Supplemental Table 1: 30 day and 1-year mortality over the study period in those patients with and without coronary perforation.

Variable	2006	2007	2008	2009	2010	2011	2012	2013	P-value
30-day mortality for patients with perforation	12/136 (8.82, 4.05-13.59%)	19/165 (11.52, 6.65-16.39%)	16/201 (7.96, 4.22-11.70%)	15/218 (6.88, 3.52-10.24%)	28/244 (11.48, 7.48-15.48%)	21/243 (8.64, 5.11-12.17%)	42/271 (15.5, 11.19-19.81%)	32/258 (12.4, 8.38-16.42%)	0.049
30-day mortality for patients without perforation	663/46083 (1.44, 1.33-1.55%)	829/54362 (1.52, 1.42-1.62%)	1015/61881 (1.64, 1.54-1.74%)	1230/64630 (1.90, 1.79-2.01%)	1395/67835 (2.06, 1.95-2.17%)	1676/70699 (2.37, 2.26-2.48%)	1901/74655 (2.55, 2.44-2.66%)	1877/74158 (2.53, 2.42-2.64%)	<0.001
1-year mortality for patients with perforation	16/136 (11.76, 6.35-17.17%)	26/164 (15.85, 10.26-21.44%)	19/200 (9.50, 5.44-13.56%)	25/218 (11.47, 7.24-15.70%)	41/244 (16.80, 12.11-21.49%)	24/243 (9.88, 6.13-13.63%)	52/269 (19.33, 14.61-24.05%)	41/148 (27.70, 20.49-34.91%)	<0.001
1-year mortality for patients without perforation	1787/46070 (3.88, 3.70-4.06%)	2124/54257 (3.91, 3.75-4.07%)	2574/61695 (4.17, 4.01-4.33%)	3022/64586 (4.68, 4.52-4.84%)	3176/67732 (4.69, 4.53-4.85%)	3766/70619 (5.33, 5.16-5.50%)	4,112/74114 (5.55, 5.39-5.71%)	3,924/43181 (9.09, 8.82-9.36%)	<0.001

Supplementary Table 2: Exploration of how significant predictors of coronary perforation complication changes over time

Variable	2006	2007	2008	2009	2010	2011	2012	2013	P-value
Age (95%CI)	64.08 (63.98-64.18)	64.19 (64.09-64.28)	64.47 (64.38-64.56)	64.92 (64.84-65.01)	64.91 (64.82-65.00)	65.24 (65.16-65.33)	65.07 (64.98-65.16)	65.03 (64.94-65.11)	<0.001
Male gender (95%CI)	34842/47143 (73.91, 73.51-74.31%)	41062/55475 (74.02, 73.66-74.38%)	46589/63061 (73.88, 73.54-74.22%)	48937/66106 (74.03, 73.70-74.36%)	51015/68933 (74.01, 73.68-74.34%)	53443/72274 (73.94, 73.62-74.26%)	56374/76364 (73.82, 73.51-74.13%)	57615/77765 (74.09, 73.78-74.40%)	0.958
Hypercholestolaemia (95%CI)	20046/42883 (46.75, 46.28-47.22%)	29965/53512 (56.00, 55.58-56.42%)	33090/61168 (54.10, 53.71-54.49%)	38345/64879 (59.10, 58.72-59.48%)	38946/67631 (57.59, 57.22-57.96%)	38533/70281 (54.83, 54.46-55.20%)	40085/74395 (53.88, 53.52-54.24%)	40467/74925 (54.01, 53.65-54.37%)	<0.001
Diabetes (95%CI)	6910/39744 (17.39, 17.02-17.76%)	9619/52904 (18.18, 17.85-18.51%)	11310/60954 (18.55, 18.24-18.86%)	12001/64727 (18.54, 17.24-18.84%)	12815/66889 (19.16, 18.86-19.46%)	13664/70078 (19.50, 19.21-19.79%)	15013/72533 (20.70, 20.41-20.99%)	15919/74203 (21.45, 21.15-21.75%)	<0.001
Previous CABG (95%CI)	2633/28191 (9.34, 9.00-9.68%)	3406/38336 (8.88, 8.60-9.16%)	3904/46983 (8.31, 8.06-8.56%)	4053/48308 (8.39, 8.14-8.64%)	4316/53251 (8.11, 7.88-8.34%)	4349/56122 (7.75, 7.53-7.97%)	4578/57875 (7.91, 7.69-8.13%)	4512/57437 (7.86, 7.64-8.08)	<0.001
Shock (95%CI)	468/40046 (1.17, 1.06-1.28%)	748/50998 (1.47, 1.37-1.57%)	903/58847 (1.53, 1,43-1.63%)	1149/61719 (1.86, 1.75-1.97%)	1453/64722 (2.24, 2.13-2.35%)	1722/67941 (2.53, 2.41-2.65%)	1850/72490 (2.55, 2.44-2.66)	2310/73761 (3.13, 3.00-3.26%)	<0.001
Circulatory support (95%CI)	634/39744 (1.60, 1.48-1.72%)	955/50927 (1.88, 1.76-2.00%)	1080/59227 (1.82, 1.71-1.93%)	1259/62393 (2.02, 1.91-2.13%)	1435/65585 (2.19, 2.08-2.30%)	1609/70244 (2.29, 2.18-2.40%)	1618/74424 (2.17, 2.07-2.27%)	1621/74893 (2.16, 2.06-2.26%)	<0.001
Left main stem PCI (95%CI)	1221/42268 (2.89, 2.73-3.05%)	1452/53043 (2.74, 2.60-2.88%)	1681/60781 (2.77, 2.64-2.90%)	2053/64405 (3.19, 3.05-3.33%)	2124/66448 (3.20, 3.07-3.33%)	2508/70537 (3.56, 3.42-3.70%)	2863/74548 (3.84, 3.70-3.98%)	3707/75027 (4.94, 4.78-5.10%)	<0.001
Chronic occlusions (95%CI)	2421/42026 (5.76, 5.54-5.98%)	3044/53949 (5.64, 5.45-5.83%)	3439/61732 (5.57, 5.39-5.75%)	3461/63941 (5.41, 5.23-5.59%)	3306/66588 (4.96, 4.80-5.12%)	3353/69965 (4.79, 4.63-4.95%)	3309/74161 (4.46, 4.31-4.61%)	3225/75637 (4.26, 4.12-4.40%)	<0.001
Rotational atherectomy (95%CI)	326/42424 (0.77, 0.69-0.85%)	474/52657 (0.90, 0.82-0.98%)	780/60031 (1.30, 1.21-1.39%)	879/63352 (1.39, 1.30-1.48%)	1055/65529 (1.61, 1.51-1.71%)	1275/69350 (1.84, 1.74-1.94%)	1621/73280 (2.21, 2.10-2.32%)	1740/74529 (2.33, 2.22-2.44%)	<0.001
Cutting balloon (95%CI)	338/42424 (0.80, 0.72-0.88%)	443/52657 (0.84, 0.76-0.92%)	2591/60031 (4.32, 4.16-4.48%)	2695/63352 (4.25, 4.09-4.41%)	2489/65529 (3.80, 3.65-3.95%)	2619/69350 (3.78, 3.64-3.92%)	2803/73280 (3.83, 3.69-3.97%)	3071/74529 (4.12, 3.98-4.26%)	<0.001
NSTEMI indication (95%CI)	16141/45528 (35.45, 35.01-35.89%)	21275/54427 (39.09, 38.68-39.50%)	22784/62134 (36.67, 36.29-37.05%)	24595/65661 (37.46, 37.09-37.83%)	25424/68486 (37.12, 36.76-37.48%)	26243/71837 (36.53, 36.18-36.88%)	27365/75838 (36.08, 35.74-36.42%)	28842/77219 (37.35, 37.01-37.69%)	<0.001

95% Confidence intervals calculated from http:www.mccallum-layton.co.uk/tools/statistic-calculators/confidence-interval-for-proportions-calculator/

Supplemental Table 3: Propensity score matching analysis on 10 imputed datasets, reporting average treatment effects (ATE).

Analysis of propensity score matching with ATE	N	Coefficient	95% CI		p-value
In-hospital MACE	341,143	0.2054	0.1507	0.2601	<0.001
30 day mortality	346,808	0.0654	0.0330	0.0979	<0.001
1 year mortality	294,424	0.0596	0.0202	0.0990	0.003
5 year mortality	97,742	0.0503	-0.0320	0.1326	0.229
In-hospital re-infarction	352,822	0.0484	0.0247	0.0721	<0.001
In-hospital emergency CABG	352,822	0.0085	-0.0014	0.0185	0.091
In-hospital cardiac tamponade	352,822	0.1248	0.0910	0.1587	<0.001
In-hospital stroke	341,143	0.0056	-0.0039	0.0150	0.245
In-hospital bleed	352,822	0.1240	0.0894	0.1584	<0.001

Supplementary Table 4: Balance diagnostics for propensity model

Propensity model	Group	Mean (SD)	Median (IQR)
Perforation vs. no perforation	Case	0.9969 (0.0037)	0.9978 (0.9966, 0.9985)
	Control	0.9969 (0.0037)	0.9978 (0.9966, 0.9985)
	Abs(Case-Control)	$9.1*10^{-6}$ (0.00028)	$2.4*10^{-6}$ ($9.5*10^{-7}$, $5.5*10^{-6}$)

Supplementary Table 5: Adjusted odds of adverse outcomes by coronary perforation status with and without adjustments for center volume

Adverse outcome	Multiple logistic regression adjusted odds ratio without center volume variable (95% CI)	p-value	Multiple logistic regression adjusted odds ratio with center volume variable (95% CI)	p-value
In-hospital MACCE	16.14 (13.73-18.98)	<0.001	16.49 (14.02-19.39)	<0.001
30-day mortality	5.54 (4.40-6.97)	<0.001	5.57 (4.42-7.03)	<0.001
1-year mortality	2.72 (2.24-3.30)	<0.001	2.73 (2.24-3.31)	<0.001
5-year mortality	1.42 (1.08-1.86)	0.011	1.42 (1.09-1.86)	0.010
In-hospital re-infarction	6.84 (5.26-8.89)	<0.001	7.30 (5.61-9.50)	<0.001
In-hospital emergency CABG	6.87 (4.38-10.77)	<0.001	6.91 (4.42-10.81)	<0.001
In-hospital cardiac tamponade	234.13 (181.36-302.27)	<0.001	239.90 (186.14-309.19)	<0.001
In-hospital stroke	5.32 (3.01-9.38)	<0.001	5.48 (3.10-9.67)	<0.001
In-hospital bleed	22.98 (19.04-27.73)	<0.001	24.59 (20.34-29.73)	<0.001

Adjusted for age, gender, smoking status, body mass index, family history of coronary artery disease, hypercholesterolaemia, hypertension, diabetes, previous myocardial infarction, previous stroke, peripheral vascular disease, valvular heart disease, renal disease, previous PCI, previous CABG, left ventricular function, cardiogenic shock, ventilator use, circulatory support, antiplatelet therapy, warfarin, glycoprotein IIb/IIIa inhibitor, bivalirudin use, radial access, surgical cover, year, vessel of PCI, chronic occlusion, rotational atherectomy, laser angioplasty, cutting balloon and diagnosis.