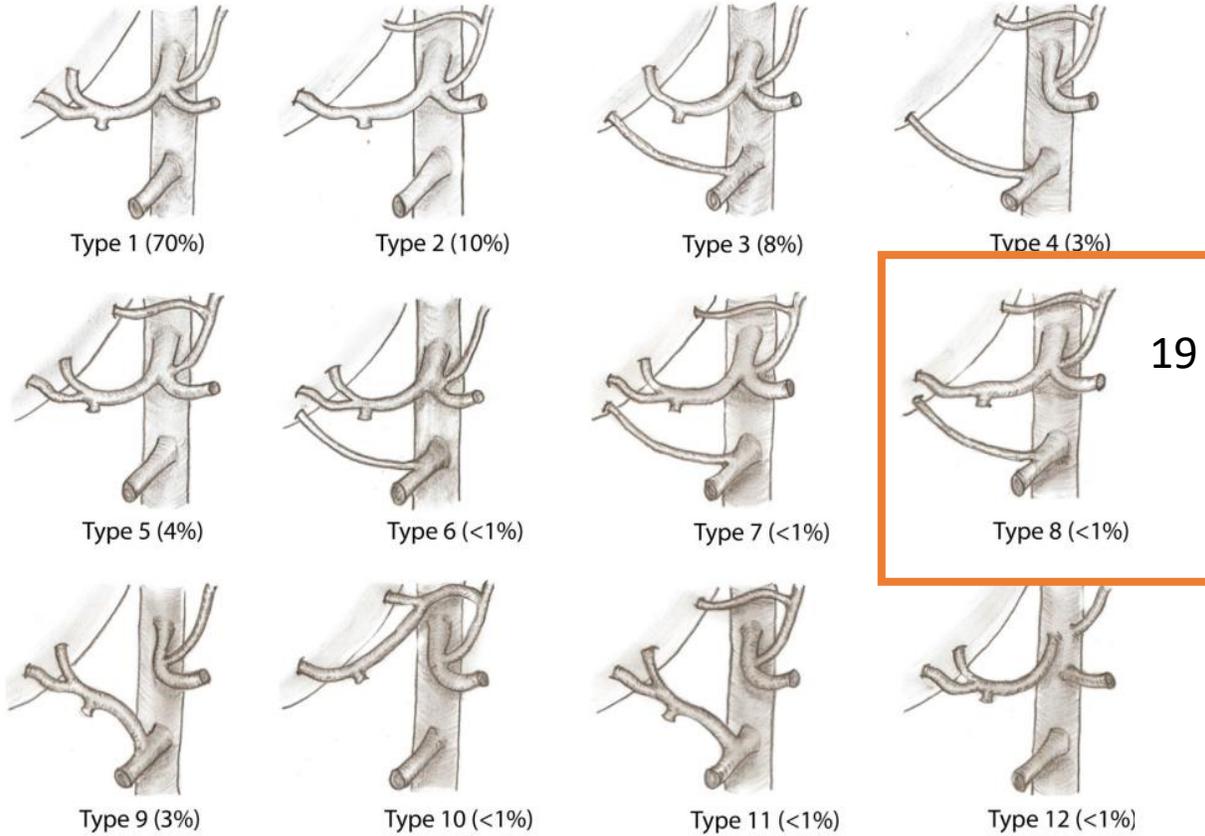


Figure 7: Hepatic arterial variations (after Michel's classification and Lopez-Andujar [54,55]).

# OPCIONES

→ Conocimiento **PRE-THO**

→ Flujo de cada arteria. ¿1 **Anastomosis** o Varias?

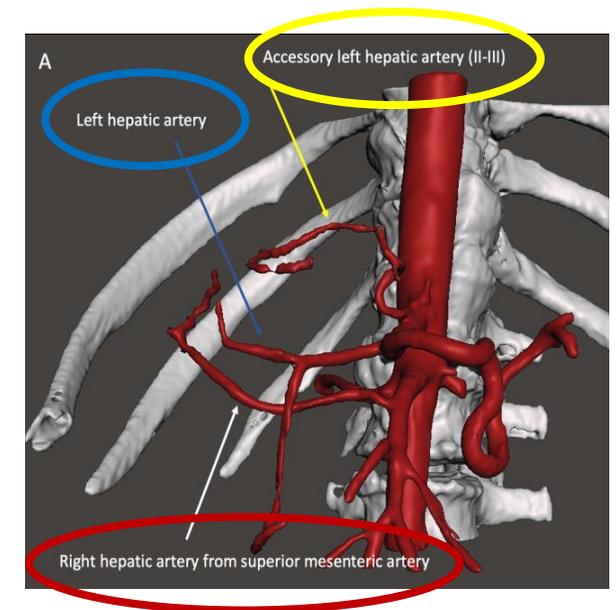
→ Anatomía del DONANTE  
Arteria del injerto corta



**Conclusion:** The type of arterial reconstruction used for arterial anastomosis during primary liver transplantation has an impact on the occurrence of early HAT. The use of a long graft artery is an independent risk factor of early HAT. Thereby, we recommend the use of a short graft artery with a direct path when feasible to reduce the occurrence of early HAT after primary liver transplantation.

**Table 3** Arterial anatomy, types of reconstruction and HAT prevention

Variables	Patients (n = 282) n (%)	HAT (n = 17) n (%)	No HAT (n = 265) n (%)	p value
Donor artery length				
Short	191 (68)	6 (35)	185 (70)	–
Long	91 (32)	11 (65)	80 (30)	0.003



- Injerto arterial corto = arteria hepática propia /común
- Injerto arterial largo = tronco celiaco

(OR 3.2; 95% CI 1.2 - 9; p = 0.02)

# OPCIONES

→ Conocimiento PRE-THO

→ Flujo de cada arteria. ¿1 Anastomosis o Varias?

→ Anatomía del DONANTE  
Arteria del injerto corta

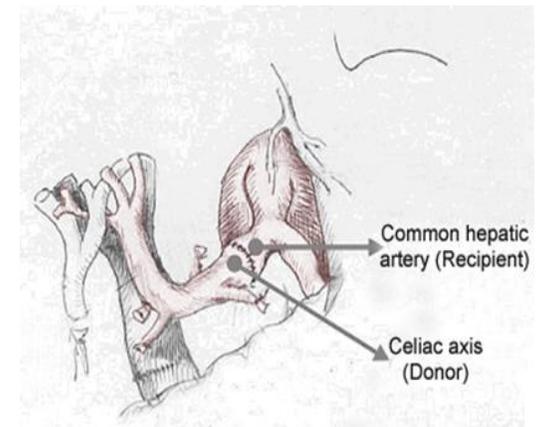
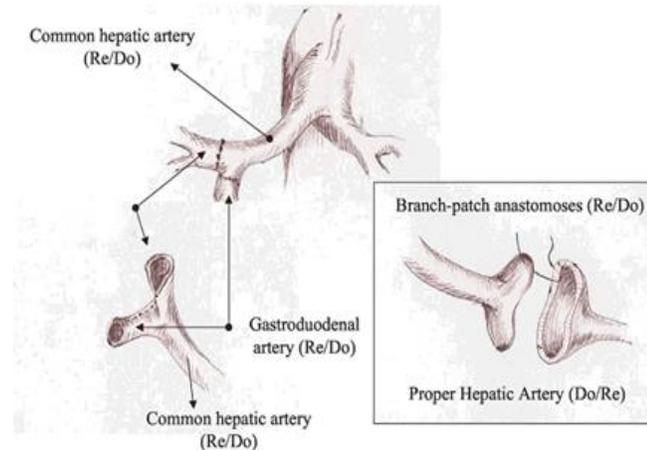
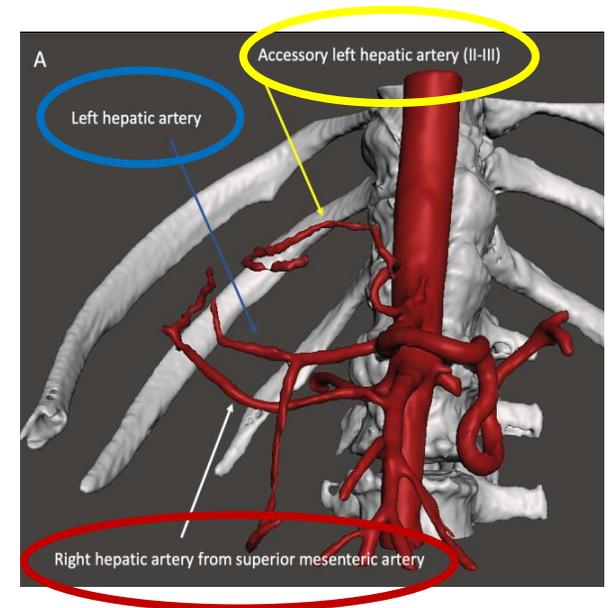
→ Manipulación cuidadosa

→ Calibres similares / Parche de Carrel



Tronco Celíaco (Parche de Carrel):

- Bifurcación gastroduodenal
- Bifurcación Hepática



# OPCIONES

→ Conocimiento PRE-THO

→ Flujo de cada arteria

→ Anatomía del DONANTE  
Arteria del injerto corta

→ Manipulación cuidadosa

→ Calibres similares / Parche de Carrel

→ Evitar acodamientos arteriales (*kinking*)

→ Sutura arterial con puntos sueltos  
Prolipropileno 6/0 – 7/0

→ Material quirúrgico adecuado

→ Suero heparinizado

**Conclusions:** Our survey confirms that no consensus is currently available regarding the most effective method for avoiding AK. Kinking occurs most probably when the liver is released in its final position. The utilization of an interposition method could ensure the maintenance of a correct HAF.

F Panaro. J Gastrointest Surg. 2012

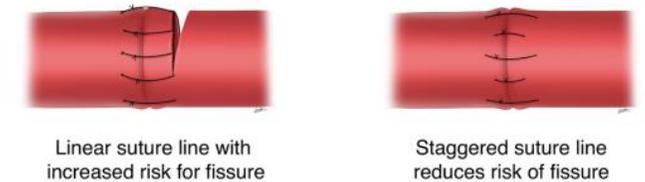
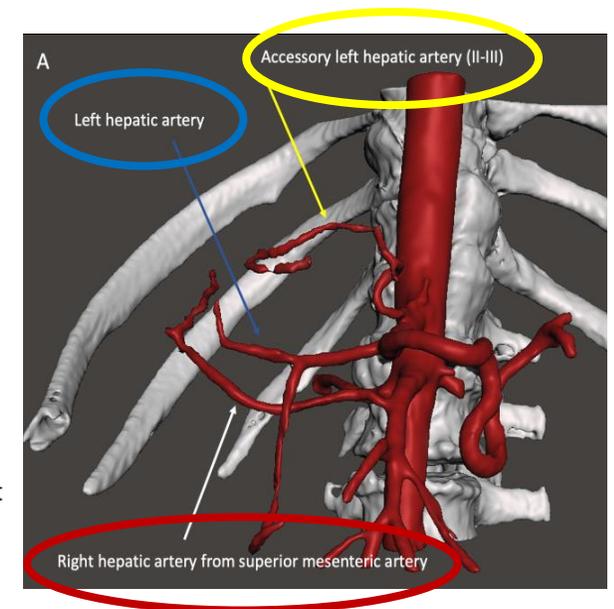
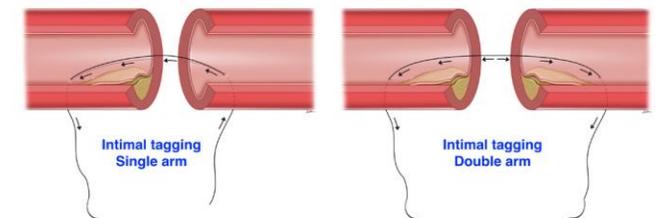


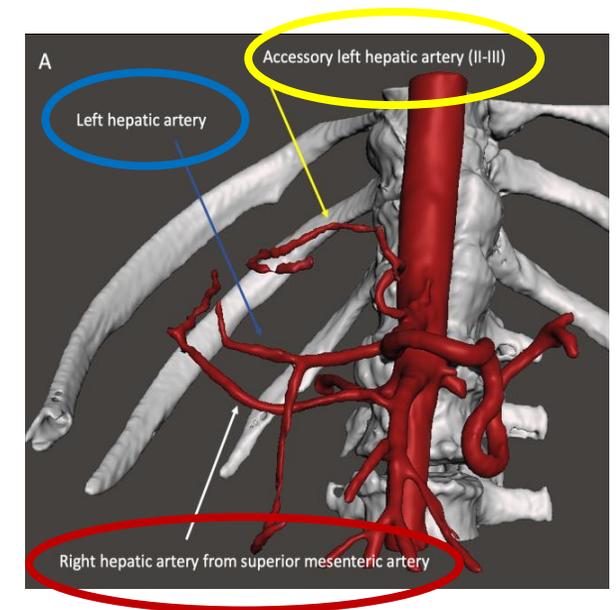
Fig. 4. Far-and-near stitching. Left: A linear line of sutures has a tendency to cause fissuring. Right: Interrupted stitches can be taken at variable distances from the vessel edge to create a staggered suture line.



B-K Tan. Ann Acad Med Singap. 2021

# OPCIONES

- Conocimiento PRE-THO
- Flujo de cada arteria . ¿1 Anastomosis o Varias?
- Anatomía del DONANTE  
Arteria del injerto corta
- Manipulación cuidadosa
- Calibres similares / Parche de Carrel
- Evitar acodamientos arteriales (*kinking*)
- Sutura arterial con puntos sueltos  
Prolipropileno 6/0 – 7/0
- Material quirúrgico adecuado
- Suero heparinizado
- Lupas quirúrgicas



**Table 3. Univariate and Multivariate Analysis of Factors Influencing Risk of Hepatic Artery Complications**

	Univariate analysis			Multivariate analysis		
	HR	95% CI	P Value	HR	95% CI	P Value
<b>Risk of hepatic artery complication</b>						
Group 2 (vs Group 1)	0.12	0.02-0.92	.04	0.09	0.01-0.71	.02
Male sex (recipient)	0.58	0.20-1.68	.32	-	-	-
Recipient age	0.97	0.92-1.02	.28	-	-	-
MELD-Na at transplant	1.00	0.94-1.07	.94	-	-	-
Cold ischemia time	1.00	1.00-1.00	.10	-	-	-
Warm ischemia time	1.00	1.00-1.00	.46	-	-	-
HCC	2.66	0.84-8.50	.10	-	-	-
LDLT (vs DDLT)	3.21	1.11-9.25	.03	4.23	1.46-12.27	.008
<b>Type of arterial anastomosis</b>						
Single	Ref	Ref	Ref	-	-	-
Two	0.57	0.07-4.23	.57	-	-	-
Aortic jump graft	0	0	.99	-	-	-

Abbreviations: CI, confidence interval; DDLT, deceased donor liver transplant; HCC, hepatocellular carcinoma; HR, hazard ratio; LDLT, living donor liver transplant; MELD-Na, Model for End-Stage Liver Disease-Sodium score.

# CASO CLÍNICO

## FLUJOS EN LA DISECCION:

Arteria hepática común 110 ml/minuto.

Arteria hepática derecha de AMS 95 ml/minuto

Arteria hepática izquierda de AGI 45 ml/minuto

DONANTE : Arteria hepática derecha de la AMS, que se anastomosó en cirugía de banco al muñón de la arteria esplénica

## TECNICA

Hepatectomía : Técnica de Piggy-back + shunt portocava temporal

Anastomosis entre la vena cava del donante y las tres venas suprahepáticas del receptor en una boca común

Anastomosis portal T-T

Reperfusión sin incidencias

Anastomosis arterial : entre el tronco celiaco sin patch y la bifurcación hepato-gastroduodenal del receptor

Flujo arterial: 120mL/min

Tras realizar la anastomosis biliar, flujo arterial 20 ml/minuto.

# OPCIONES



## FLUJO ARTERIAL **INADECUADO**

Lig arcuato, hiperaflujo portal, robo de la esplénica

Trombosis

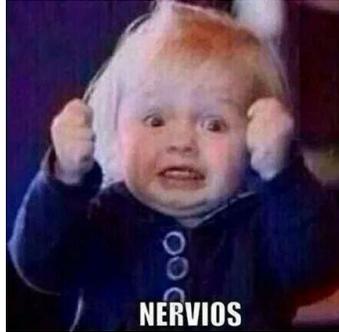
Arteriosclerosis

Friabilidad de los vasos (Post-TACE)

Pequeño calibre. Múltiples arterias.

Retrasplante.

# OPCIONES



## FLUJO ARTERIAL **INADECUADO**

Lig arcuato, hiperaflujo portal, robo de la esplénica

**Trombosis**



-¿Cuándo?

Arteriosclerosis

-Si flujo portal elevado, clampar la porta.

-Abrir la AGD: ¿Hay flujo?.

Friabilidad de los vasos (Post-TACE)

-Abrir anastomosis: ¿Flujo? Trombo?

-Rehacer anastomosis.

Pequeño calibre. Múltiples arterias.

Retrasplante.

# OPCIONES

## TROMBOSIS

Tratamiento Endovascular (trombolisis intraarterial)

Menos agresivo pero menos resolutivo.

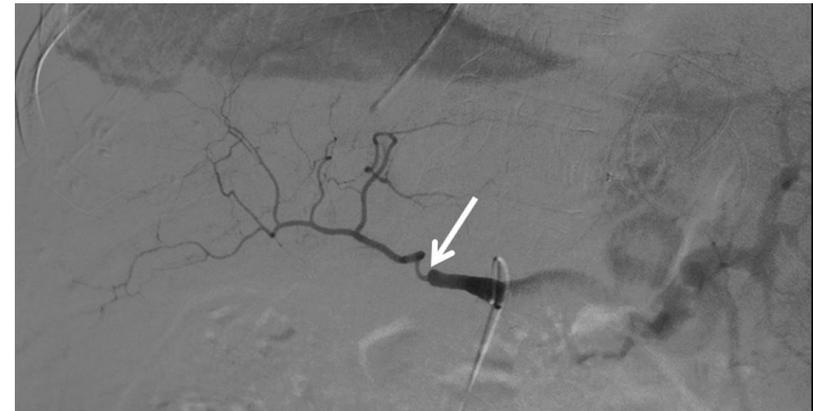
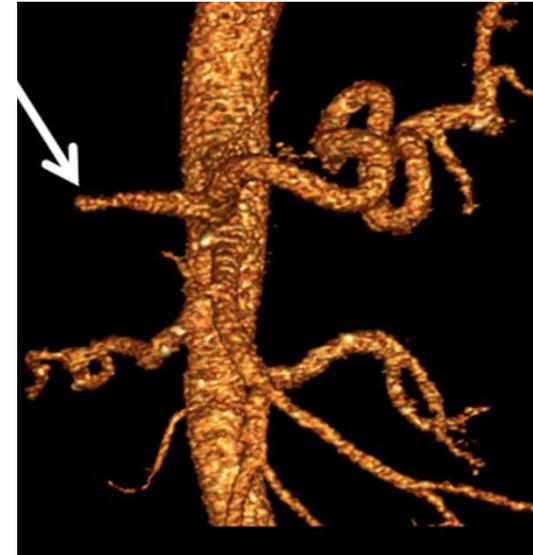
Complicaciones:

Disección arterial

Sangrado

Lesión de la anastomosis

Fracaso de revascularización



# OPCIONES

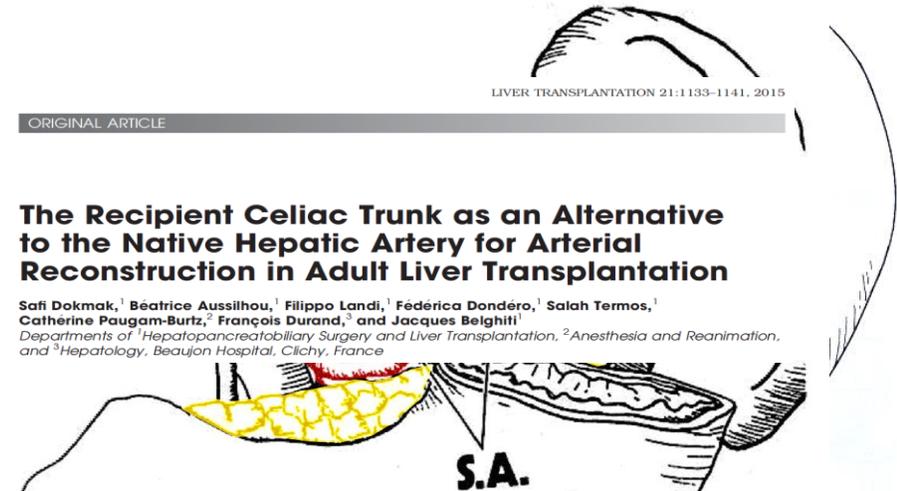
## TROMBOSIS

Reintervención Quirúrgica:

Aspecto del injerto hepático.  
Resolución según la causa de la trombosis.

*Opciones:*

- Anastomosis a la A. Esplénica
- Anastomosis a la Aorta (con/sin Injerto)
- Tronco Celíaco



ORIGINAL ARTICLE

LIVER TRANSPLANTATION 21:1133-1141, 2015

### The Recipient Celiac Trunk as an Alternative to the Native Hepatic Artery for Arterial Reconstruction in Adult Liver Transplantation

Safi Dokmak,<sup>1</sup> Béatrice Aussilhou,<sup>1</sup> Filippo Landi,<sup>1</sup> Federica Dondéro,<sup>1</sup> Salah Termos,<sup>1</sup> Catherine Paugam-Burtz,<sup>2</sup> François Durand,<sup>3</sup> and Jacques Belghiti<sup>1</sup>  
Departments of <sup>1</sup>Hepatopancreatobiliary Surgery and Liver Transplantation, <sup>2</sup>Anesthesia and Reanimation, and <sup>3</sup>Hepatology, Beaujon Hospital, Clichy, France

TABLE 3. Advantages and Drawbacks of Different Arterial Conduits

	Feasibility/Rapidity	Need for Conduit/ Length/Trajectory	Risk of Thrombosis	Specific Complications	Best Indications
Infrarenal aortohepatic conduit	High/low	Systematically/ long/indirect	High	Bleeding, pancreatitis, internal hema, lymphatic leak	RCT stenosis; severe portal hypertension around CLT; lesser omentum and supra-celiac aorta; deep SA associated portal shunting;
Supraceliac aortohepatic conduit	Moderate/low	Not systematically/ short/direct	Moderate	Bleeding, renal failure, lymphatic leak	RCT stenosis; severe portal hypertension around CLT; encapsulated peritonitis/ intra-abdominal adhesions; deep SA
Recipient SA	Moderate/high	No/very short/ indirect if lateral	Moderate	Bleeding, pancreatitis	Large and superficial SA
RCT (present study)	Moderate/moderate	No/very short/direct and anatomical	Low	Bleeding	First option and whatever possible

# OPCIONES

## TROMBOSIS

### RESULTS OF USING THE RECIPIENT'S SPLENIC ARTERY FOR ARTERIAL RECONSTRUCTION IN LIVER TRANSPLANTATION IN 23 PATIENTS

JUAN FIGUERAS,<sup>1</sup> DAVID PARÉS, HUMBERTO ARANDA, ANTONIO RAFECAS, JUAN FABREGAT, JAUME TORRAS, EMILIO RAMOS, CARMEN LAMA, LAURA LLADÓ, AND EDUARDO JAURRIETA

*Liver Transplant Unit, Clínic Sanitaria i Universitària Bellvitge, University of Barcelona, Barcelona, Spain*

Transplantation

Número: Volume 64(4), 27 August 1997, pp 655-658

### A simplified technique for hepatic revascularization of the liver graft with inadequate recipient hepatic artery

J. Figueras, E. Jaurrieta, R. Segura, A. Rafecas, J. Fabregat, A. Sabate, R. Fradera, and J. Torras

Liver Transplant Unit, Hospital de Bellvitge, University of Barcelona, Hospitalet de Llobregat, E-08907 Barcelona, Spain

Received June 4, 1991/Accepted October 17, 1991

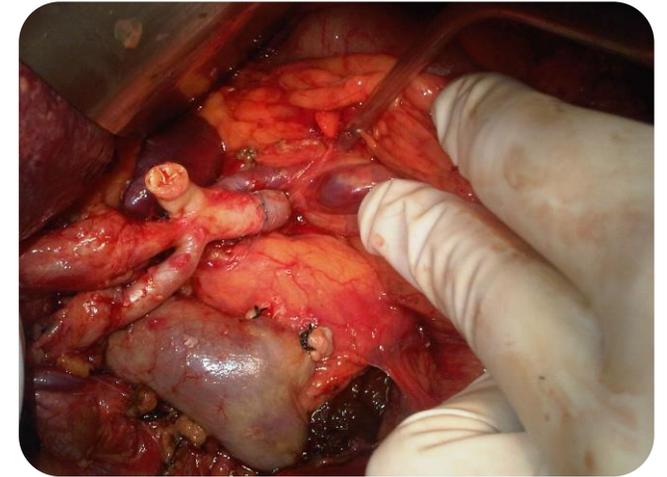
Transplant International

ORIGINAL ARTICLE

**Short- and long-term outcomes of arterial reconstruction on recipient splenic artery in adult liver transplantation. Single-center prospective study 25 years after first description**

Laura Llado<sup>1</sup>, Emilio Ramos<sup>1</sup>, Alex Bravo<sup>1</sup>, Carme Baliellas<sup>2</sup>, Kristel Mils<sup>1</sup>, Juli Busquets<sup>1</sup>, Alba Cachero<sup>2</sup>, Lluís Secanella<sup>1</sup>, Nuria Pelaez<sup>1</sup>, Emma Gonzalez-Vilatarsana<sup>3</sup> & Joan Fabregat<sup>1</sup>

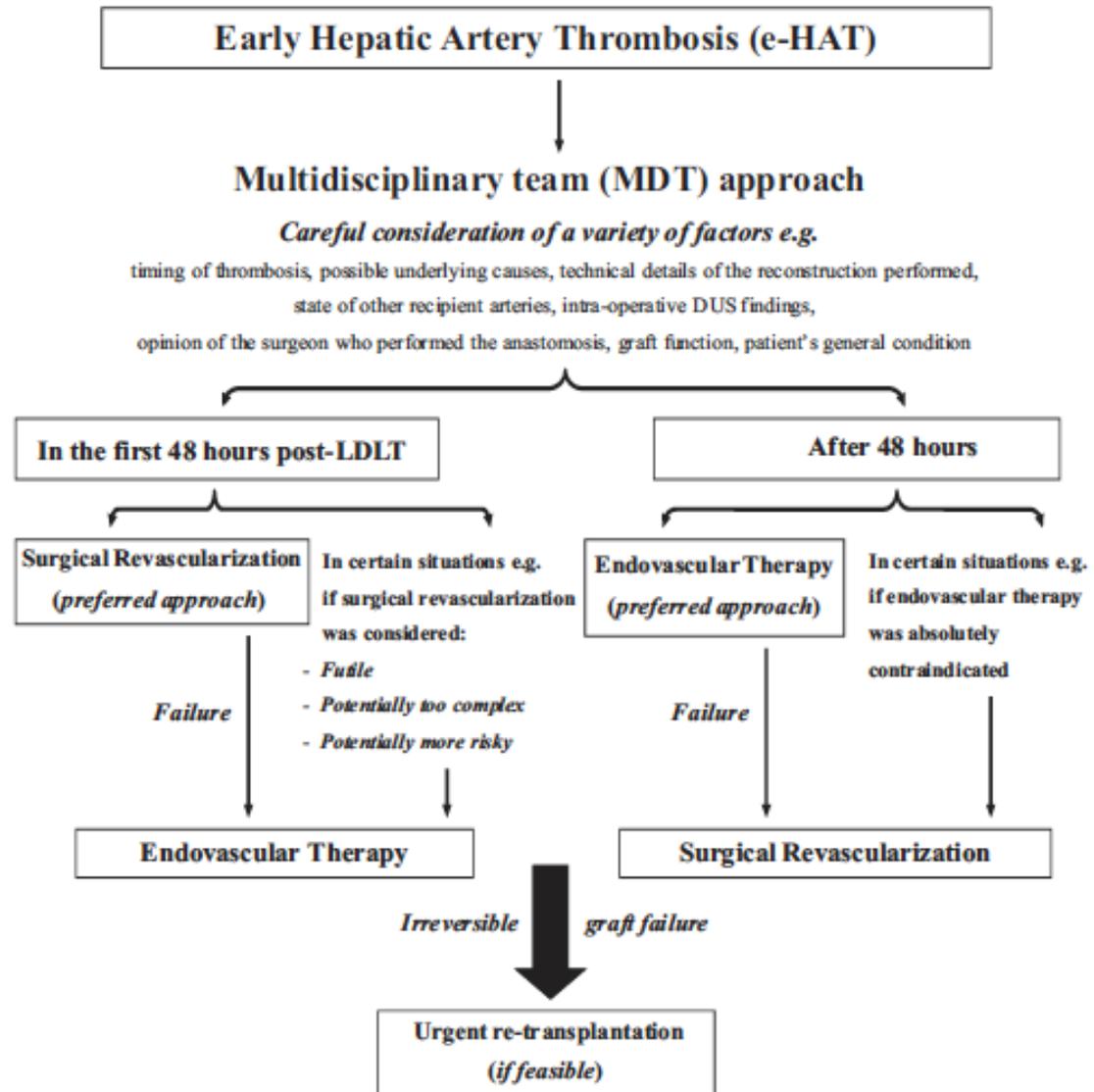
- |                        |                           |                       |             |
|------------------------|---------------------------|-----------------------|-------------|
| • Figueras et al.      | Descripción de la técnica | Transplant Int        | 1992        |
| • Katz et al.          | Casos (n=5)               | Transplantation       | 1992        |
| • Cherqui D et al.     | How I do it (n=7)         | AmJSurg               | 1994        |
| • Figueras et al.      | 23 casos                  | Transplantation       | 1997        |
| • Kazemi K et al.      | 17 casos                  | ExpClinTranspl        | 2017        |
| • <b>Lladó L et al</b> | <b>54 casos</b>           | <b>Transplant Int</b> | <b>2019</b> |



# OPCIONES

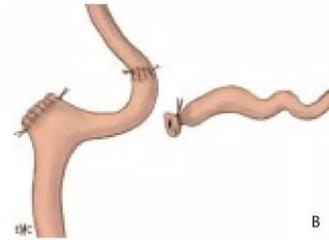
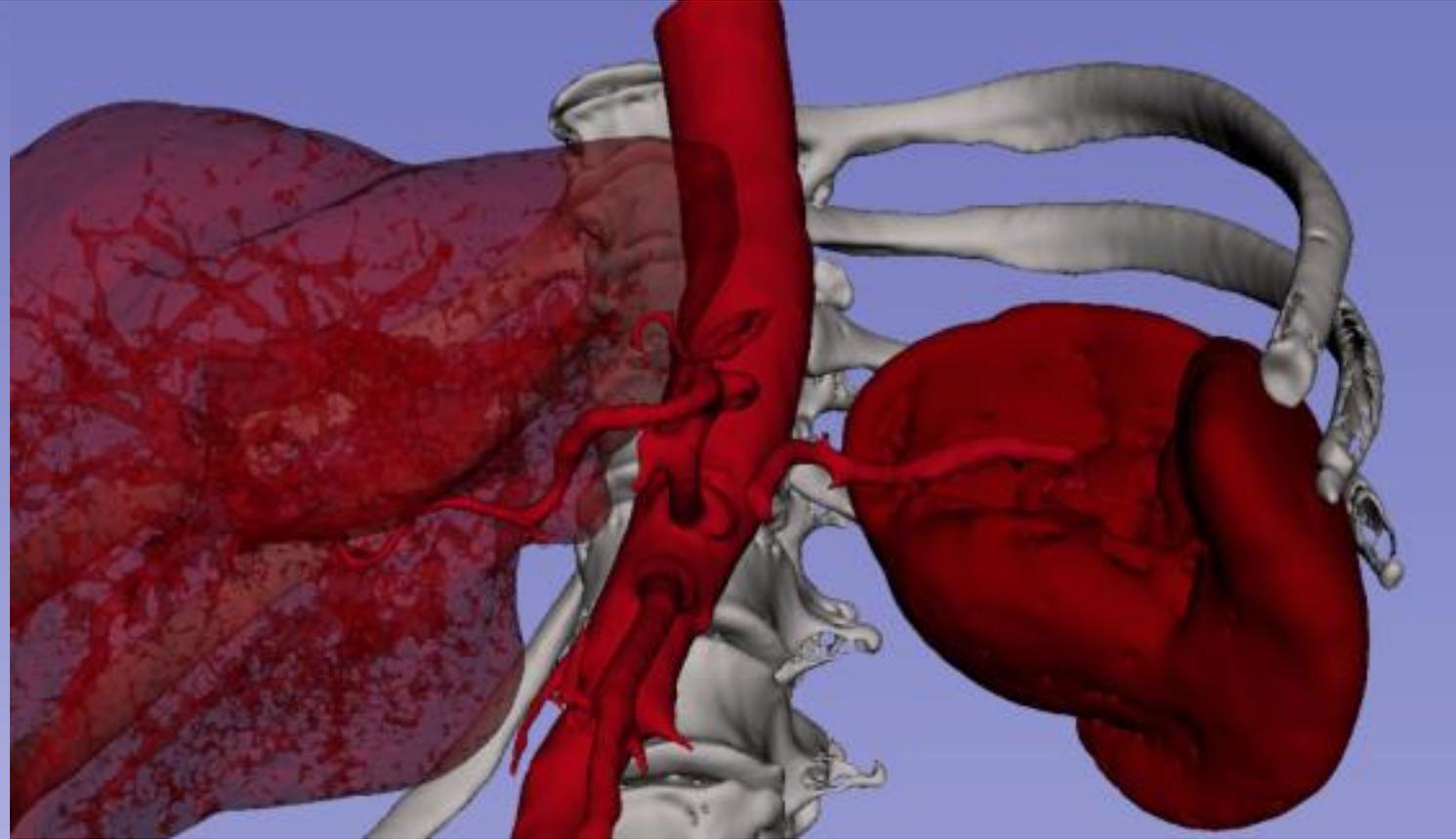
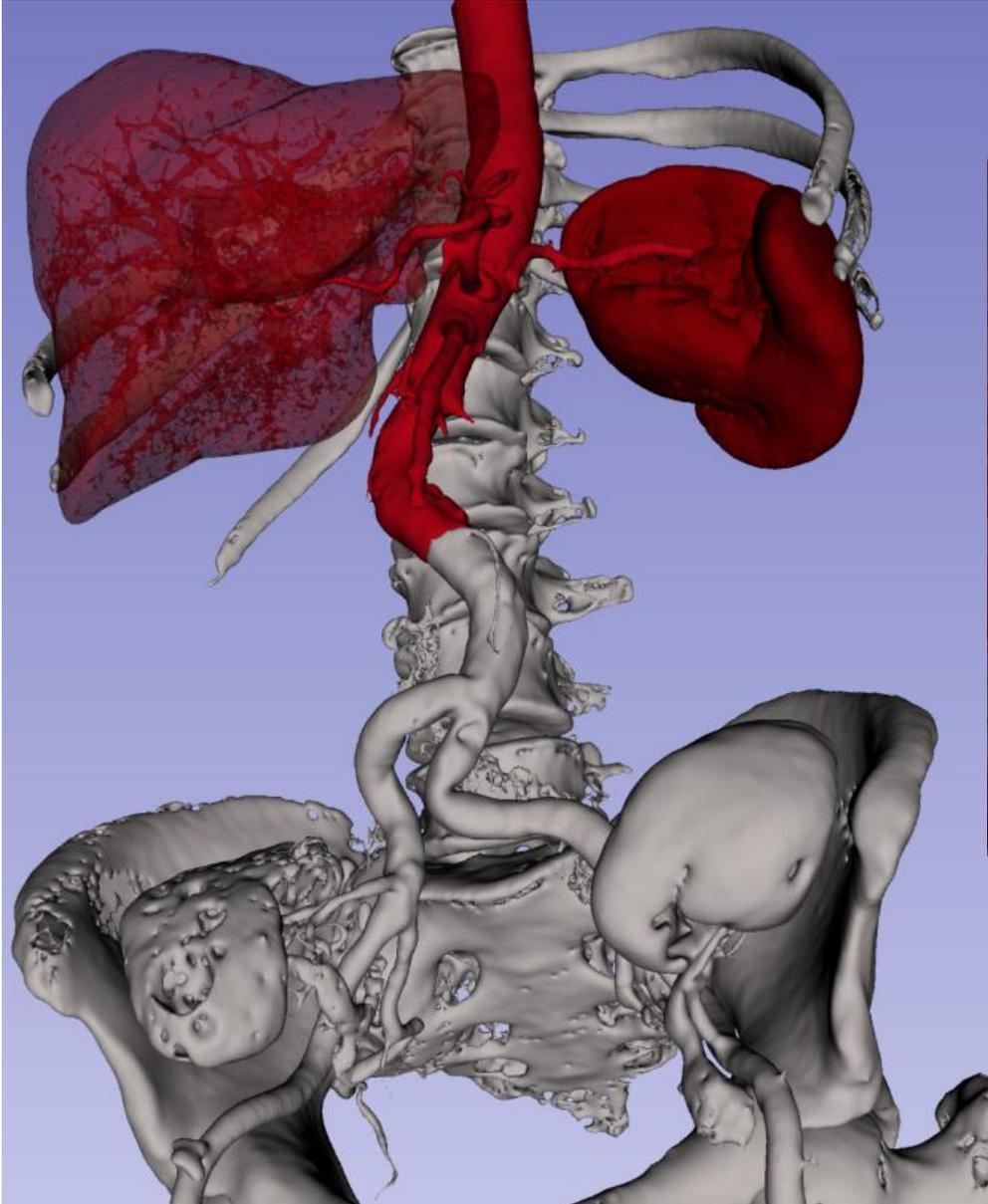
## TROMBOSIS

### Management of early hepatic artery thrombosis after liver transplant

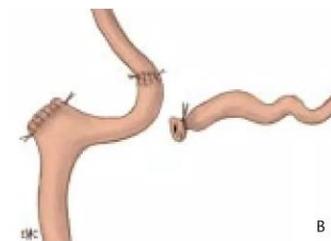
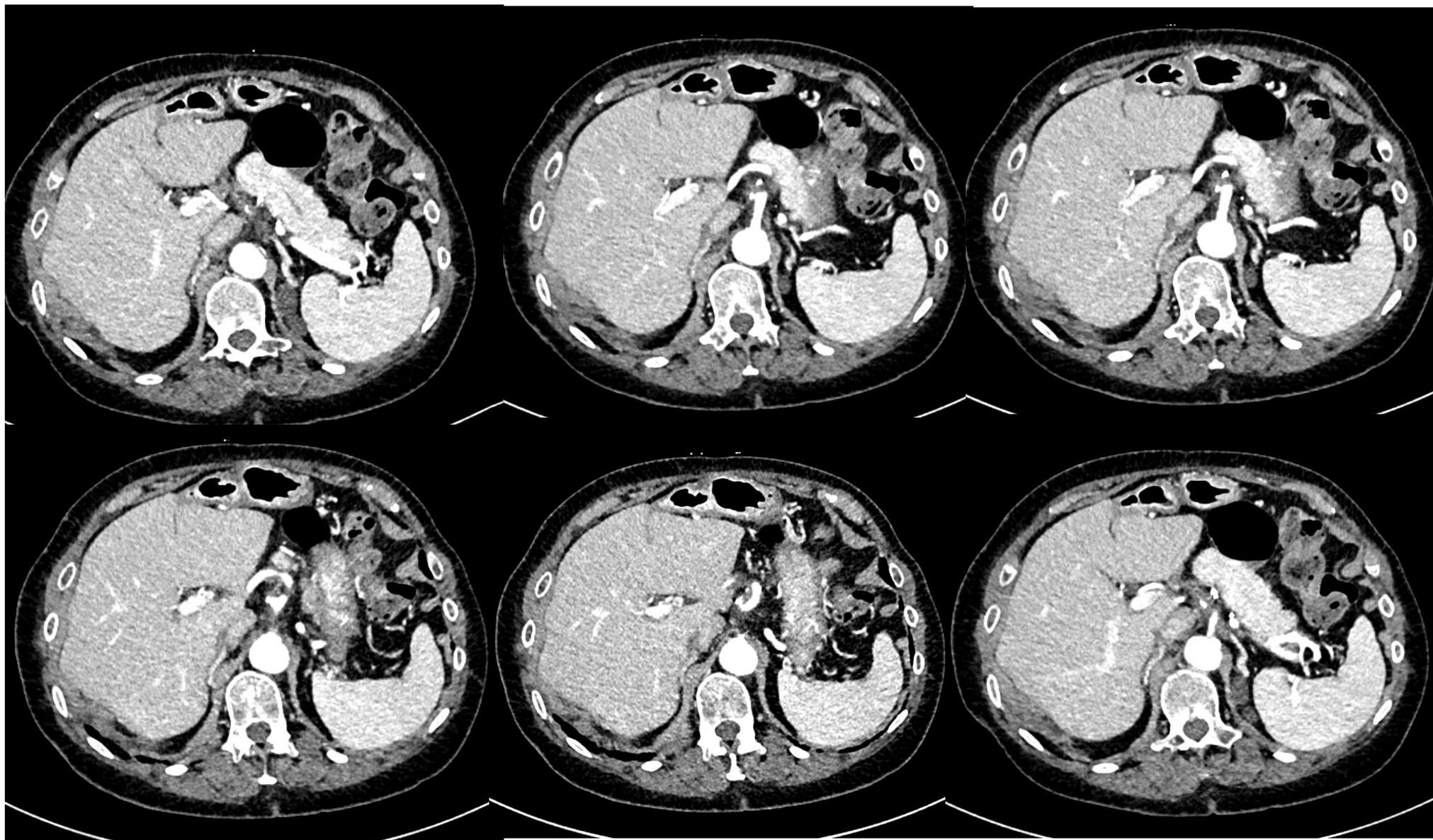


# OPCIONES

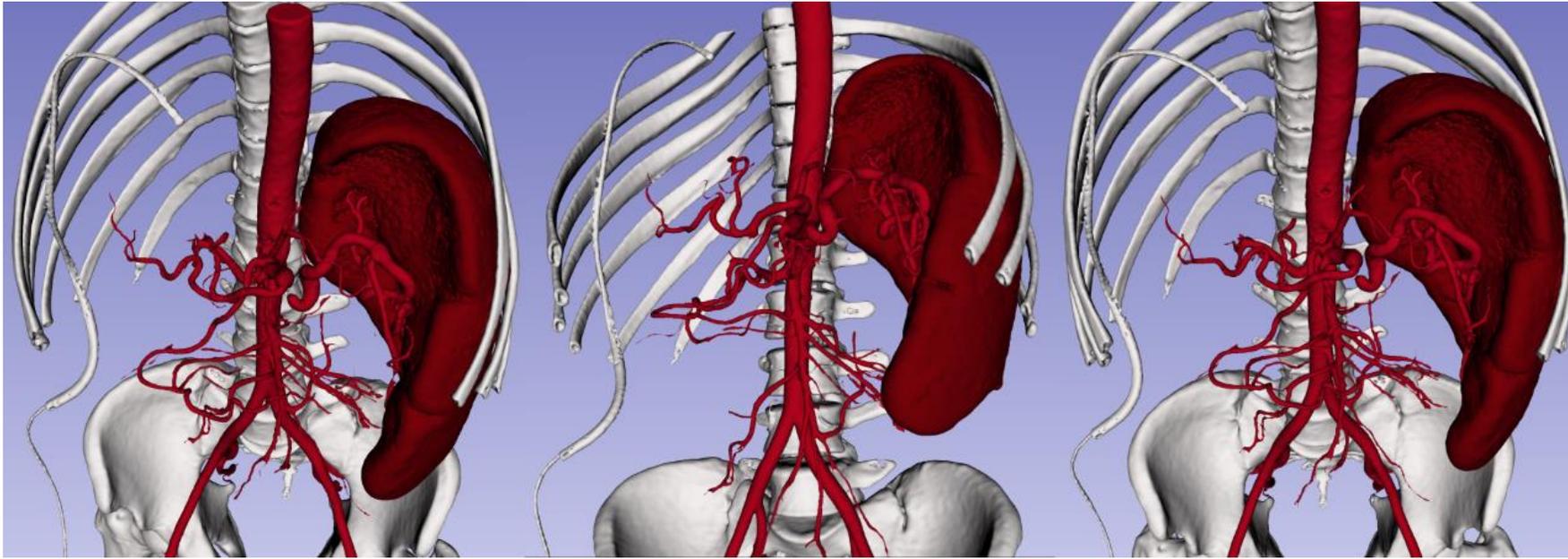
Reconstrucciones cedidas por el Dr. Sergi Quiroga



K Boudjema Enciclopedia Médico-Quirúrgica- E-40.790



# ANASTOMOSIS ARTERIA ESPLENICA



# CASO CLÍNICO

EVENTOS CLINICOS TRAS EL TRASPLANTE:

Síndrome metabólico:

Sobrepeso

DMID

HTA el primer año post-TH

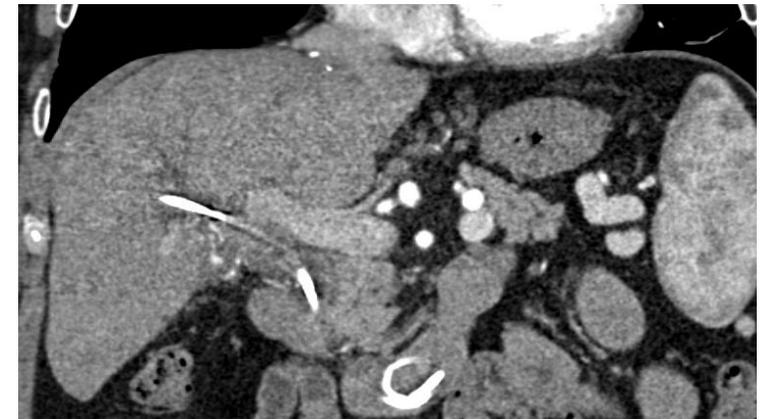
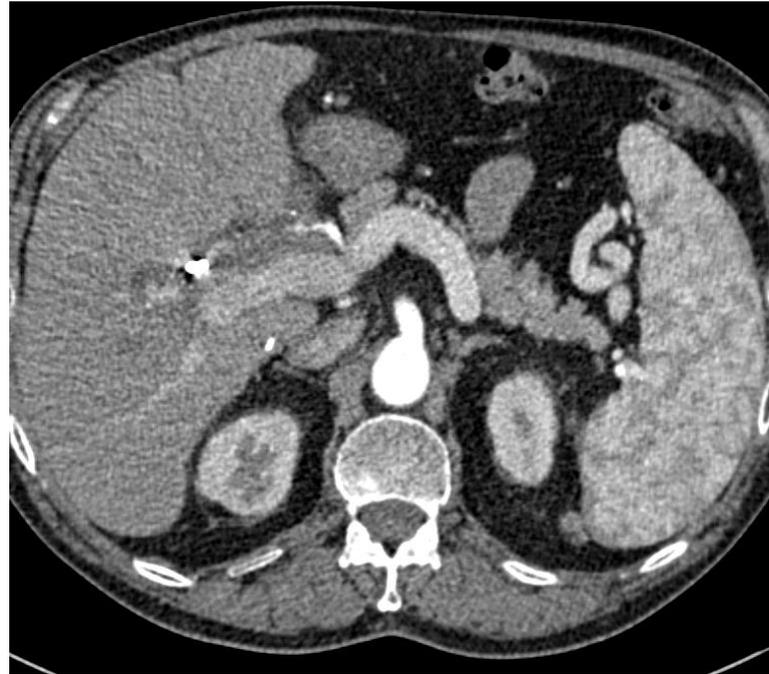
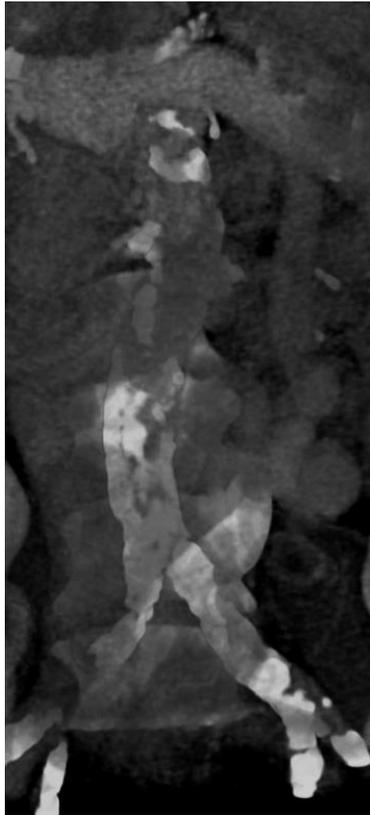
DL 6 año post-TH

IRC con necesidad de diálisis

Trombosis arterial

7 años despues del 1º trasplante: Doble trasplante hepatico y renal

# Estudio para Retrasplante hepático y trasplante renal



# OPCIONES

Updates in Surgery (2020) 72:659–669  
<https://doi.org/10.1007/s13304-020-00839-x>

ORIGINAL ARTICLE



## Infrarenal versus supraceliac aorto-hepatic arterial revascularisation in adult liver transplantation: multicentre retrospective study

M. Vivarelli<sup>1</sup> · A. Benedetti Cacciaguerra<sup>1</sup> · J. Lerut<sup>2</sup> · J. Lanari<sup>3</sup> · G. Conte<sup>4</sup> · R. Pravisan<sup>5</sup> · J. Lambrechts<sup>6</sup> · S. Ilesari<sup>2,7</sup> · K. Ackenine<sup>2</sup> · D. Nicolini<sup>1</sup> · U. Cillo<sup>3</sup> · G. Zanusi<sup>3</sup> · M. Colledan<sup>4</sup> · A. Risaliti<sup>5</sup> · U. Baccarani<sup>5</sup> · X. Rogiers<sup>6</sup> · R. I. Troisi<sup>6,8</sup> · R. Montalti<sup>1,8</sup> · F. Mocchegiani<sup>1</sup>

120 TH  
 6 Centro Europeos  
 01/2003-12/2018

IR AHAR: 56/120 (46.6%) Injerto arterial en todos.  
 SC AHAR 64/120 (53.4%) Injerto arterial en 45/64 (70.3%)

Trombosis arterial temprana:

6.2% (4/64) SC-AHAR  
 10.7% (6/56) IR-AHAR

Trombosis arterial tardía:

4.7% (3/64) SC-AHAR  
 19.6% (11/56) IR-AHAR

666

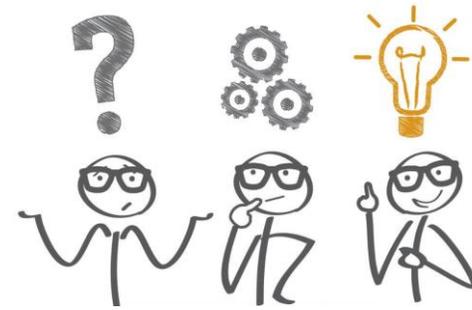
Updates in Surgery (2020) 72:659–669

**Table 5** Univariate analysis: intra- and postoperative risk factors of HAT

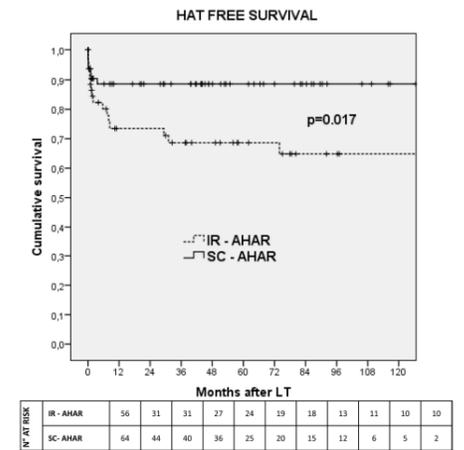
HAT risk factors	Univariate analysis		Multivariate analysis	
	Odds ratio (95%CI)	p	Odds ratio (95%CI)	p
Surgical time (min) > 470	2.419 (0.768–7.616)	0.131		
Hepatic artery anastomosis				
SC-AHAR				
IR-AHAR	<b>5.048 (1.337–19.054)</b>	<b>0.017</b>	<b>3.915 (1.400–10.951)</b>	<b>0.009</b>
Arterial conduit	1.873 (0.626–5.603)	0.165		
Caval anastomosis				
Piggyback				
Conventional technique	1.693 (0.504–5.685)	0.394		
Latero-lateral	2.031 (0.201–8.675)	0.374		
End to side	4.063 (0.330–9.564)	0.548		
Portal anastomosis				
Termino-terminal				
Jump graft	1.000 (0.999–1.000)	> 0.999		
Cavo-portal hemitransposition	1.000 (0.999–1.001)	> 0.999		
Biliary reconstruction				
Duct to duct				
Roux-en-Y	0.535 (0.064–4.494)	0.564		
External biliary drainage	2.139 (0.386–11.850)	0.384		
Homologous PRBCs (cc)				
> 1850	1.959 (0.654–5.866)	0.229		
Autologous PRBCs (cc)				
≥ 250	0.440 (0.131–1.480)	0.221		
Total PRBCs (cc)				
> 450	0.765 (0.298–1.897)	0.187		
Cold ischaemia time (min)				
> 358	2.000 (0.611–6.544)	0.252		
Warm ischaemia time (min)				
> 34	1.217 (0.409–3.625)	0.724		
Total ischaemia time (min)				
> 605	3.302 (0.702–15.529)	0.131		
Arterial ischaemia time (min)				
> 65	1.127 (0.348–3.650)	0.843		

Bold values indicate the level of significance  $p \leq 0.05$

IR-AHAR Infrarenal Aorto-Hepatic Arterial Reconstruction, SC-AHAR Supraceliac Aorto-Hepatic Arterial Reconstruction, HAT Hepatic artery thrombosis, PRBC packed red blood cells

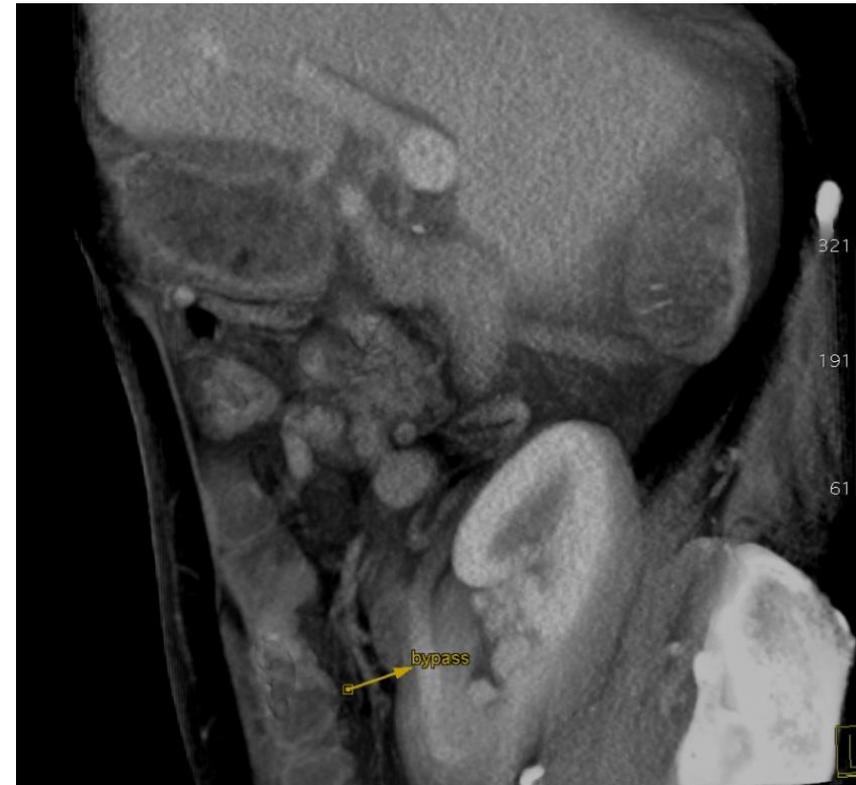


Updates in Surgery (2020) 72:659–669



**Fig. 2** HAT-free survival in the IR-AHAR group and the SC-AHAR group

# INJERTO SUPRACELIACO PARA AMBOS ÓRGANOS



# CONCLUSION

**UN BUEN ESTUDIO VASCULAR Y ANATÓMICO**

**ES FUNDAMENTAL**

**PARA EVITAR LA IMPROVISACIÓN**

**EN CASOS DE**

**ARTERIA HEPÁTICA COMPLEJA**