| 15 | A CLINICAL DECISION TOOL FOR PRESCRIBING ANTI-PLATELET MEDICATION FOR PATIENTS WITH SUSPECTED ACUTE CORONARY SYNDROME (PAM) |

Charles Reynard, Rick Body. *Central Manchester University Hospital NHS Foundation Trust*

Background The benefit of antiplatelet medication in confirmed acute coronary syndrome (ACS) is well established. In the Emergency Department (ED) diagnostic uncertainty may lead to over-treatment, with consequent risks (e.g., bleeding), or under-treatment, compromising clinical outcomes. Clinicians must subjectively balance the anticipated risks and benefits with their perceived probability of ACS in order to decide whether to prescribe these medications. We aimed to construct a clinical model to optimise and personalise recommendations for anti-platelet prescription in this context.

Methods In stage 1 we conducted three full systematic reviews, which were registered with PROSPERO and conducted according to PRISMA guidelines. We searched MEDLINE, EMBASE and Cochrane to quantify the risks and benefits of ticagrelor, clopidogrel and nothing/placebo in comparison with aspirin alone. We extracted data for (a) the outcomes of cardiovascular death, acute myocardial infarction, stroke and major bleeding at 30 days and 12 months; and (b) weighted patient preferences (utilities) for each outcome or health state.

In stage 2, we used those data to construct a probabilistic model that calculated the probability of each relevant outcome for patients with and without ACS. We assigned the patient-centred utilities identified to each clinical outcome, and calculated the net expected utility for each treatment strategy. Using that model, we calculated the probability of each outcome under conditions of diagnostic uncertainty. We then identified the threshold probability of ACS at which each treatment option became superior. Finally, we ran sensitivity analyses using both one-at-a-time (OATS) and Monte Carlo simulation with 10 000 cases.

Results Systematic review identified three relevant original studies, and three sub-studies. After extracting data, we constructed two separate models, based on clinical outcomes after 30 days and 12 months. Aspirin alone led to greater net utility at probabilities below 7.4%, whereas treatment with ticagrelor led to greater net benefit when the probability of ACS exceeded 8.3% (figures 1 and 2). Sensitivity analyses including 10,000-fold Monte Carlo simulations demonstrated that the models were robust to a wide range of assumptions (figure 3).

Conclusion This work suggests that treatment with ticagrelor yields greater net benefit for patients when the probability of ACS exceeds 8.3%. This has potential to improve clinical outcomes when used alongside a prediction model, such as the Manchester Acute Coronary Syndromes (MACS) decision aid, which calculates each patient's individual probability of ACS. The clinical and cost effectiveness of this novel 'precision Emergency Medicine' approach should now be evaluated in clinical studies.

	Threshold for the probability of ACS at which the net expected utility is superior	
	30-day outcomes	12-month outcomes
Aspirin alone	< 8.18%	< 7.36%
Clopidogrel	8.18 - 8.34%	7.36 – 7.78%
Ticagrelor	> 8.34%	> 7.78%

Figure 1 Acute coronary syndrome risk thresholds of treatment strategy superiority. (Clopidogrel and ticagrelor treatment strategies included the use of aspirin at ACS treatment)
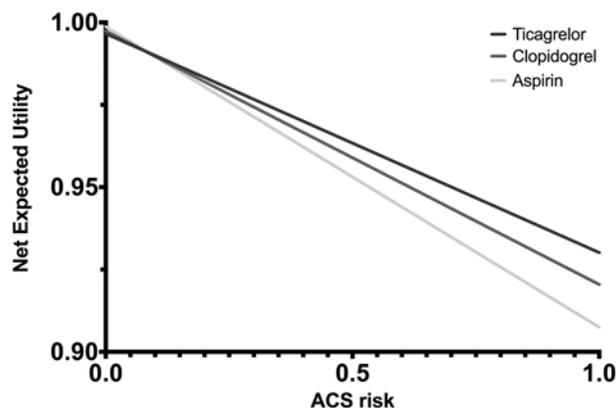

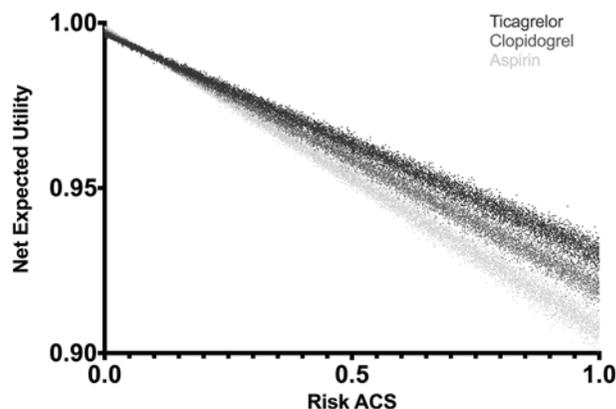**Figure 2** Net expected utility of anti-platelet therapy in 12 months combined outcome model

Figure 3 A monte carlo simulation (n=10,000) – net expected utility of anti-platelet therapy in 12 month combined outcome model – varying risk and utility outcomes