Impact of presentation and transfer delays on complete ST-segment resolution before primary percutaneous coronary intervention: the ATLANTIC ST-segment resolution substudy

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Purpose: This exploratory analysis aimed to evaluate predictors of pre-PCI complete ST-resolution (STR) and clinical significance of complete STR before PCI in STEMI patients enrolled in the ATLANTIC trial (NCT01347580)

Methods: ST-segment analysis was performed on ECGs recorded at the time of inclusion (pre-H ECG) and in the cath lab before angiography (pre-PCI ECG); the degree of STR at pre-PCI ECG was assessed by an independent core laboratory (ERT; Peterborough, United Kingdom). Complete STR was defined as ≥70% STR. Composite major adverse cardiovascular events (MACCE: death, myocardial infarction, stroke or urgent revascularization) and total mortality were assessed over 30 days.

Results (1): Pre-PCI complete STR occurred in 12.8% (n=204/1598) of patients. At logistic regression, complete STR predicted lower 30-day composite MACCE and total mortality **(table1, figure 1 and 2)**.

Table 1. STR and ischemic endpoints*, logistic regression analysis

Ischemic endpoints	Incomplete STR pre-PCI (<70%) (n=1394)	Complete STR pre-PCI (≥70%) (n=204)	Odds ratio†	p-value†
Composite of death, MI, stroke and urgent revascularization– n, (%)	67 (4.8%)	1 (0.5%)	0.10 [0.002;0.57]	**0.0013**
Definite stent thrombosis- n, (%)	11 (0.8%)	0 (0%)	0.44 [0;2.14]	0.3777
Death (all-cause)– n, (%)	42 (3.0%)	1 (0.5%)	0.16 [0.004;0.95]	**0.0350**

*Events occurring up to the date of the last study visit (≤32 days) † exact if n<5 in one group

Figure 1 Composite MACCE curves in relation to complete and incomplete STR

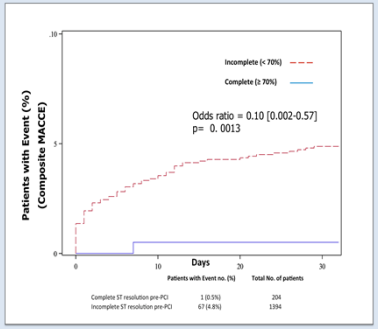
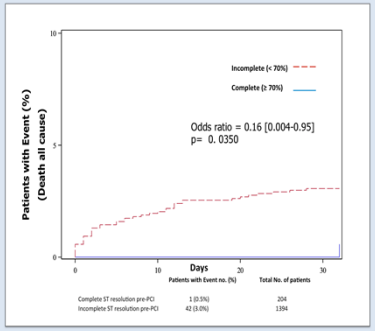


Figure 2 Total mortality curves in relation to complete and incomplete STR



Results (2): Pre-PCI use of aspirin (80.1%), its use in the 24h before index event (29.8%) or any use (98.9%), as well as the use of GP IIb/IIIa inhibitor (3.3%) was not different between complete STR and incomplete STR group; conversely the use of heparin before pre-PCI ECG was more frequent in complete STR group compared with incomplete STR (74% vs 62.4% p=0.0013).

In the multivariate adjusted analysis, independent predictors of complete STR included the Time from Index Event to Pre-H ECG (Mins) (OR=0.94, CI 0.89-1.00, p=0.0346), the Time from Pre-H ECG to Pre-PCI ECG (Mins) (OR=1.09, CI 1.03-1.16, p=0.0051) and use of heparin before pre-PCI ECG (OR = 1.75, CI 1.25-2.45), p=0.0011).

Results (3): In pre-H ticagrelor group, patients with complete STR had a significantly longer delay between Pre-H ECG and Pre-PCI ECG compared to patients without complete STR; conversely this was not observed in the control group (in-hospital ticagrelor) **(Table 2)**

Table 2. Transfer time and STR in in-hospital and pre-hospital ticagrelor groups

Variable	Group	n	Pre-PCI STR	Median [q1;q3]	p-value
Time from pre-H ECG to pre-PCI ECG (min)	In-hospital ticagrelor group	722	Incomplete (<70%)	49 [39;61]	0.2581
		102	Complete (≥70%)	50 [40;67]	
	Pre-hospital ticagrelor group	672	Incomplete (<70%)	49 [38.5;61]	**0.0013**
		102	Complete (≥70%)	53 [44;73]	

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Conclusion: Pre-PCI complete STR represents a valid surrogate marker for cardiovascular clinical outcomes. The delay between symptom onset and diagnosis (first ECG) should be minimized as this time interval was an independent predictor of complete STR. The fact that a longer delay during patient transportation emerged as independent predictor of complete STR suggests that pre-H treatment is effective on outcomes when there is longer transfer time allowing the drug to become biologically active.

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