



# 70<sup>TH</sup> ESCVS CONGRESS & 7<sup>TH</sup> IMAD MEETING

20 | 23 JUNE 2022

Liège | Théâtre de Liège | Belgium

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**70th ESCVS**

International congress of the European Society  
for Cardiovascular and Endovascular Surgery



**7<sup>th</sup> IMAD meeting**



# **Renal function after endovascular abdominal aortic aneurysm repair**

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# DISCLOSURES

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Grant/research support: BD, Boston Scientific, Medicor





# INTRODUCTION

- Endovascular aneurysm repair (EVAR) is the preferred treatment for abdominal aortic aneurysm (AAA) when anatomy is compatible<sup>1</sup>.
- Acute kidney injury (AKI) is a common complication after EVAR<sup>2</sup>.
- Long term renal function decreases after EVAR<sup>3</sup>.
- AKI and long term renal function decline after EVAR are associated with cardiovascular morbidity and mortality<sup>3</sup>.

<sup>1</sup>Sakalihasan N, Michel JB, Katsargyris A, Kuivaniemi H, Defraigne JO, Nchimi A, Powell JT, Yoshimura K, Hultgren R. Abdominal Aortic Aneurysms. Nat Rev Dis Primers. 2018, 4 : 34.

<sup>2</sup>Castagno C, Varetto G, Quaglini S, Frola E, Scozzari G, Bert F, Rispoli P. Acute kidney injury after open and endovascular elective repair for infrarenal abdominal aortic aneurysms. J Vasc Surg. 2016, 64 : 928-933.

<sup>3</sup>Charles ER, Lui D, Delf J, Sayers RD, Bown MJ, Sidloff D, Saratzis A. The Impact of Endovascular Aneurysm Repair on Long Term Renal Function Based on Hard Renal Outcomes. Eur J Vasc Endovasc Surg. 2019, 58 : 328-333.



# INTRODUCTION

- Our primary end point was to assess incidence of AKI and mid term renal function decrease after EVAR.
- Secondary end points were to look for factors influencing renal function deterioration and to evaluate effect of renal function decrease on survival.

## **MATERIAL AND METHODS**

- We reviewed retrospectively EVAR performed in our University Hospital between January 2014 and June 2019.
- Based on the Acute Kidney Injury Network (AKIN) and Risk, Injury, Failure, Loss, End-stage (RIFLE) staging systems, AKI was defined as increase in serum creatinine by  $\geq 0,3$  mg/dl within 48 hours<sup>4</sup>.
- Based on CKD-EPI equation (Chronic Kidney Disease Epidemiology collaboration), mid term renal function decline was defined as loss of estimated glomerular filtration rate (eGFR)  $\geq 20$  %<sup>3</sup>.
- 32 factors related to patients, procedures and follow-up were screened.

<sup>4</sup>Section 2: AKI Definition. Kidney Int Suppl. 2012, 2 : 19-36.

## **MATERIAL AND METHODS**

- For quantitative variables, data were summarized as mean and standard deviation (SD).
- Frequency tables (numbers and percentages) were used for categorical variables.
- Creatinine and eGFR evolution was analyzed using Student test for paired observations.
- Logistic regression models were used to identify predicting factors for AKI and for renal function decrease.
- Survival after EVAR has been described using Kaplan Meier curves and Cox regression models were used to examine the impact of AKI and of renal function decrease on survival.
- Results were considered significant at the 5% critical level ( $p < 0.05$ ).
- The analyses were performed using SAS (version 9.4) and R (version 3.6).



## RESULTS

- 190 EVAR included
- Mean age : 74,0 ± 8,1 years old
- 90% men
- Mean AAA diameter : 58,6 ± 10,9 mm
- 46,3% general anesthesia





## RESULTS

### Renal function within 48 hours (N=185)

Creatinine (mg/dl)	N (%)	Mean $\pm$ SD
Baseline	185	1.09 $\pm$ 0.312
Within 48 hours	185	1.15 $\pm$ 0.414
Evolution	185	0.0643 $\pm$ 0.241 p=0.0004
AKI	<b>15 (8.1)</b>	—
Stage 1	14	—
Stage 2	1	—
Stage 3	0	—



## RESULTS

- Factor influencing AKI :

		AKI	No AKI	OR (95% CI)	p-value
CKD	52/185	10	42	6,1 (2,0-19)	0,0017
pre-op creatinine	1,09 ± 0,312	1,35 ± 0,399	1,07 ± 0,293	11 (2,5-47)	0,0016
pre-op eGFR	68,6 ± 18,2	53,7 ± 22,1	69,9 ± 17,3	0,95 (0,92-0,98)	0,0019

- Others factors like patients characteristics, pre-operative medications, renal artery stenosis, aortic neck thrombus, polar renal artery coverage, contrast medium dosis, associated procedure, transfusions had no influence.



## RESULTS

### Mid term renal function evolution (N=177)

	N (%)	Mean $\pm$ SD
Follow up (months)	177	31 $\pm$ 19
eGFR Baseline	177	68.3 $\pm$ 17.9
eGFR Last value	177	63.8 $\pm$ 21.6
Evolution	177	-4.6 $\pm$ 12.7 p<0.0001
Decrease $\geq$ 20 %	44 (24.9)	—



## RESULTS

- Factor influencing mid term renal function deterioration :

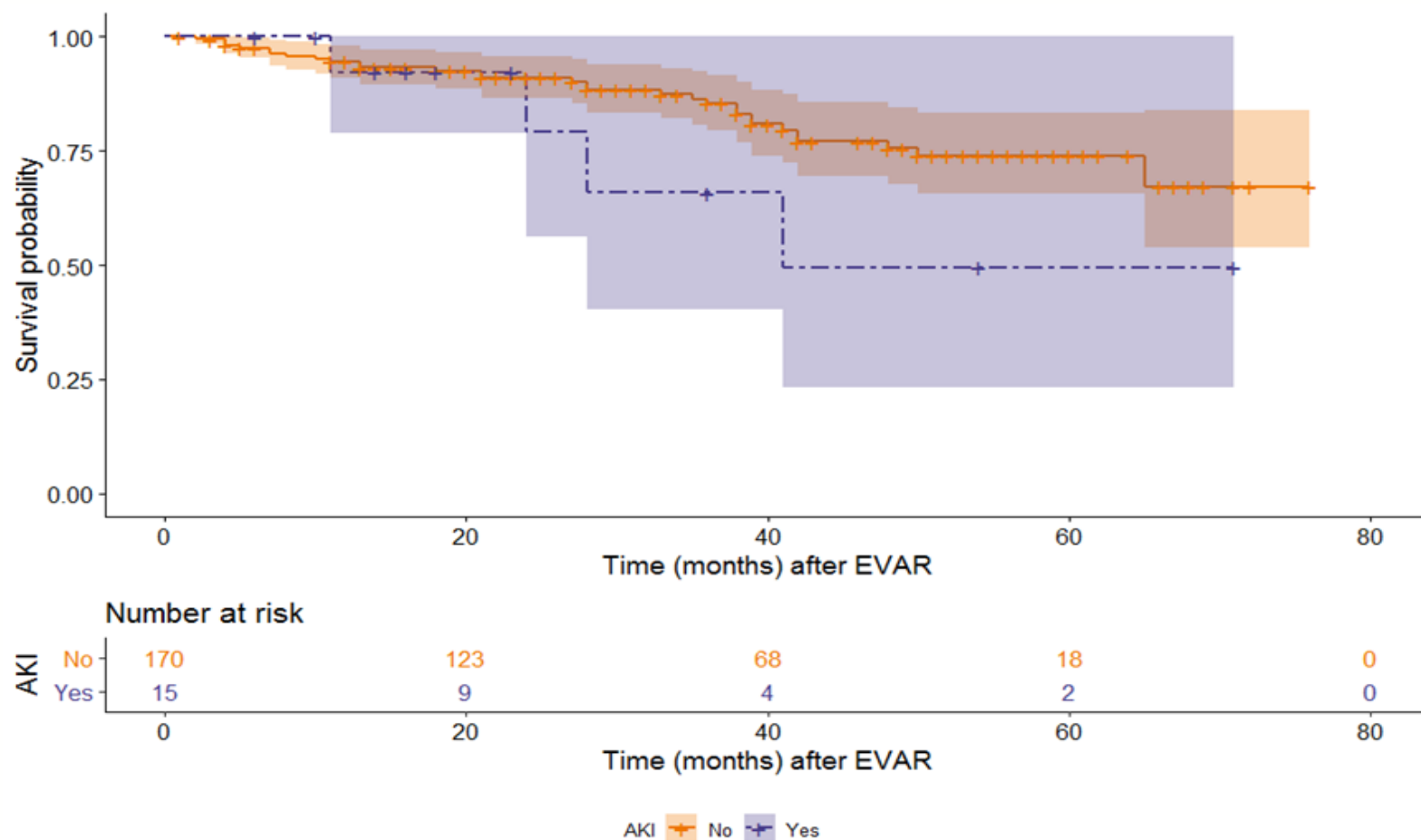
		deterioratio n	No deterioration	OR (95% CI)	p-value
AKI	15/177	9	6	5,6 (1,9- 17)	0,0022

- Others factors like patients characteristics, pre-operative medications, renal artery stenosis, aortic neck thrombus, polar renal artery coverage, contrast medium dosis, associated procedure, transfusions, number of computed tomography had no influence.





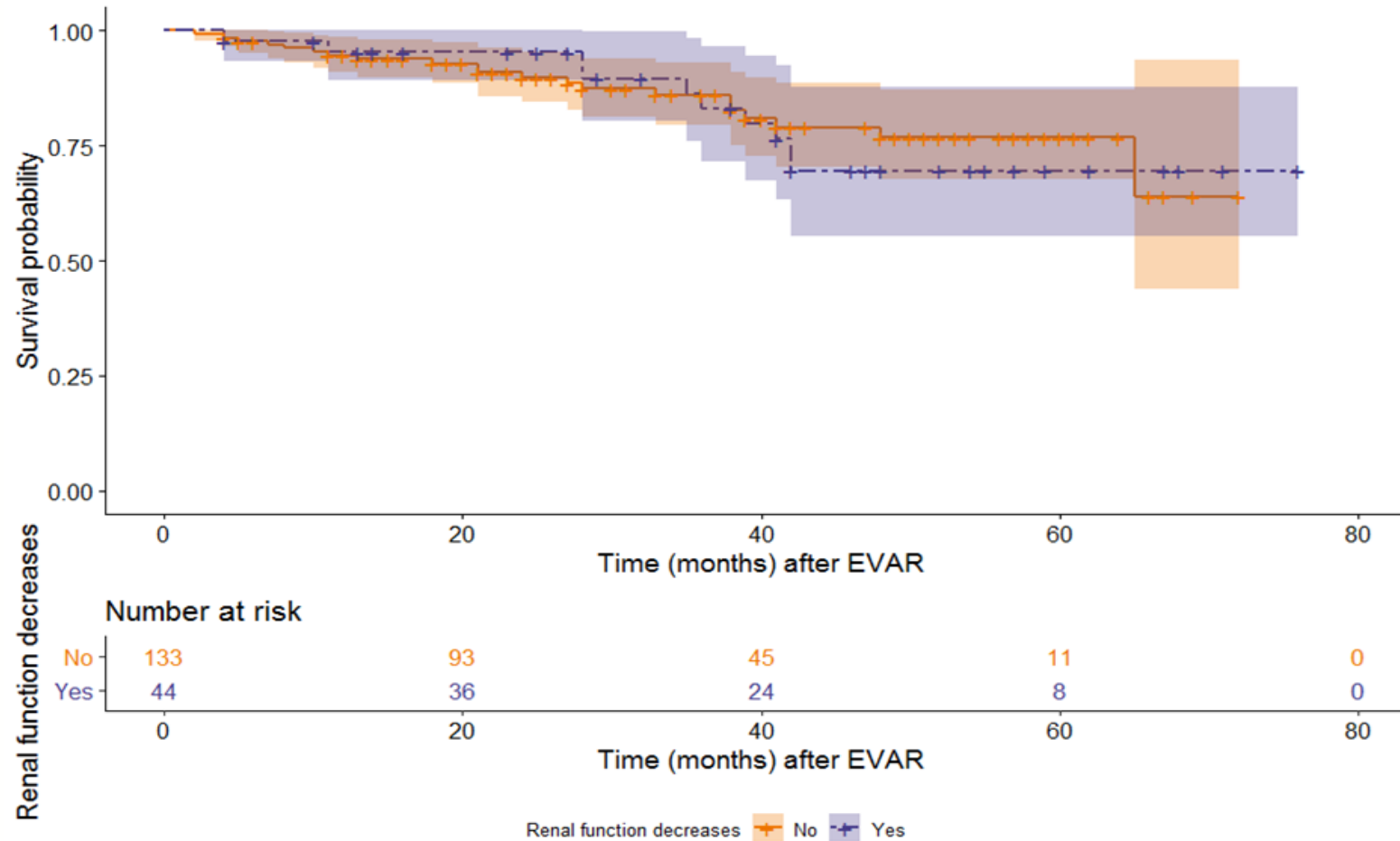
# RESULTS



p-value 0,75



# RESULTS



p-value 0,69



## CONCLUSIONS

- Incidence of AKI after EVAR was **8,1%** and of mid term renal function deterioration was **24,9%**.
- The only predicting factor of AKI was **CKD** and the only of mid term renal function deterioration was **AKI**.
- Renal function had **no** influence on the survival.
- Potential new diagnostic **markers** of renal function decline, prevention modalities and therapeutic agents have to be evaluated and validated in prospective studies.