Supplementary data

Supplementary Table 1. Incidence of coronary artery perforation in each centre.

Center 1	9.3%
Center 2	8.9%
Center 3	8.6%
Center 4	7.2%
Center 5	5.8%
Center 6	5.3%
Center 7	4.6%
Center 8	4.4%
Center 9	4.3%
Center 10	4.1%
Center 11	3.7%
Center 12, 13	3.6%
Center 14	3.1%
Center 15	3.0%
Center 16	2.6%
Center 17, 18	2.5%
Center 19	2.4%
Center 20	2.3%
Center 21, 22	2.1%
Center 23	1.8%

Center 24	1.7%
Center 25	1.6%
Center 26	1.5%
Center 27, 28	1.4%
Center 29, 30	1.2%
Center 31, 32	1.0%
Center 33	0.7%
Center 34	0.5%
Center 35, 36, 37, 38	0%

Supplementary Table 2. A calculator incorporating the variables in the final prediction model.

Variables	**Logistic regression beta coefficients**				
Age	0.0331748				
Moderate-severe calcification (Y/N)	0.5653086	Yes	0.565309	No	0
Crossing strategy (1 for ADR, 2-if retrograde is used)					
1	0.8438278	Yes	0.843828	No	0
2	1.375603	Yes	1.375603	No	0
Constant	-6.814339				
Stump (Blunt/No)					
0		0			
1		0.373537			

ADR = antegrade dissection and re-entry.

Supplementary Table 3. Perforation type according to the crossing strategy that caused the perforation.

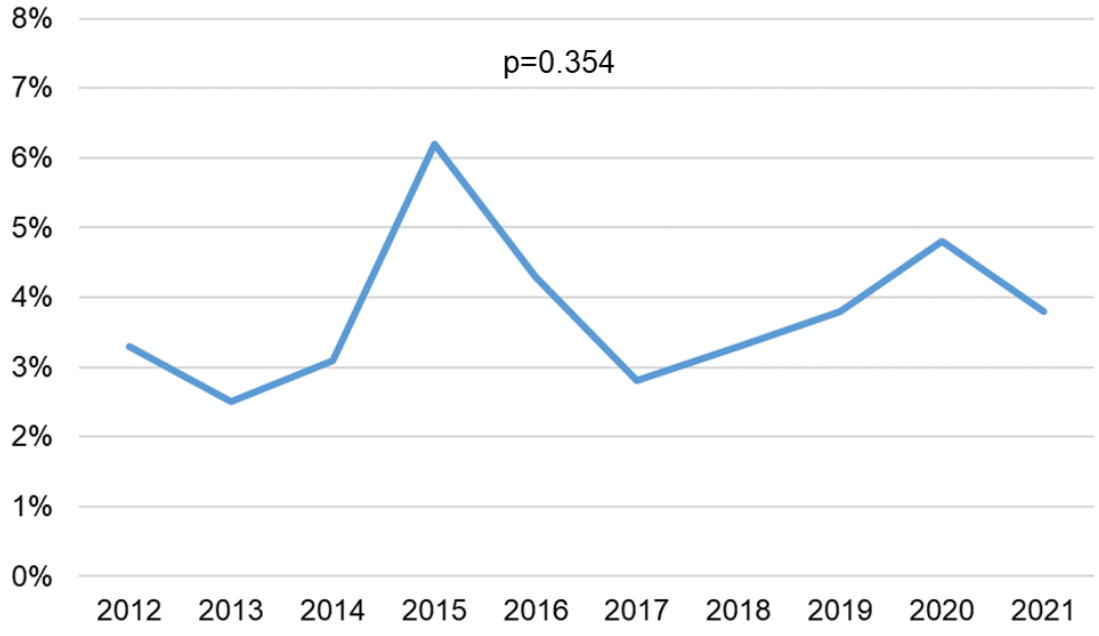
	AWE (n=133)	ADR (n=46)	Retrograde (n=118)
Large vessel, n (%)	62 (50)	31 (72)	41 (35)
Distal vessel, n (%)	61 (50)	12 (28)	11 (9)
Septal collateral, n (%)	0	0	26 (22)
Epicardial collateral, n (%)	0	0	40 (34)

AWE = antegrade wire escalation; ADR = antegrade dissection and re-entry.

Supplementary Table 4. Simulated patient: an 80-year-old patient, moderate-severe calcification, tapered stump, retrograde strategy (9.8% perforation risk).

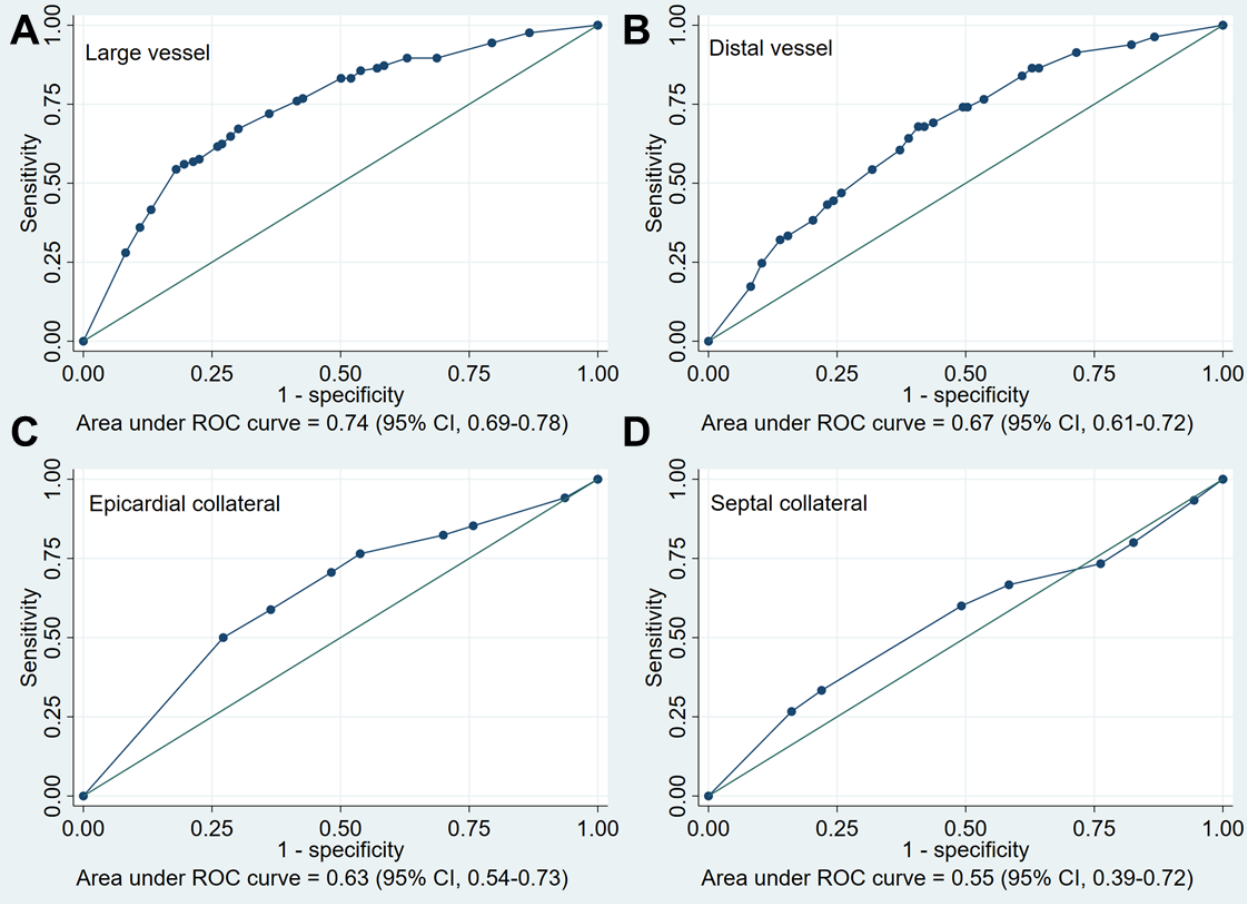
Clinical perforation % risk calculator	
Age (continuous)	80
Crossing strategy (0AWE, 1ADR, 2Retrograde)	2
Mod-sev calcification (no/yes)	yes
Blunt/no stump (0/1)	0
% perforation risk	9.8018

AWE = antegrade wire escalation; ADR = antegrade dissection and re-entry.

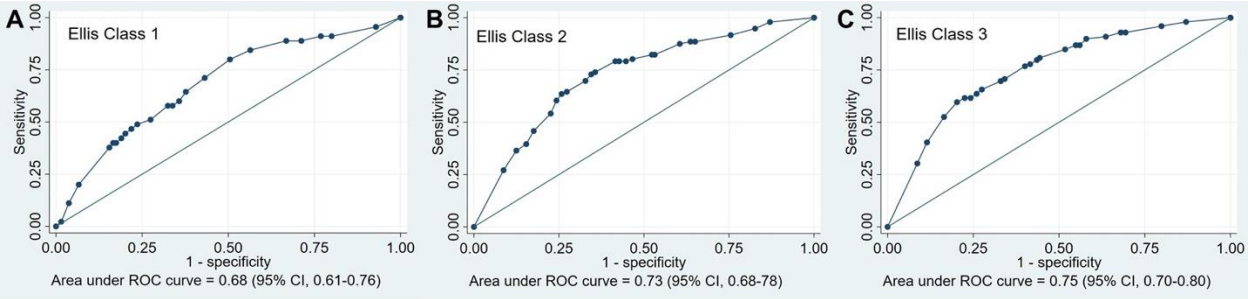


Number of cases	361	393	391	535	895	1213	1384	1838	1455	1153

Supplementary Figure 1. Temporal trend on clinical coronary perforation.



Supplementary Figure 2. Validation of the PROGRESS-CTO perforation score on the different types of clinical perforations.



Supplementary Figure 3. Validation of the PROGRESS-CTO perforation score on perforation severity (Ellis Class).