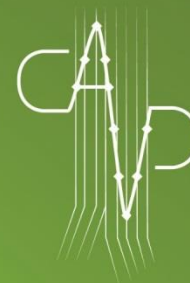




CONTROVERSES ET ACTUALITES EN CHIRURGIE VASCULAIRE

CONTROVERSIES & UPDATES IN VASCULAR SURGERY

JANUARY 23-25 2020



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TAVI & ECMO

Vascular complications

Guillaume LEBRETON, MD, PhD
Pitié-Salpêtrière Hospital, Sorbonne University, Paris



Disclosure

Speaker name: LEBRETON Guillaume

.....

I have the following potential conflicts of interest to report:

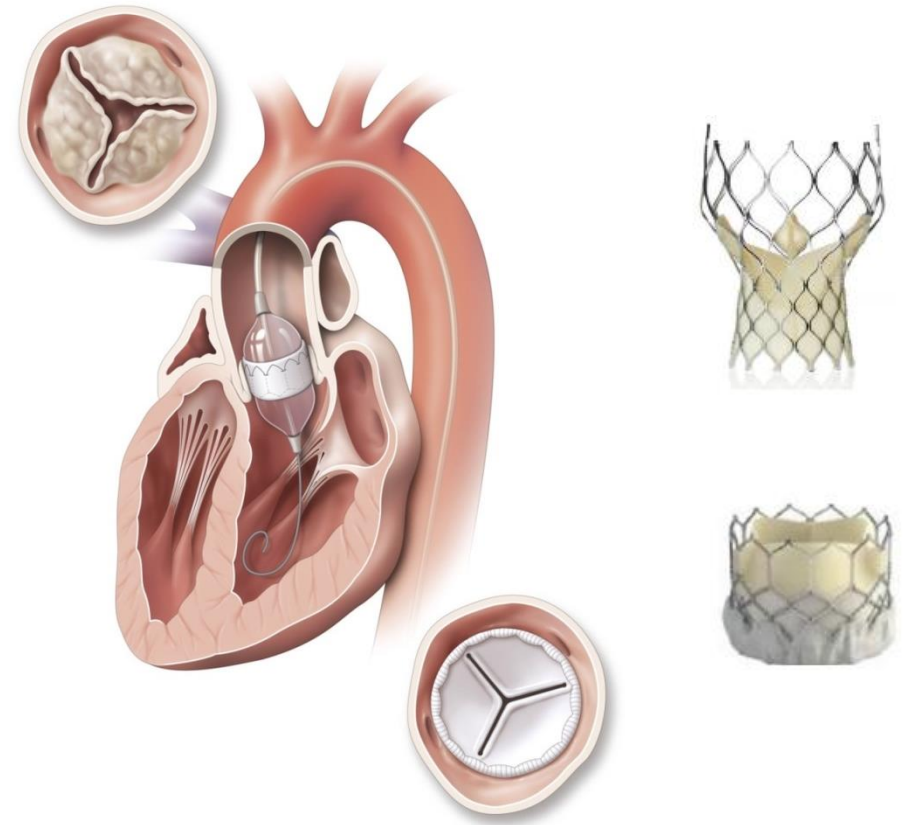
Lectures: Abiomed, Medtronic, Abbott, Syncardia, Novartis,
Vifor, Servier

Proctor: Abiomed, Medtronic, Syncardia, Jarvik

Research grant: Abiomed



Transcatheter Aortic Valve Implantation





Vascular Complications

18,8%
(9,5 – 51,6%)

Bleeding

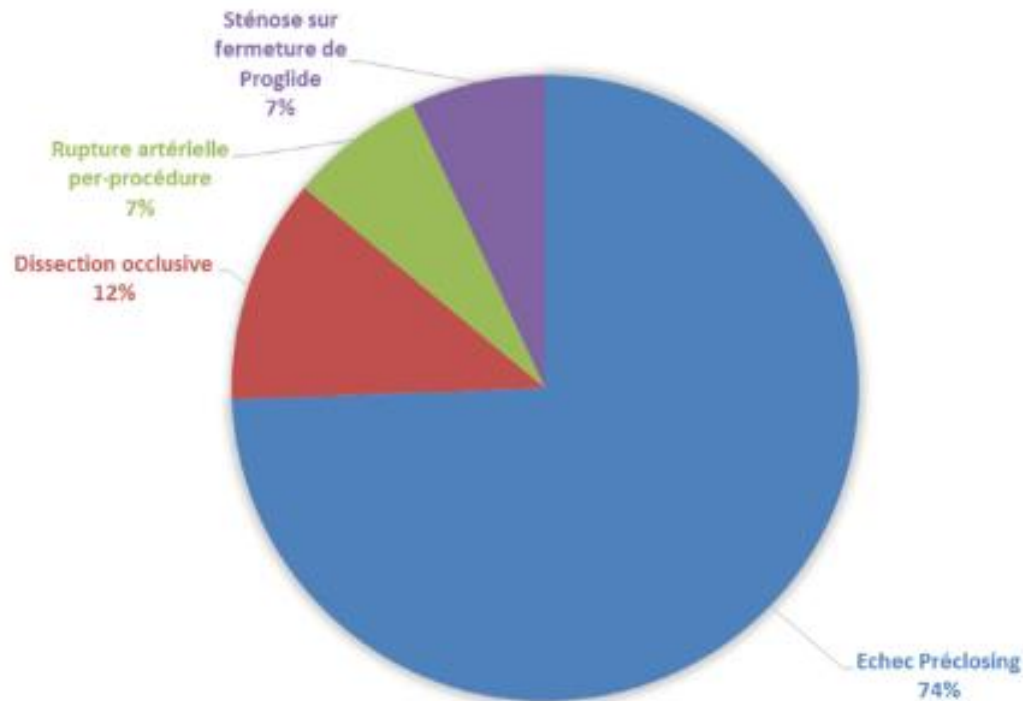
41.4%
(26,8 – 77%)

(J Am Coll Cardiol 2012;59:2317-26)

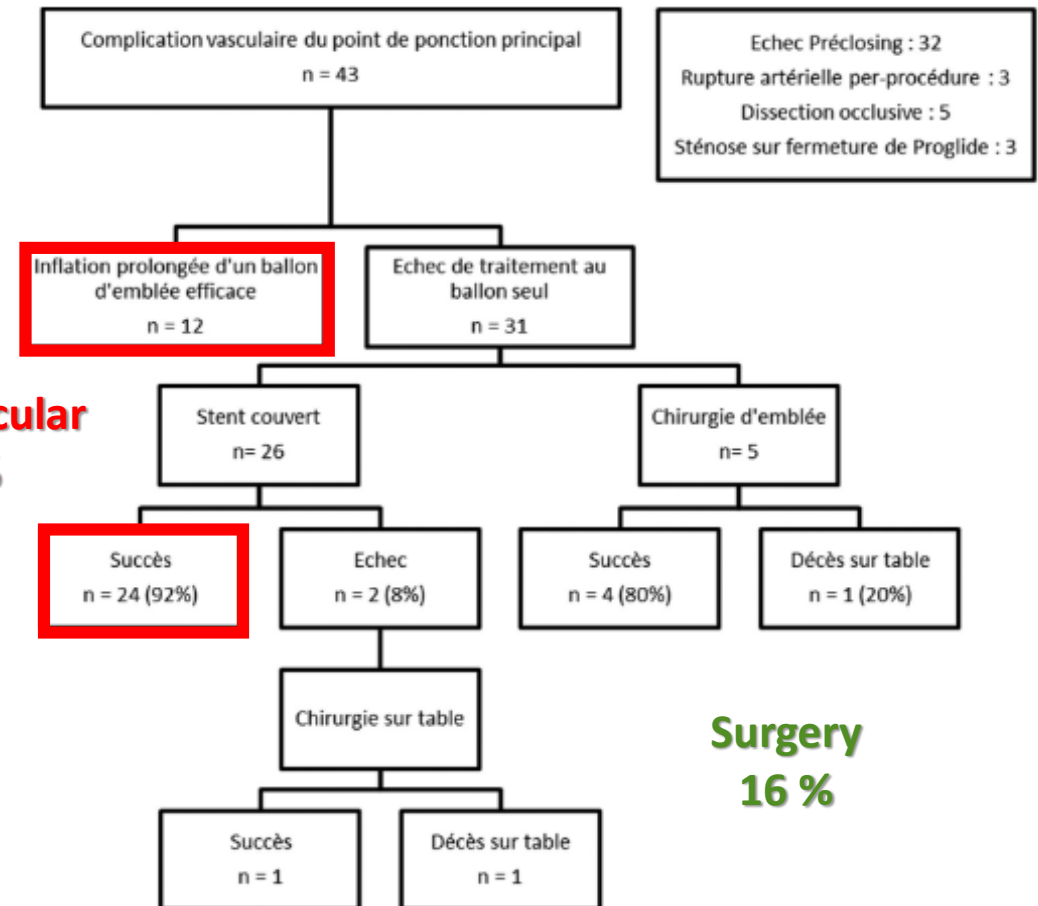


Common femoral artery bailout stenting with covered stent graft due to TAVR vascular complication: Clinical long term follow-up

E. Drouelle^{a,*}, F. De Poli^a, P. Couppie^a, S. Uhry^a, H. Heyer^a, O. Morel^b, P. Ohlmann^b, S. Hess^b, M. Kibler^b, P. Leddet^a



**Endovascular
84 %**



**Surgery
16 %**

E. Drouelle et al. / Annales de Cardiologie et d'Angéiologie 68 (2019) 316–324

CONTROVERSIES & UPDATES IN VASCULAR SURGERY

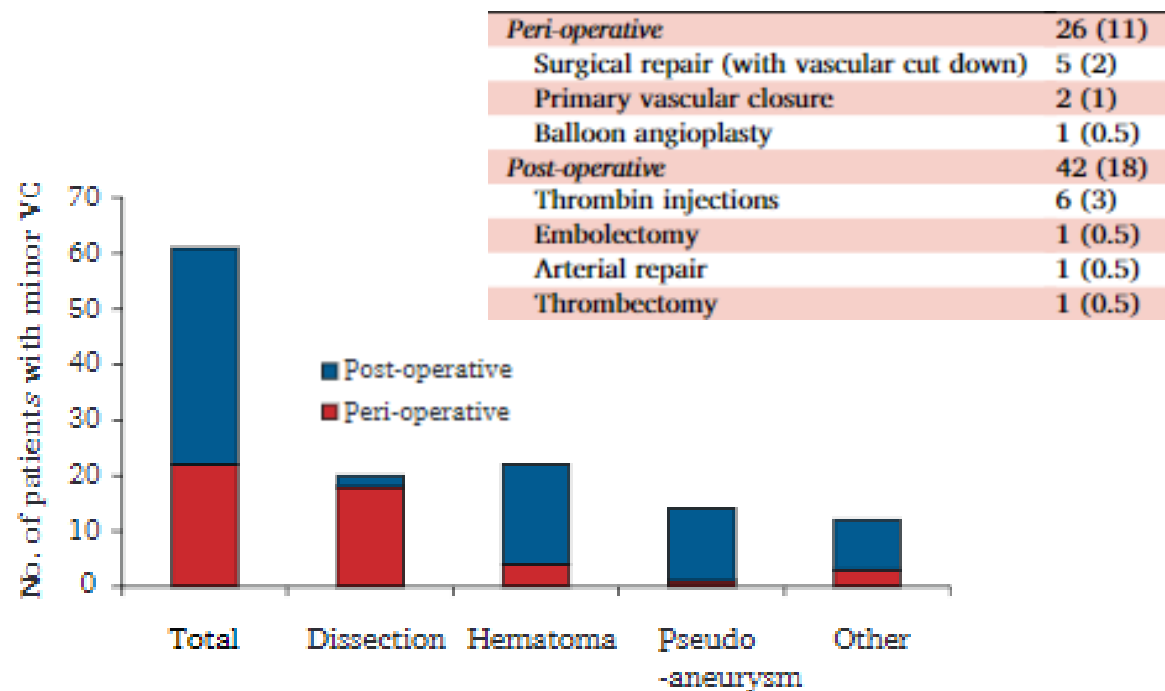


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Vascular Complications and Procedures Following Transcatheter Aortic Valve Implantation ☆



Eur J Vasc Endovasc Surg (2019) 58, 437–444

Vascular complications after transcatheter aortic valve implantation (TAVI): risk and long-term results

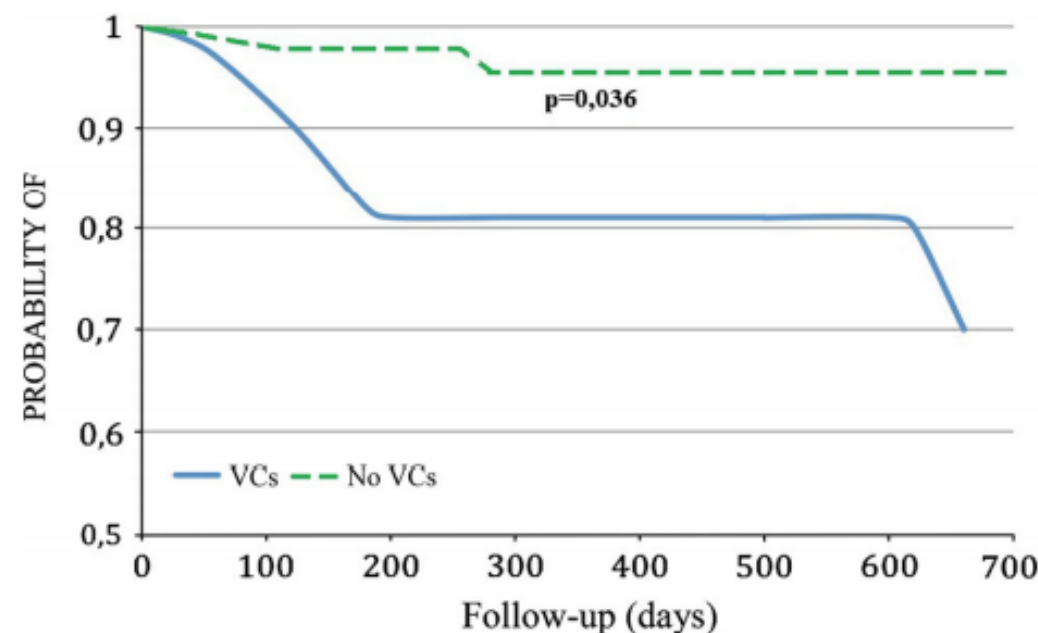


Fig. 1 Impact of early VCs on long-term prognosis after TAVI with Kaplan-Meier curves in 75 pts

J Thromb Thrombolysis (2014) 37:490–498



Comparison of ProGlide vs. Prostar in patients undergoing transcatheter aortic valve implantation.

RESULTS: A total of 1987 subjects were included, 913 (46.0%) receiving ProGlide, and 1074 receiving Prostar. Several baseline and procedural differences were evident, including surgical risk, concomitant coronary artery disease, and chosen TAVI device (all $P<0.05$). Periprocedurally, despite similar rates of vascular stenosis ($P=0.005$), but a higher rate of major adverse events in the Prostar group. Outcomes suggested higher rates of major adverse events in the Prostar group (all $P<0.05$). However, propensity score-adjusted analyses suggested that confounding factors mostly drove unadjusted differences.

CONCLUSION The use of choice for TAVI appears similarly safe and effective, despite some potential benefits associated with the use of choice. Further randomized trials are warranted to confirm or disprove these findings.

total of 1987 subjects were included, 913 (46.0%) receiving ProGlide, and 1074 receiving Prostar. Differences were evident, including surgical risk, concomitant coronary artery disease, and prior aortic valve surgery (all $P<0.05$). Periprocedurally, despite similar rates of stroke (all $P<0.05$), but a higher rate of adverse events in the Prostar group (all $P<0.05$).



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Early Outcomes After Percutaneous Closure of Access Site in Transfemoral Transcatheter Valve Implantation Using the Novel Vascular Closure Device Collagen Plug-Based MANTA

Clinical outcome and access site related complications

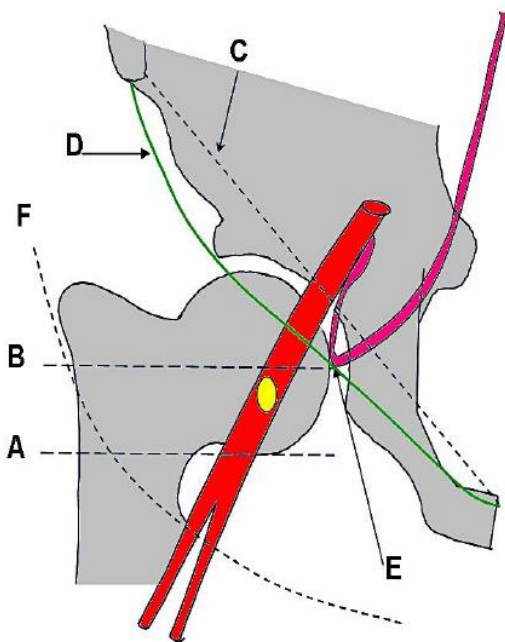
Variable	MANTA (n = 168)	Prostar XL (n = 198)	p Value
Major bleeding	1 (0.6%)	2 (1.0%)	0.661
Minor bleeding	23 (13.7%)	39 (19.7%)	0.080
Major vascular complications	1 (0.6%)	3 (1.5%)	0.109
<i>Occlusion</i>	0	1	
<i>Femoral dissection</i>	0	1	
<i>Closure failure</i>	1	1	
Minor vascular complications	18 (10.7%)	36 (18.2%)	0.003
<i>Hematoma</i>	12	28	
<i>Occlusion</i>	0	1	
<i>Femoral dissection</i>	0	2	
<i>Closure failure</i>	1	2	
<i>Pseudoaneurysm</i>	4	3	
Hospitalization length	5.26 ± 3.3	6.25 ± 3.4	0.006
30-day all-cause mortality	6 (3%)	4 (2.0%)	0.278

(Am J Cardiol 2019;124:1265–1271)





X-rays guidance



US guidance

[Catheter Cardiovasc Interv. 2019 Nov 19.](#)

Ultrasound guided vascular access site management and left ventricular pacing are associated with improved outcomes in contemporary transcatheter aortic valve replacement: Insights from the OxTAVI registry.

[Kotronias RA^{1,2}](#), [Scarsini R^{1,3}](#), [De Maria GL¹](#), [Rajasundaram S¹](#), [Sayeed R¹](#), [Krasopoulos G¹](#), [Grebenik C¹](#), [Keiralla A¹](#), [Newton JD¹](#), [Banning AP¹](#), [Kharbanda RK¹](#).

RESULTS: Five-hundred-twenty-nine patients underwent transfemoral TAVR using contemporary techniques during the study period and were enrolled in the OxTAVI registry. Female sex and high frailty were associated with a higher risk of death, major bleeding, vascular complication or pericardial tamponade. The use of ultrasound (US) guidance for vascular access management was independently associated with a reduced composite primary endpoint (OR = 0.35, CI:0.14-0.86, $p = .02$) after adjustment for clinical confounders, largely driven by a threefold reduction in vascular access complication (OR = 0.29, CI:0.15-0.55, $p < .001$). Performing rapid pacing via the left ventricle guidewire (LV-GW) was associated with a significant decrease in the risk of cardiac tamponade/pericardial effusion (OR = 0.19, CI:0.05-0.66, $p = .009$).

CONCLUSION: US-guided vascular access management and rapid pacing via the LV-GW are important determinants of reduced procedural complications during TAVR.

➤ **Vascular Complications (OR = 0,35)**



Femoral Versus Nonfemoral Peripheral Access for Transcatheter Aortic Valve Replacement

Beurtheret, S. et al. J Am Coll Cardiol. 2019;74(22):2728-39.

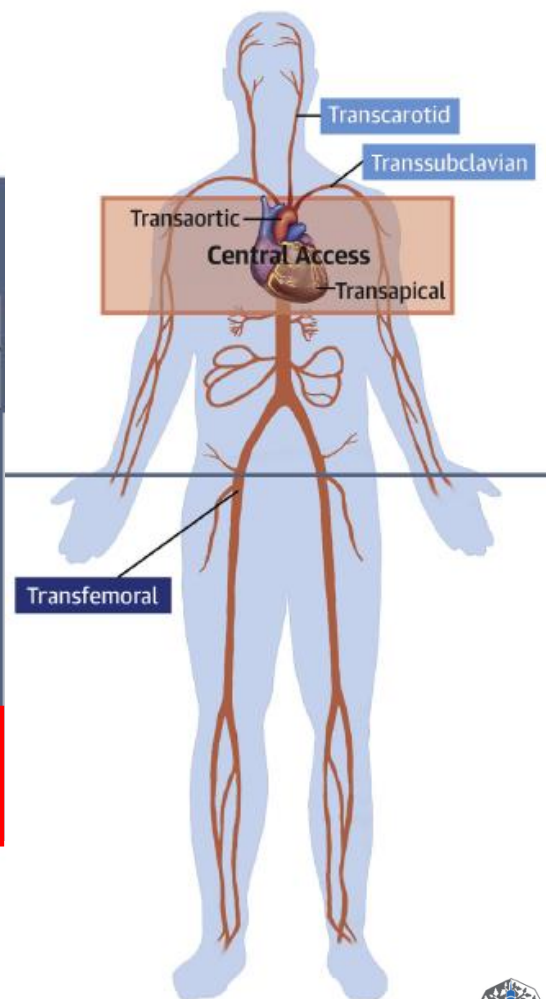
Non-Femoral Peripheral Vascular Access N = 1,616
Mean Logistic EuroSCORE I = 19.95%

Femoral Peripheral Vascular Access N = 19,995
Mean Logistic EuroSCORE I = 16.99%

Complications	n (%)
Operative mortality	64 (3.96)
Stroke	54 (3.34)
Unplanned vascular repair	51 (3.16)

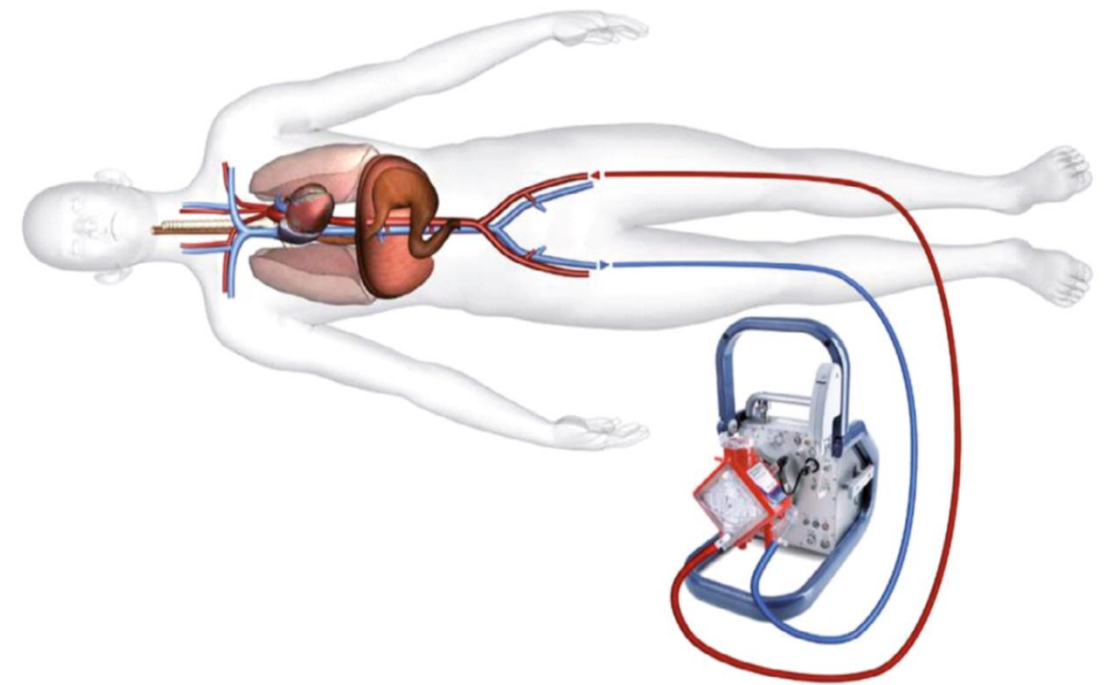
Impact of Access Type on Outcome of the Matched Population		
	OR* (95% CI)	P Value
Operative mortality	1.29 (0.87-1.94)	0.21
Aortic dissection	1.63 (0.32-10.45)	1.63
Tamponade	1.38 (0.73-2.65)	0.32
PM insertion	0.95 (0.78-1.16)	0.61
Renal failure	1.39 (0.92-2.11)	0.12
Major bleeding	1.06 (0.81-1.39)	0.68
Unplanned vascular repair	0.41 (0.29-0.59)	<0.001
Major vascular complications	0.45 (0.21-0.93)	0.03

Complications	n (%)
Operative mortality	583 (2.92)
Stroke	362 (1.81)
Unplanned vascular repair	1,288 (6.44)





Extra-Corporeal Membrane Oxygenation





Complications of Extracorporeal Membrane Oxygenation for Treatment of Cardiogenic Shock and Cardiac Arrest: A Meta-Analysis of 1,866 Adult Patients

Richard Cheng, MD, Rory Hachamovitch, MD, Michelle Kittleson, MD, PhD, Jignesh Patel, MD, PhD, Francisco Arabia, MD, Jaime Moriguchi, MD, Fardad Esmailian, MD, and Babak Azarbal, MD

Cedars-Sinai Heart Institute, Los Angeles, California, and Department of Cardiovascular Medicine, Heart and Vascular Institute, Cleveland Clinic, Cleveland, Ohio

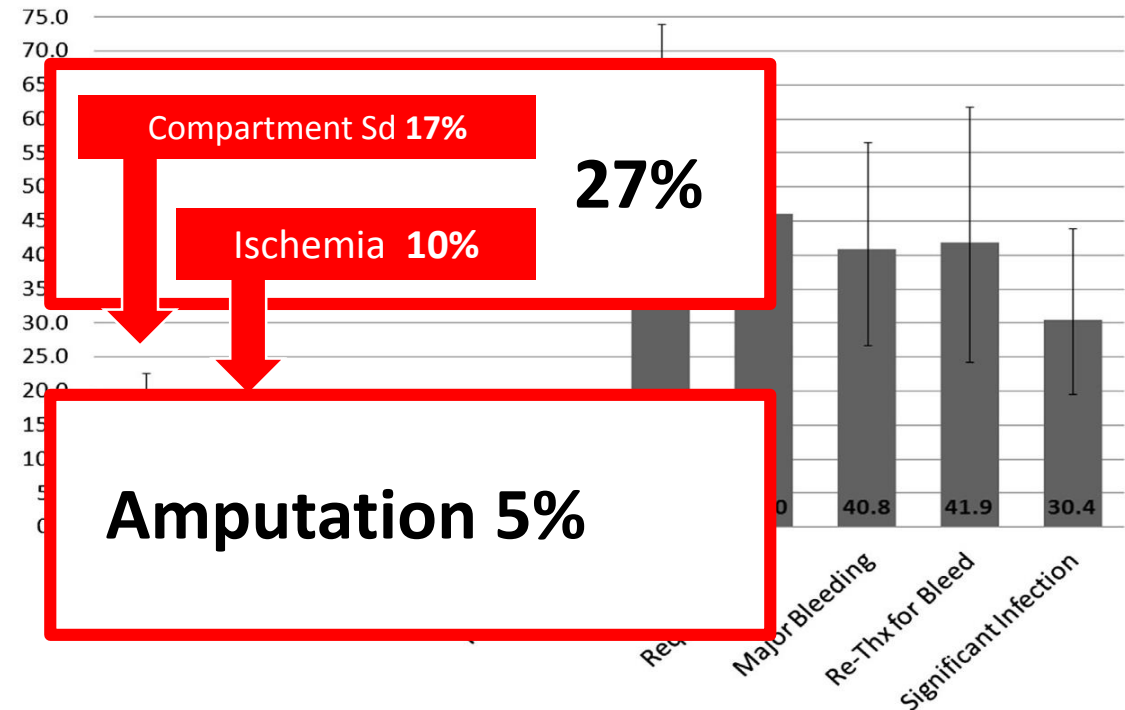
Conclusions. Although ECMO can improve survival of patients with advanced heart disease, there is significant associated morbidity with performance of this intervention. These findings should be incorporated in the risk-benefit analysis when initiation of ECMO for cardiogenic shock is being considered.

(Ann Thorac Surg 2014;97:610–6)

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Meta-analysis

- 22 studies (1866 patients) VA ECMO
- Survival 21 to 65 %



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Arterial protocol including prophylactic distal perfusion catheter decreases limb ischemia complications in patients undergoing extracorporeal membrane oxygenation

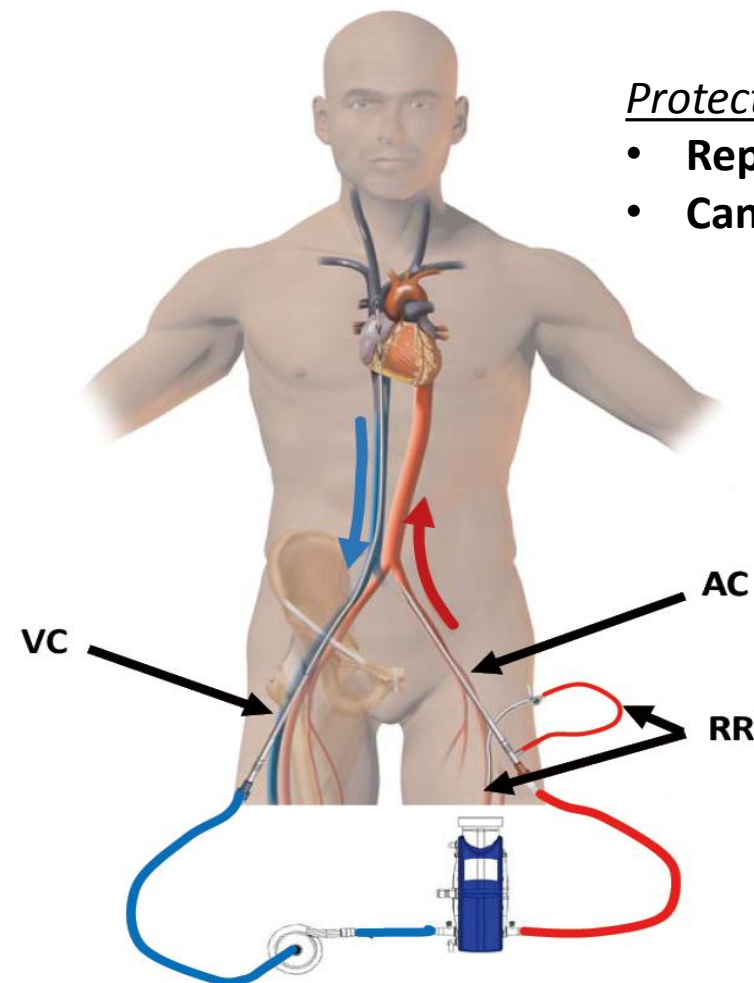
Kathleen M. Lamb, MD,^a Paul J. DiMuzio, MD,^b Adam Johnson, MD, MPH,^b Philip Batista, MD,^b Neil Moudgill, MD,^c Megan McCullough, NP,^b Joshua A. Eisenberg, MD,^d Hitoshi Hirose, MD,^b and Nicholas C. Cavarocchi, MD,^b Philadelphia, Pa; Tampa, Fla; and Pennington, NJ

(J Vasc Surg 2017;65:1074-9.)

Risk factor	Ischemia (row %)	No ischemia (row %)	P
DPC			<.001
Yes	0 (0)	55 (100)	
No	12 (33)	24 (67)	
Cannula < 20 F			.013
Yes	9 (24)	28 (76)	
No	3 (6)	51 (94)	
Ipsilateral cannulas			.129
Yes	7 (20)	28 (80)	
No	5 (9)	51 (91)	

Protective factor:

- Reperfusion
- Cannula < 20 Fr





Percutaneous versus surgical femoro-femoral veno-arterial ECMO: a propensity score matched study

Intensive Care Med
November 2018

January 2015 - December 2017

899 patients



Femoro – femoral VA ECMO

Technical aspects:

Jan 15 – nov 16 : All surgery

Nov16 – dec 17:

- Percutaneous, in 1st line.
- Surgery if CPR, ... : 85 exclusions

	Before matching			After matching		
	Surgical group n = 485 (%)	Percutaneous group n = 329 (%)	p value	Surgical group n = 266 (%)	Percutaneous group n = 266 (%)	Standardized mean difference
Age, years	53.6 ± 14.3	55.8 ± 14.5	0.036	54.2 ± 14.4	55.2 ± 14.9	0.07
Female	145 (30)	88 (27)	0.329	80 (30)	70 (26)	0.08
Weight, kg	77.8 ± 17.9	79.4 ± 17.5	0.258	78.2 ± 17.3	78.6 ± 16.2	0.02
Height, cm	171.5 ± 8.8	172.1 ± 8.4	0.247	172.0 ± 8.6	172.1 ± 8.1	0.01
BMI, kg/m ²	26.4 ± 5.6	26.8 ± 5.3	0.233	26.4 ± 5.5	26.5 ± 5.0	0.02
Atherosclerosis risk factors						
Tobacco use	179 (39)	127 (40)	0.685	96 (36)	109 (40)	0.10
Arterial hypertension	138 (30)	105 (33)	0.321	91 (34)	83 (31)	0.06
Dyslipidemia	118 (25)	122 (38)	< 0.001	86 (32)	98 (37)	0.09
Diabetes mellitus	87 (19)	71 (22)	0.215	60 (23)	55 (21)	0.05
Peripheral artery disease	22 (5)	6 (2)	0.035	3 (1)	6 (2)	0.09
Chronic heart failure	213 (46)	167 (53)	0.08	144 (54)	151 (57)	0.05
Long-term anticoagulation before VA-ECMO	152 (33)	114 (36)	0.359	99 (37)	97 (36)	0.02
Antiaggregants before VA-ECMO implantation	155 (33)	118 (37)	0.277	100 (38)	101 (38)	0.01
SOFA score	11.9 ± 4.9	12.9 ± 4.6	0.006	12.8 ± 4.9	12.5 ± 4.5	0.05



Percutaneous versus surgical femoro-femoral veno-arterial ECMO: a propensity score matched study

Intensive Care Med
November 2018

	Surgical group <i>n</i> = 266 (%)	Percutaneous group <i>n</i> = 266 (%)	<i>p</i> value
30-Day overall survival	150 (56.3)	170 (63.8)	0.034
Cannulation site infection	74 (27.8)	44 (16.5)	0.001
Infection requiring surgical revision ^a	40 (15.0)	14 (5.3)	< 0.001
Vascular complications at cannulation ^b	7 (2.6)	10 (3.8)	0.663
Limb ischemia	33 (12.4)	23 (8.6)	0.347
Cannula relocation or removal	25 (9.4)	15 (5.6)	0.258
Limb fasciotomy	10 (3.8)	6 (2.3)	0.310
Amputation	2 (0.8)	2 (0.8)	1.000
Vascular complications after cannula removal	9 (3.4)	39 (14.7)	< 0.001
Surgical revision for persistent bleeding early after decannulation	4 (1.5)	25 (9.4)	< 0.001
Surgical revision in the days after decannulation ^c	5 (1.9)	14 (5.3)	0.035
Lower limb sensory-motor deficit	6 (2.3)	7 (2.6)	0.779

**Better
Survival**

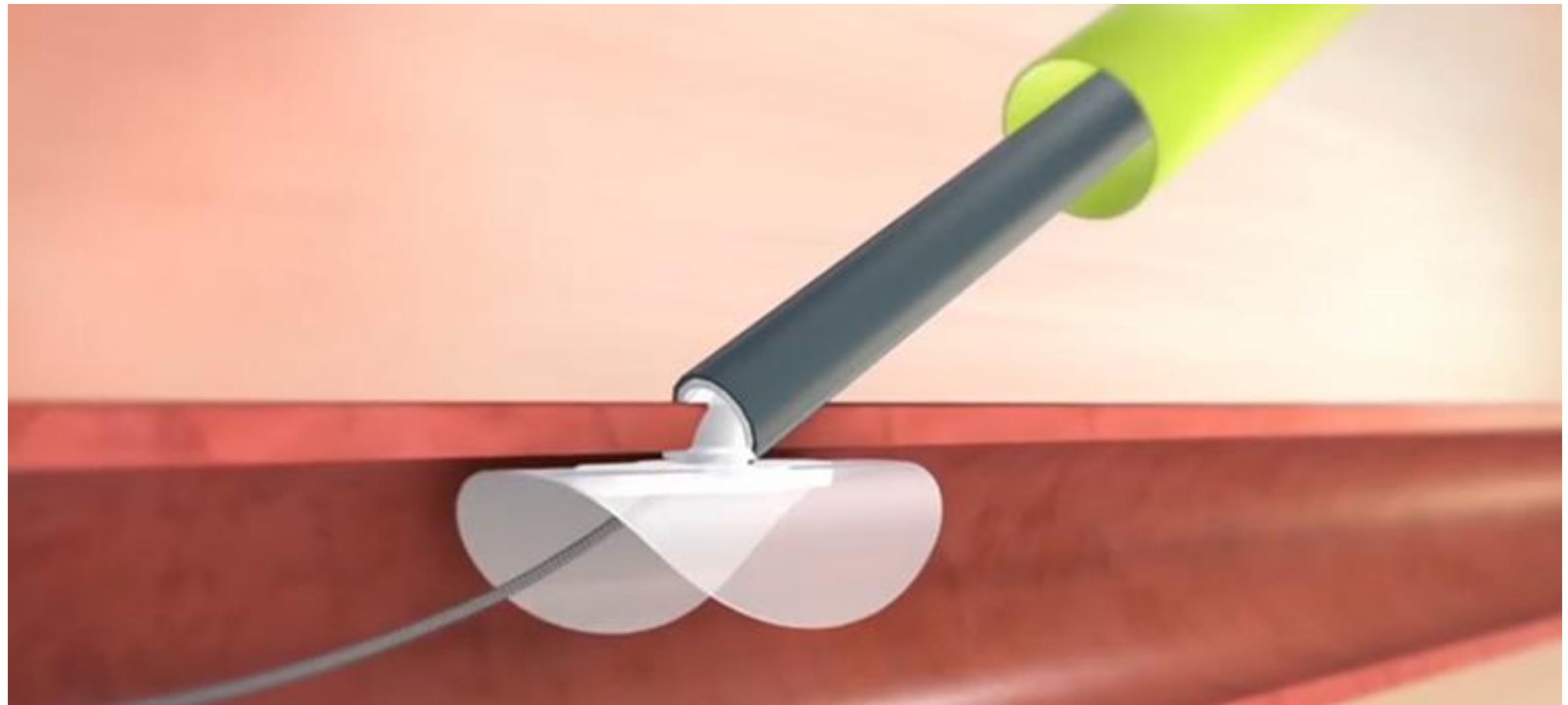
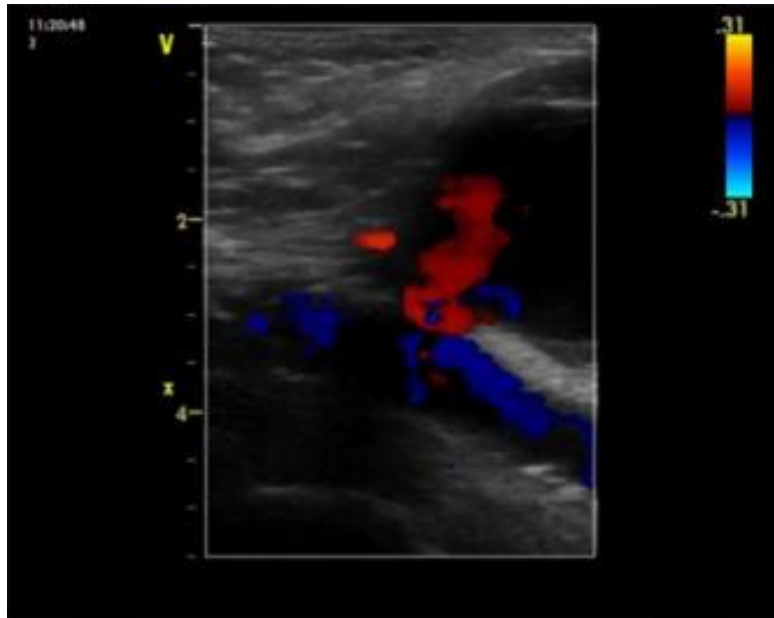
**Less
Infection**

**Vascular
complications**



Percutaneous versus surgical femoro-femoral veno-arterial ECMO: a propensity score matched study

Intensive Care Med
November 2018



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Vascular Complications in Patients Undergoing Femoral Cannulation for Extracorporeal Membrane Oxygenation Support

Theodosios Bisdas, MD, Gernot Beutel, MD, Gregor Warnecke, MD, Marius M. Hoeper, MD, Christian Kuehn, MD, Axel Haverich, MD, and Omke E. Teebken, MD

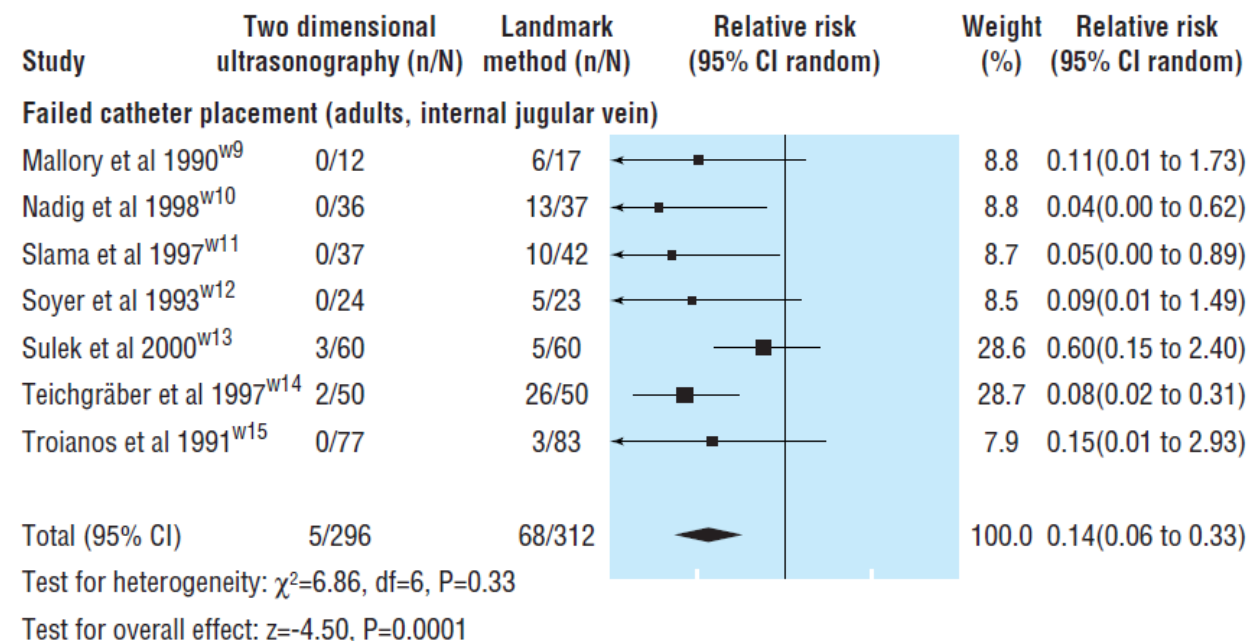
(Ann Thorac Surg 2011;92:626–31)

Variables	Odds Ratio	95% CI	p Value
Diabetes mellitus ^a	1.83	0.49 to 6.92	0.36
Implantation technique ^b	1.54	0.15 to 16.35	0.72
Length of ECMO support, days	0.92	0.80 to 1.05	0.21
Peripheral arterial disease ^c	6.95	1.88 to 25.59	0.003

^a Type I, type II, or due to corticosteroids. ^b Percutaneous versus open. ^c Peripheral arterial disease was defined according to Norgren et al [18].

Ultrasonic locating devices for central venous cannulation: meta-analysis

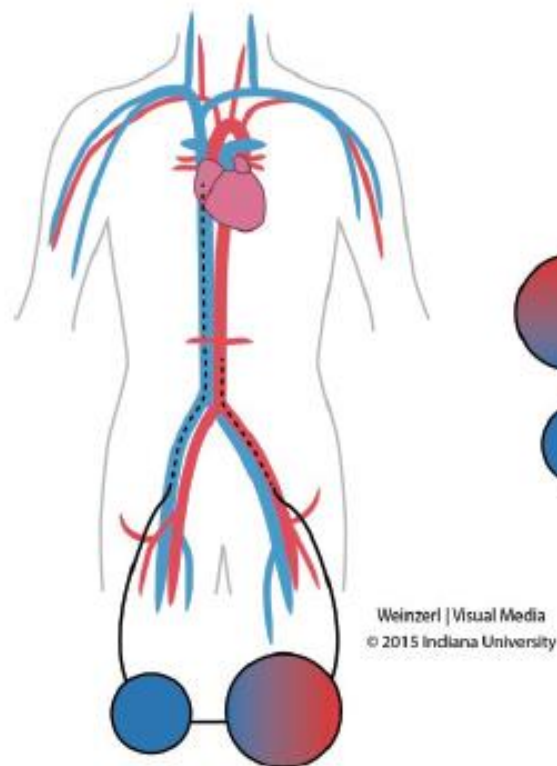
Daniel Hind, Neill Calvert, Richard McWilliams, Andrew Davidson, Suzy Paisley, Catherine Beverley, Steven Thomas



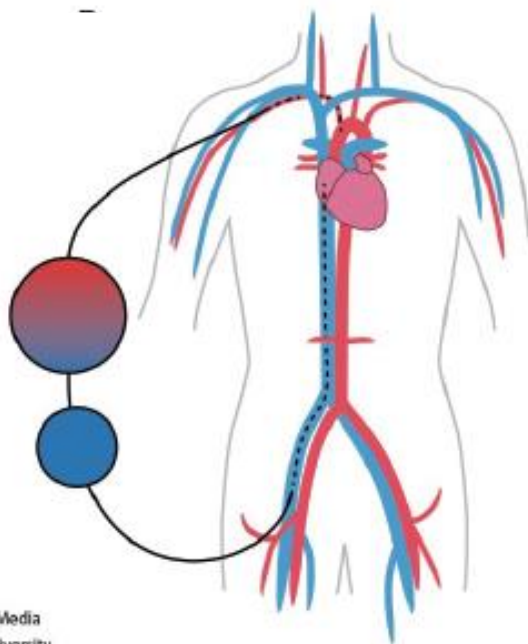


Peripheral VA ECMO

Femoro-femoral



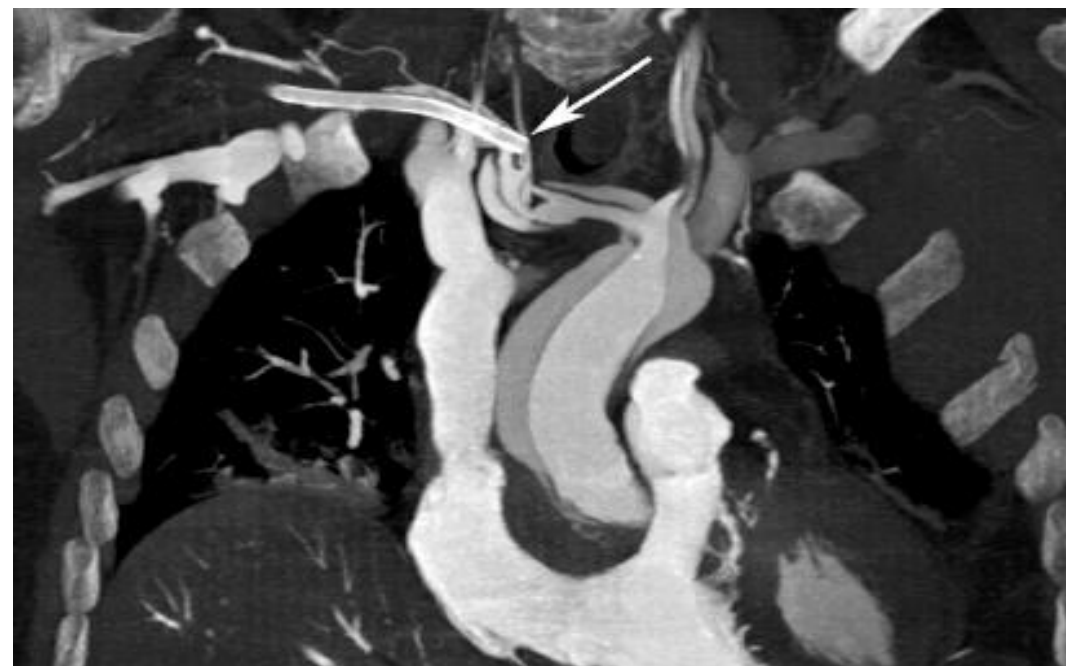
Femoro-axillary



Fatal Aortic Dissection during Extracorporeal Membrane Oxygenation Axillary Cannulation Confirmed by *Postmortem* Computed Tomography Angiography

Jérémie Joffre^{1,2}, Gabriel Preda¹, Lionel Arrivé³, and Eric Maury¹

Am J Respir Crit Care Med Vol 195, Iss 7, pp 953–954, Apr 1, 2017





TAVI

VC = 18,8 % (9,5-51,6)

Impact on survival & LT outcome

X-rays & US guidance

Percutaneous closure improvement?

Reducing the size ?

Training & expertise

Vascular Complications



ECMO

VC = 27 % (9,1-71,2)

Impact on survival & infections

Reperfusion catheter

Percut. approach & US guidance

Percutaneous closure?

Training & expertise