



## Short Communication

# In-hospital antithrombotic therapy and outcomes of elderly patients on warfarin undergoing percutaneous coronary intervention: Insights from the WAR-STENT registry



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## ARTICLE INFO

## Article history:

Received 28 March 2022

Accepted 28 April 2022

Available online 4 May 2022

## Keywords:

Oral anticoagulation

Warfarin

Percutaneous coronary intervention

Stent

## ABSTRACT

In the patients on warfarin undergoing percutaneous coronary intervention included in the prospective, multicentre, observational WAR-STENT registry, age  $\geq 75$  years was associated with a significant increase in in-hospital major bleeding, length of hospitalization, and use of bare-metal stents, with no differences in the peri-procedural management and antithrombotic therapy.

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To evaluate the in-hospital antithrombotic therapy (AT) and outcomes of patients on warfarin undergoing percutaneous coronary intervention (PCI) stratified by age  $<75$  vs.  $\geq 75$  years, we analyzed the database of the prospective, multicentre, observational WAR-STENT registry ([ClinicalTrials.gov](https://clinicaltrials.gov) identifier NCT00722319).<sup>1</sup>

In patients  $\geq 75$  years old, male gender (31 vs. 21%;  $p = 0.019$ ), hypertension (89 vs. 76%;  $p = 0.024$ ), diabetes (39 vs. 30%;  $p = 0.041$ ), and chronic kidney disease (35 vs. 21%;  $p = 0.002$ ), were significantly more frequent. No significant differences between the two age groups were observed regarding the indications for warfarin (mostly atrial fibrillation) and PCI (mostly chronic and acute non-ST-elevation coronary syndromes). Mean duration of hospitalization was significantly longer in patients aged  $\geq 75$  years ( $6.3 \pm 2.7$  vs.  $4.8 \pm 2.4$  days;  $p = 0.008$ ). No significant differences between the two age groups were observed regarding the peri-PCI pharmacological, as well as interventional, management, with the only exception of the use of bare-metal stents (BMS) which was

significantly more frequent in patients  $\geq 75$  years old (Table 1). The post-PCI various ATs were also comparable in the two age groups (Table 1). In-hospital major adverse cardiovascular events (MACVEs), including cardiovascular death, myocardial infarction, target vessel revascularization, stent thrombosis, stroke, and venous thromboembolism, were comparable in the two age groups, both globally and as individual components (Table 2). In-hospital occurrence of major bleeding was significantly higher in patients aged  $\geq 75$  years (Table 2). The combined occurrence of MACVEs and total bleeding was also significantly more frequent in patients  $\geq 75$  years old (Table 2). At both Cox univariable and multivariable analyses, age  $\geq 75$  years was a predictor of BMS use (odds ratio [OR] 1.55, 95% confidence interval [CI] 1.04–2.31,  $p = 0.029$ ), and occurrence of combined MACVEs and total bleeding (OR 2.67, 95% CI 1.27–5.63,  $p = 0.009$ ). At multivariable analysis, only age  $\geq 75$  years remained an independent predictor of significantly increased occurrence of combined MACVEs and total bleeding (OR 1.89; 95% CI 1.32–2.98;  $p = 0.007$ ).

In conclusion, our observational data suggest that in patients on warfarin undergoing PCI, age  $\geq 75$  years is associated with a significant increase in the risk of in-hospital major bleeding, length of hospitalization, and use of BMS, in the absence of differences in the peri-procedural management and AT. Within the limited duration

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**Table 1**  
Peri-PCI management.

	<75 years (n = 185)	≥75 years (n = 226)	p value
Uninterrupted OAC, n (%)	72 (39)	104 (46)	0,148
Mean INR value	1,94	2,13	0,107
LMWH bridging, n (%)	47 (25)	57 (25)	0,560
UFH bridging, n (%)	23 (12)	31 (14)	0,770
Pre-PCI DAPT, n (%)	146 (79)	178 (79)	0,301
Radial approach, n (%)	117 (63)	145 (64)	0,917
Intra-procedural UFH, n (%)	151 (81)	168 (82)	0,223
Mean intra-procedural UFH dose, IU	5083 ± 1833	5166 ± 1708	0,406
Intra-procedural GPI, n (%)	27 (15)	21 (9)	0,096
Intra-procedural bivalirudin, n (%)	4 (2)	3 (1,3)	0,515
Bare-metal stent, n (%)	99 (53)	145 (64)	0,028
Post-PCI antithrombotic therapy			
TAT, n (%)	141 (76)	168 (74)	0,660
DAT, n (%)	6 (3)	9 (4)	0,690
DAPT, n (%)	15 (8)	25 (11)	0,314
Other, n (%)	26 (14)	21 (9)	0,131

OAC: oral anticoagulation; INR: International Normalized Ratio; LMWH: low molecular weight heparin; UFH: unfractionated heparin; PCI: percutaneous coronary intervention; DAPT: dual antiplatelet therapy; GPI: glycoprotein IIb/IIIa inhibitors; TAT: triple antithrombotic therapy; DAT: double antithrombotic therapy.

**Table 2**  
In-hospital outcomes.

	<75 years (n = 185)	≥75 years (n = 226)	p value
MACVE	2 (1,1)	9 (3,9)	0,069
Death, n (%)	1 (0,5)	6 (2,6)	0,099
Myocardial infarction, n (%)	0	1	–
Stent thrombosis, n (%)	0	0	–
Stroke, n (%)	1 (0,5)	2 (0,9)	0,679
VTE, n (%)	0	0	–
Total bleeding	8 (4,3)	21 (9,3)	0,050
Major, n (%)	1 (0,5)	8 (3,5)	0,038
Minor, n (%)	7 (3,8)	13 (5,8)	0,356
Combined MACVE + total bleeding, n (%)	10 (5,4)	30 (13,3)	0,007

MACVE: major adverse cardiovascular events; VTE: venous thromboembolism.

of in-hospital stay, age ≥75 years appeared to impact more on the occurrence of (major) bleeding rather than MACVEs. The increase in bleeding, and associated need for additional care, either medical or interventional/surgical, is the likely explanation for the increased length of hospitalization, whereas the greater use of BMS is consistent with the recommendations in force at the time when the WAR-STENT registry was carried out and warfarin was the only OAC available.<sup>2</sup> While acknowledging the latter point as a limitation, we believe that our observations are valuable given the still incomplete penetration of direct oral anticoagulants in clinical practice<sup>3</sup> and the persistence of unique indication for warfarin in special clinical contexts.

### Acknowledgement

The present work was supported by a grant awarded to Dr. Andrea Rubboli by the National Association of Hospital Cardiologists (ANMCO).

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