

Limb Ischemia in Patients with Peripheral Venoarterial Extracorporeal Membrane Oxygenation

Sylvain Beurtheret, MD¹, Marie Hauguel-Moreau, MD², Orianne Weizman MD, MPH^{2,3}, Victor Majois, MSc¹, Guillaume Fadel, MD⁴, Nicolas Danchin, MD, PhD³, Eloi Marijon, MD, PhD³, Mathieu Schmidt, MD, PhD⁵, Pierre Mordant, MD^{6,7}

1. Department of Cardiac Surgery, Hôpital Saint Joseph, Marseille, France; 2. Ambroise Pare University Hospital, Cardiology department, Assistance Publique-Hôpitaux de Paris, Université de Versailles-Saint Quentin, Boulogne Billancourt, France; 3. European Hospital Georges Pompidou, Cardiology department, Assistance Publique-Hôpitaux de Paris, Université Paris Cité, Paris, France; 4. Department of Thoracic and Cardiovascular Surgery, Cardiology Institute, Assistance Publique-Hôpitaux de Paris, Université La Sorbonne, Hôpital de la Pitié-Salpêtrière, Paris, France; 5. Sorbonne Université, Assistance Publique-Hôpitaux de Paris, Hôpital de la Pitié-Salpêtrière, Medical Intensive Care Unit, Paris Cedex 13, France; 6. Department of Vascular Surgery, Thoracic Surgery, and Lung Transplantation, Hôpital Bichat, Assistance Publique – Hôpitaux de Paris, Paris, France; 7. Université Paris Cité, INSERM 1152, Paris, France

INTRODUCTION

Peripheral veno-arterial extracorporeal membrane oxygenation (VA-ECMO) is increasingly used in cardiogenic shock, but femoral cannulation comes with vascular complications. We aimed to assess the incidence, characteristics, and outcomes of Acute Limb Ischemia (ALI) complicating peripheral VA-ECMO.

METHODS

We used the French national administrative database to extract all consecutive VA-ECMO implanted in 136 French centers from January 2013 to December 2022.

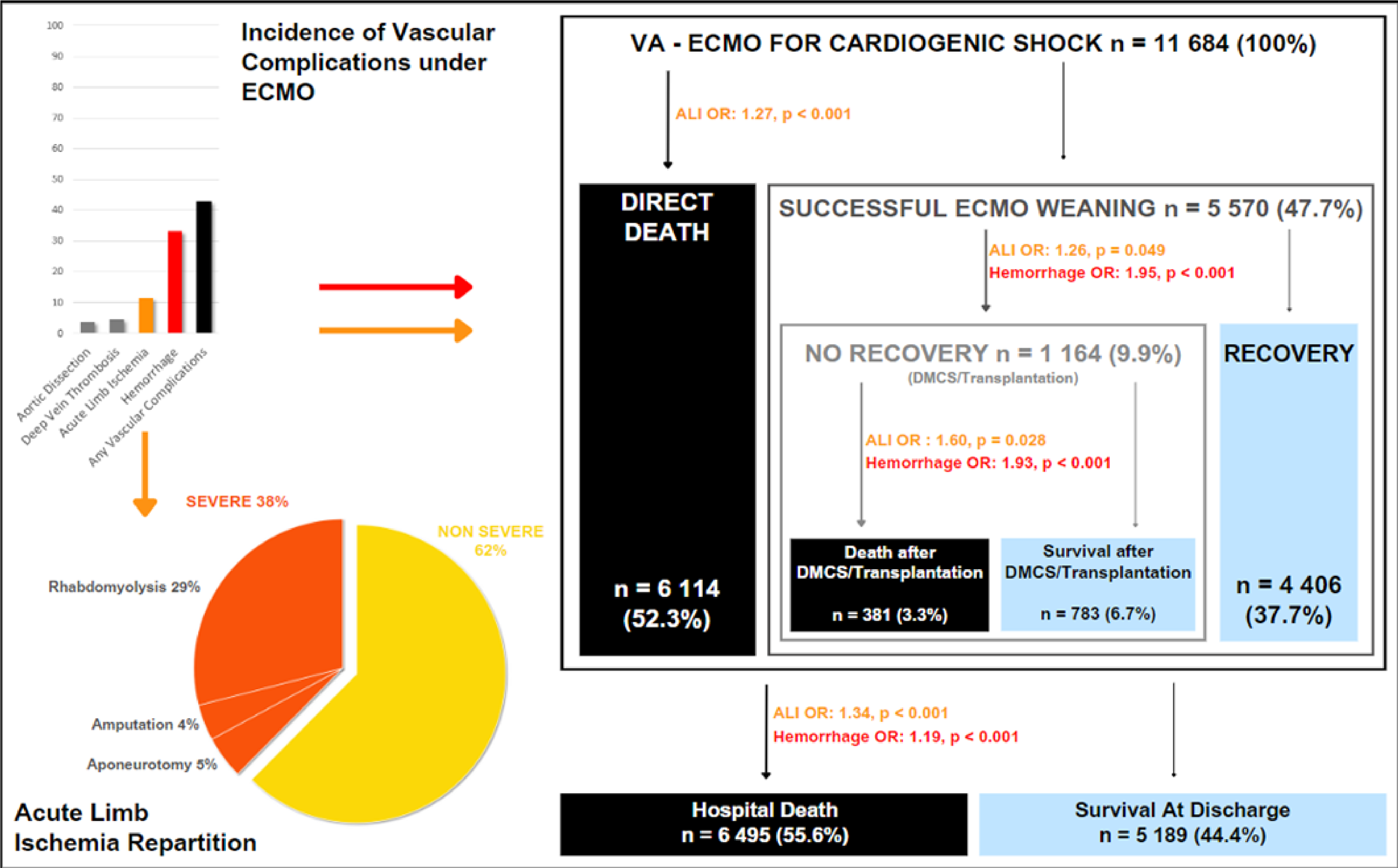
RESULTS

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Out of 11,684 patients with peripheral VA-ECMO, 1,334 had an ALI (11.4%). Patients with ALI were younger (53.2 vs. 54.8 years, $p<0.001$), more likely women (67.5% vs. 70.6%, $p=0.02$), with peripheral vascular disease (75.5% vs. 22.5%, $p<0.001$), diabetes (23.3% vs. 20.6%, $p=0.03$). Similarly, they had a higher Charlson comorbidity index (4.41 vs. 4.1, $p<0.001$), and more frequent chronic heart failure (70.4% vs. 66.2%, $p=0.002$). The main independent predictor of limb ischemia was peripheral vascular disease (OR 12.4, 95% CI 10.7-14.3, $p<0.001$) (Table 1). ALI was independently associated with direct death under ECMO (OR 1.20, 95%CI 1.05-1.37, $p=0.006$). Lastly, among patients weaned from ECMO, ALI was independently correlated with the need for durable mechanical circulatory support (DMCS) or transplantation (OR 1.39, 95%CI 1.11-1.75).

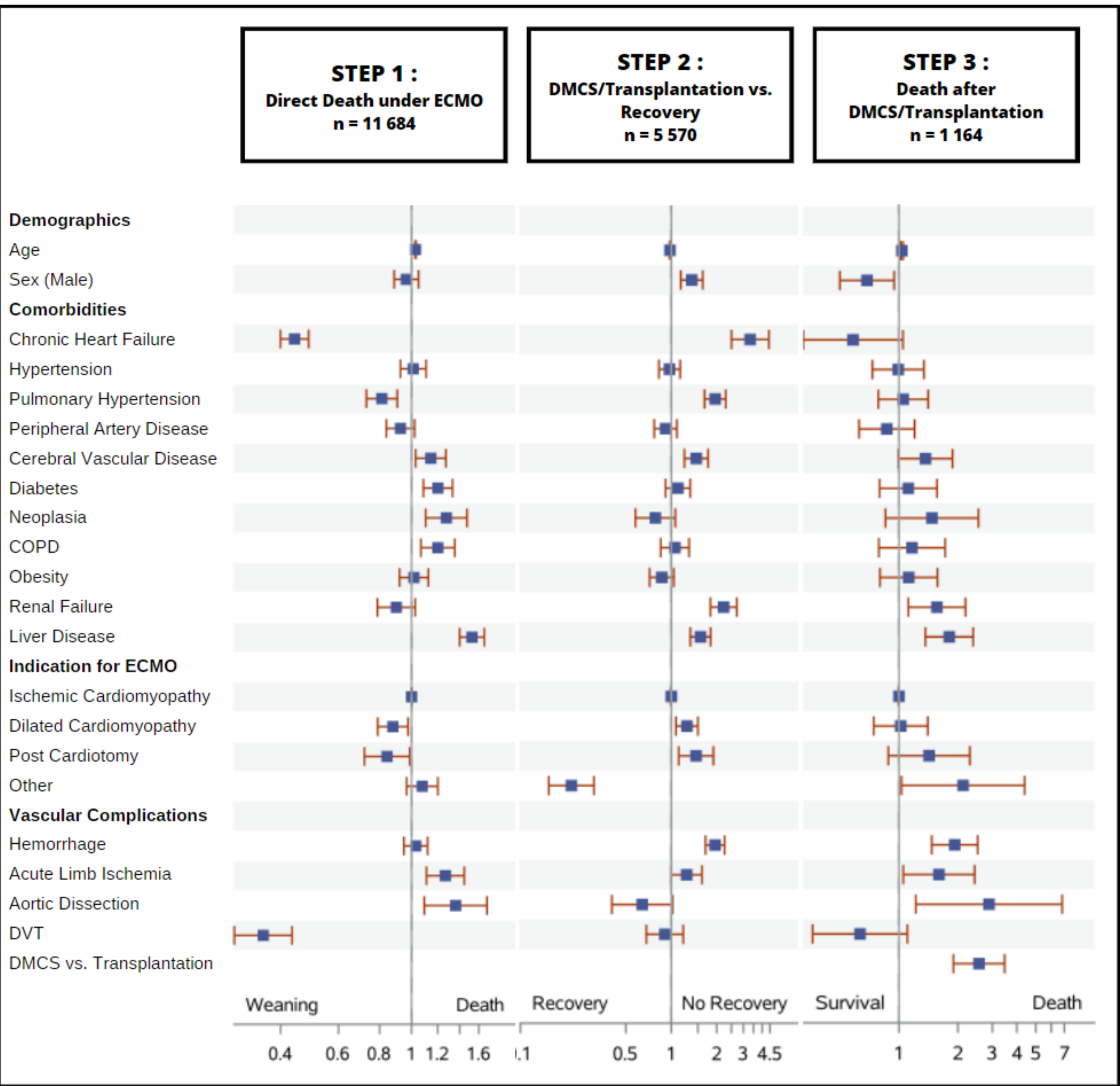
CONCLUSIONS

In a nationwide cohort over 10 years, an ALI complicated ECMO in 11.4% of patients, increasing mortality rate under ECMO and the need for DMCS or transplantation after ECMO weaning.

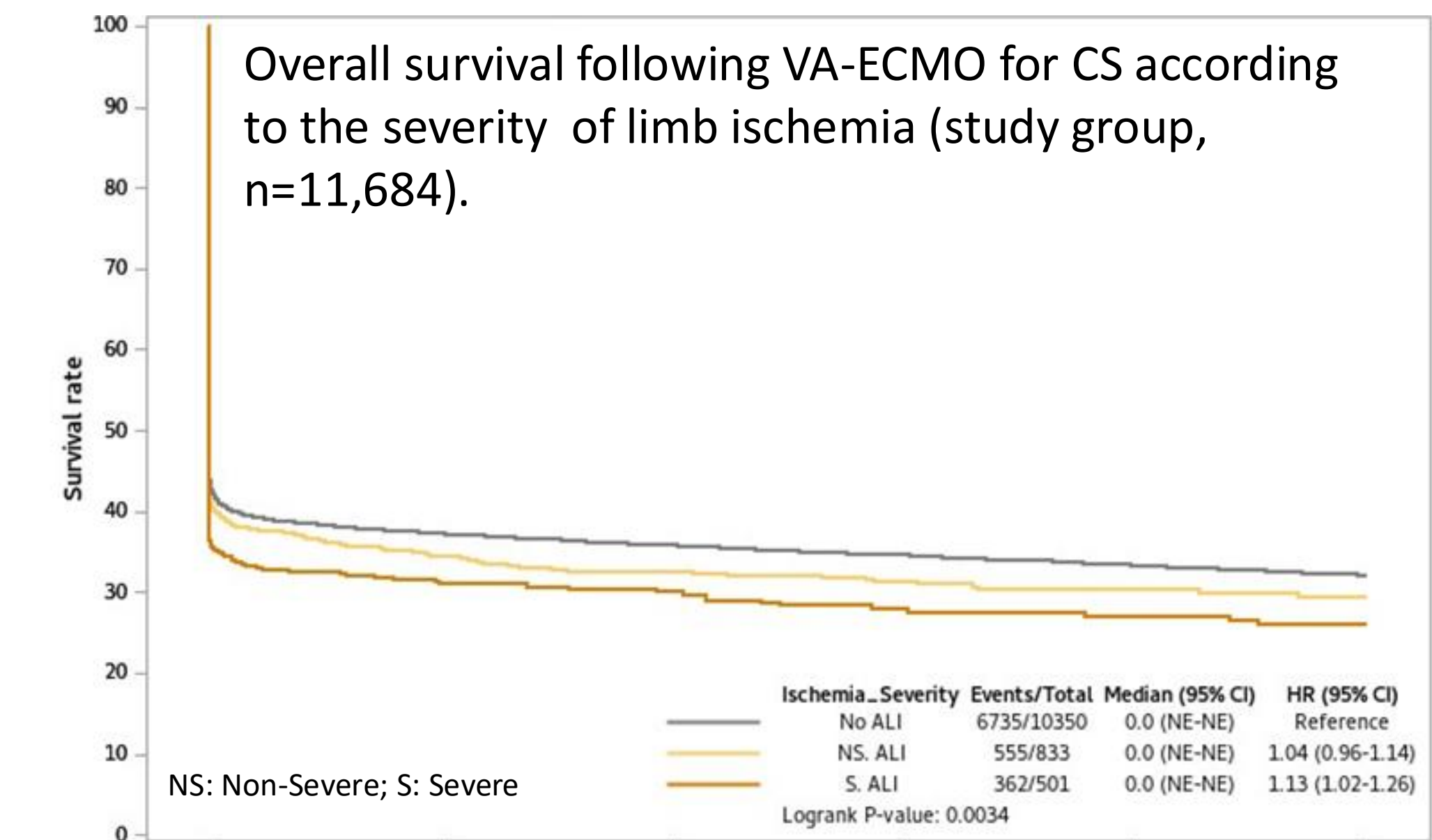


Variables	Unadjusted odds ratios		Adjusted odds ratios	
	OR (95% CI)	P-value	OR (95% CI)	P-value
Demographics				
Age	1.02 (1.02-1.03)	<.01	1.03 (1.02-1.03)	<.01
Sex (Male)	1.03 (0.96-1.12)	0.41	0.98 (0.90-1.07)	0,66
Characteristics				
Charlson Index	1.08 (1.07-1.09)	<.01	NA	
Chronic Heart Failure	0.55 (0.51-0.60)	<.01	0.48 (0.43-0.53)	<.01
Hypertension	1.21 (1.12-1.30)	<.01	0.99 (0.90-1.08)	0.77
Pulmonary Hypertension	0.83 (0.76-0.92)	<.01	0.90 (0.81-1.00)	0.05
Peripheral Artery Disease	1.05 (0.97-1.13)	0.27	0.90 (0.82-0.99)	0.04
Cerebral Vascular Disease	1.26 (1.14-1.39)	<.01	1.24 (1.11-1.38)	<.01
Diabetes	1.32 (1.20-1.44)	<.01	1.21 (1.09-1.34)	<.01
Neoplasia	1.37 (1.19-1.57)	<.01	1.26 (1.09-1.46)	<.01
COPD	1.20 (1.08-1.35)	0.01	1.21 (1.07-1.36)	<.01
Obesity	1.07 (0.98-1.17)	0.15	1.02 (0.92-1.12)	0,76
Renal Failure	1.06 (0.93-1.19)	0.38	1.09 (0.95-1.24)	0.21
Liver Disease	1.47 (1.35-1.59)	<.01	1.65 (1.51-1.80)	<.01
Indication for ECMO				
Coronary artery disease	1 (Reference)		1 (Reference)	
Dilated Cardiomyopathy	0.60 (0.55-0.66)	<.01	0.89 (0.80-0.98)	0.21
Post Cardiotomy	0.89 (0.77-1.04)	0.14	0.86 (0.73-1.01)	0.15
Other	0.98 (0.89-1.07)	0.61	1.00 (0.90-1.12)	0.11
Vascular Complication				
Any vascular complication	1.13 (1.05-1.21)	<.01	NA	
Hemorrhage	1.15 (1.06-1.24)	<.01	1.19 (1.09-1.29)	<.01
Limb Ischemia	1.22 (1.09-1.37)	<.01	1.34 (1.18-1.53)	<.01
Aortic Dissection	1.40 (1.15-1.71)	<.01	1.40 (1.12-1.74)	<.01
DVT	0.36 (0.30-0.43)	<.01	0.36 (0.30-0.44)	<.01

Independent predictors of in-hospital mortality associated with VA-ECMO for CS (study group, n=11,684).



Impact of vascular complications on the clinical path of patients under VA-ECMO for CS (study group, n=11,684).



CONTACT INFORMATION

Dr. Sylvain Beurtheret
Mail: sbeurtheret@hopital-saint-joseph.fr
Pr. Pierre Mordant
Mail: pierre.mordant@aphp.fr

- In the French administrative database, the incidence of ALI during VA-ECMO is 11.4%.
- ALI is associated with direct death under ECMO (OR=1.20).
- The main risk factor for ALI is peripheral vascular disease.
- PVD is associated with non-severe ALI that still have a negative impact on in-hospital mortality and overall survival.
- Preventing ALI during VA-ECMO thus represent a major challenge.

