

# Rapport d'activité 2010 : Collège de cardiologie section cardiologie interventionnelle

---

## Outcome of contemporary PCI in the elderly :

*Insights from the BWGIC registry.*

Report presented by Prof Victor Legrand

### INTRODUCTION

The elderly are the most rapidly growing segment of the population in the western world. Coronary artery disease prevalence increases with age and coronary revascularization is more and more often performed in elderly. Prior studies have demonstrated a 2-4 fold higher risk of mortality and major complications in elderly patients undergoing PCI. Clinical and angiographic characteristics of patients undergoing PCI are also influenced by age.

The goal of this report is twofold:

1. Assess the impact of age on patient's characteristics and outcomes in a large cohort of patients undergoing PCI in Belgium.
2. Evaluate whether indications, procedural techniques and outcomes have changed from 2006 to 2010.

### METHODS

The study cohort included patients undergoing PCI from January 2006 to December 2010.

Briefly, a web based standardized case record form needs to be completed to allow reimbursement of PCI material. This allows collection of clinical data in all patients undergoing PCI at the 36 Belgian hospitals performing coronary interventions. Baseline data include clinical, demographic, procedural and angiographic characteristics as well as in-hospital outcomes.

Data were compared by dividing the population of each calendar year by quintiles of equal number of patients:

To address the impact of age, inter quintile data of 2010 were compared, and to assess evolution over time data of the last quintile of 2006 to 2010 were assessed.

The primary end-point was in-hospital death. Other endpoints included need for CABG, stroke, major bleeding complications defined as any transfusion related to a procedural related bleeding, cerebrovascular bleeding, retroperitoneal and systemic hemorrhage. Vascular complications, procedural MI, stent thrombosis and need for dialysis were also assessed.

#### Statistical analysis:

Continuous data were expressed as mean $\pm$  SD, and discrete variables were expressed as frequency counts and percentages. The differences between groups were evaluated by the chi square test. Trends were evaluated by ANOVA comparison.

## RESULTS

### Baseline Demographics

24239 percutaneous coronary interventions were performed in 2010. This population was divided in five groups of equal number of patients ranked by increasing age at time of intervention.

Mean age, standard deviation and ranges of each quintile (Q) are respectively:

	n	Mean age	SD	min	max
Q1	4845	49,2	29,7	13,7	55,7
Q2	4846	59,9	5,6	55,7	63,6
Q3	4845	67,2	5,3	63,6	71,1
Q4	4846	74,5	4,8	71,1	77,9
Q5	4846	82,5	22,6	77,9	109,9

Characteristics of patients treated in 2010 according to age quintiles are given on Table 1.

Table 1: Demographic data

	Q1	Q2	Q3	Q4	Q5
N	4845	4846	4845	4846	4846
Male(%)	83,26	79,84	75,64	67,48	57,72
Height (kg)	167,8	164,8	163,7	162,0	160,2
Weight (cm)	83,3	81,2	79,0	74,9	70,8
Hy of previous AP(%)	4,89	6,52	8,19	8,71	8,85
Hy of previous MI(%)	14,10	14,82	14,18	15,60	15,89
Previous PCI(%)	23,53	27,69	28,67	29,69	26,66
Previous CABG(%)	3,12	6,36	9,06	13,35	13,19

Hy of stroke(%)	1,14	2,04	3,53	4,58	5,28
Hy of PVD(%)	3,38	6,29	9,54	10,75	12,15
Hy of heart failure(%)	0,64	1,18	2,27	3,57	4,75
Hy of renal failure(%)	1,14	1,16	2,79	4,73	7,45
Hy of valvular disease(%)	0,45	1,03	1,71	3,49	5,47
Current Smoker(%)	47,18	31,47	19,88	10,57	6,27
Former Smoker(%)	20,66	26,99	30,65	30,35	24,56
Diabetes w Insulin(%)	3,90	5,12	6,85	5,65	4,79
Diabetes w drugs(%)	10,79	16,28	18,86	19,91	16,22
Hypertension(%)	43,65	57,49	61,07	64,22	66,98
Hypercholesterolemia(%)	56,59	63,78	64,17	63,89	57,33

Older patients were more often female, less often overweight. Prevalence of previous angina, CABG, stroke, peripheral vascular disease, heart failure, renal failure and of valvular disease increases gradually with age. Coronary risk factors also differ between quintiles: Active smoking decreasing dramatically from the first to the last quintile, while hypertension is increasing with age.

Indications for PCI and angiographic characteristics are given on Table 2. Youngest patients are those with the highest prevalence of primary PCI, while PCI's for non STEMI, unstable angina or stabilized acute coronary syndrome are more often performed in the oldest group. Oldest patients present more often with cardiogenic shock at time of PCI. Patients of the fifth quintile also have a poorer left ventricular function and triple vessel disease.

	Q1	Q2	Q3	Q4	Q5
N	4845	4846	4845	4846	4846
PPCI(+facil/resc)(%)	27,62	17,62	13,07	11,27	13,83
nonSTEMI/UAP(%)	13,11	12,61	12,30	13,17	14,88
stable ACS(%)	16,64	15,62	15,71	16,65	20,20
stableAP(%)	39,40	50,78	55,34	54,83	47,03
Cardiogenic shock(%)	1,59	1,16	1,22	1,69	2,64
Resuscitation(%)	1,78	0,89	1,01	1,18	1,26
Haemodynamic support(%)	0,78	0,60	0,78	0,89	1,34
LVEF<40%(%)	8,53	8,97	9,33	9,68	15,93
npts without LVEF(%)	70,86	73,09	72,49	70,18	66,84
1VD(%)	58,86	52,60	48,63	45,83	38,46
2VD(%)	28,01	29,32	29,56	27,40	30,35
3VD(%)	11,06	15,89	19,40	23,32	27,16

### Acute results

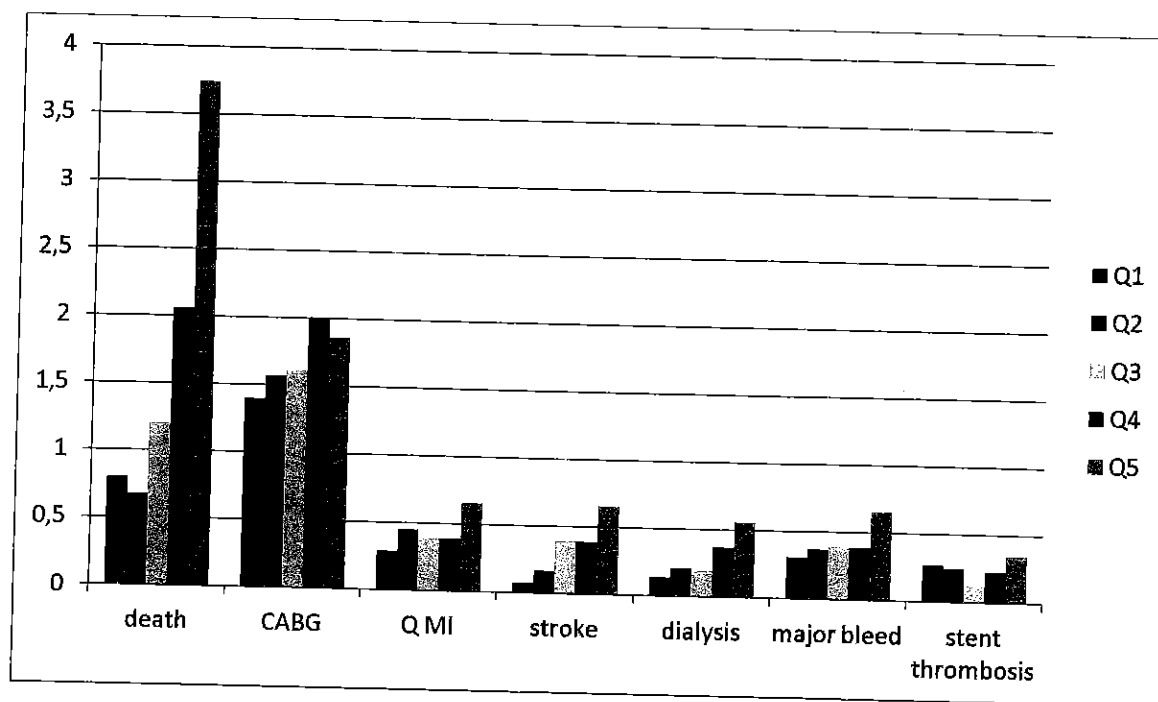
The procedure is performed more frequently by radial access in the youngest patients. Similarly, closure devices are more often used in the younger subjects. The mean use of balloon and BMS per procedure increases with age, while the use of DES is the lowest in the oldest quintile. The number of treated vessel per procedure is increasing with age as well as the number of intervention on SVG.

A dramatic increase in vascular complications is noted in the oldest patients as compare to their younger counterparts (Table 3)

	Q1	Q2	Q3	Q4	Q5
N	4845	4846	4845	4846	4846
ad hoc PCI(%)	73,77	69,48	66,58	63,58	64,61
Staged PCI(%)	7,70	6,91	7,35	6,87	6,21
femoral access(%)	68,21	68,32	70,59	71,32	71,79
radial access(%)	28,40	26,78	24,25	23,32	22,66
closure device(%)	38,02	37,87	34,94	34,32	32,71
N balloons	0,81	0,92	1,03	1,10	1,16
N BMS	0,82	0,79	0,75	0,75	0,85
N DES	0,42	0,48	0,53	0,53	0,41
1VxPCI(%)	91,87	90,34	87,20	85,89	82,73
2VxPCI(%)	5,57	5,45	6,38	6,07	7,43
3VxPCI(%)	0,10	0,29	0,10	0,21	0,27
LMPCI(%)	1,16	1,57	2,62	2,77	4,23
SVGPCI(%)	0,80	1,73	2,83	4,17	4,75
vascular complications(%)	0,68	0,74	0,68	0,74	1,30

### In Hospital outcomes

In-hospital mortality, unplanned dialysis, stroke, major bleeding and Q wave MI increase gradually with age, and oldest patients are also those with the highest incidence of acute stent thrombosis (figure 1)



### Trends from 2006 to 2010

Between January 2006 and December 2010, 126392 percutaneous interventions have been performed in 36 heart centers in Belgium (16 centers in Flanders, 8 centers in Brussels area and 12 centers in Wallonia). The number of procedures per year decreased gradually over this period: 25642 PCI's were performed in 2006, 25003 in 2007, 25061 in 2008, 24737 in 2009 and 24239 in 2010.

Data of the oldest quintile of each year from 2006 to 2010 are compared

	n	Mean age	SD	min	max
2006	5128	80,9	14,1	76,5	96,4
2007	5000	81,5	20,5	77,0	106,0
2008	5013	81,7	20,0	77,1	105,4
2009	4947	82,1	21,2	77,5	107,5
2010	4846	82,5	22,6	77,9	109,9

Over the five year period, mean age of the fifth quintile increased gradually from 80,9 to 82,5 years.

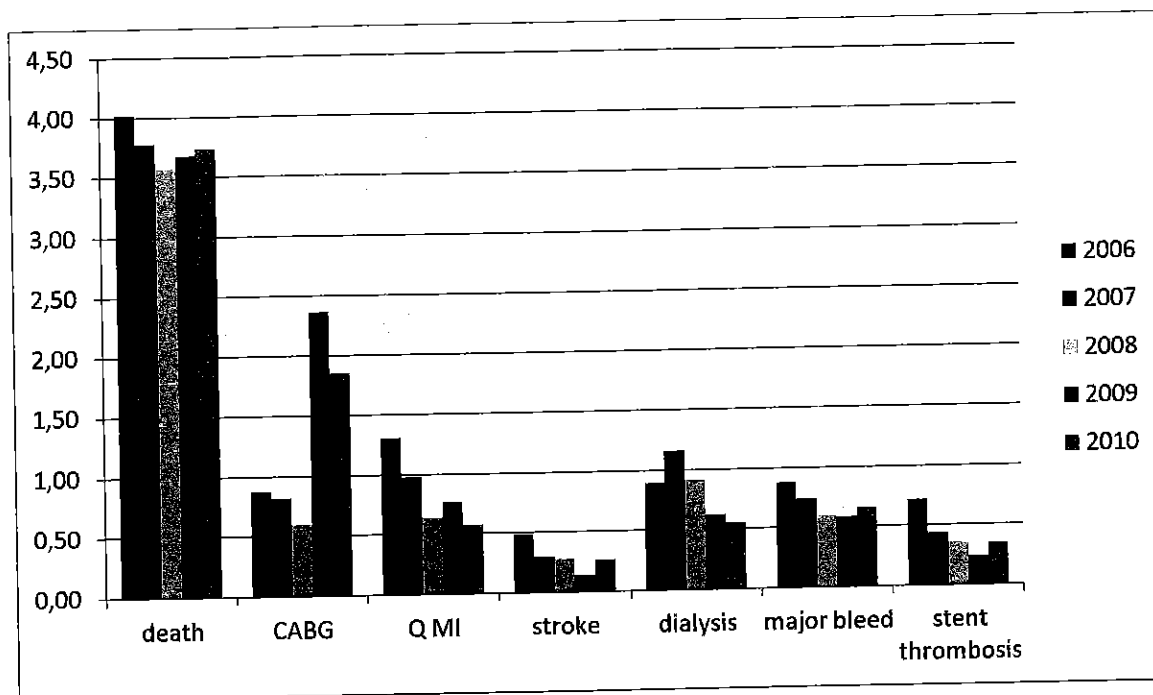
Although the oldest segment of the PCI population is getting older and older, demographic characteristics remained unchanged over time except for a higher prevalence of valvular disease and gradually more patients with hypertension and hypercholesterolemia. No marked changes in indication for PCI were noted over this period. The proportion of patients treated following a cardiac arrest diminished over time, and more patients had a poor left ventricular function. From 2006 to 2010, the percentage of PCI in patients with one vessel disease increased at the expense of patients with three vessel disease.

An important shift to radial access instead of femoral access and a bigger use of closure device was observed. Concomitantly, a significant reduction of vascular complications was noted. Use of stents remained similar, but more balloons were employed to treat these patients. Type of procedure (single or multivessel PCI) didn't change, but fewer bypass graft lesions were dilated from 2006 to 2010. (Table 4)

	2006	2007	2008	2009	2010
N	5128	5000	5013	4947	4846
male	58,89	56,26	57,49	58,26	57,72
Height (kg)	164,8	162,4	160,6	160,1	160,2
Weight (cm)	72,6	72,5	71,0	71,2	70,8
Hy of previous AP	0,06	2,96	9,67	8,85	8,85
Hy of previous MI	19,73	17,78	16,84	17,95	15,89
Previous PCI	28,92	28,86	29,86	27,53	26,66
Previous CABG	14,96	14,22	15,68	13,73	13,19
Hy of stroke	4,64	5,16	5,82	5,03	5,28
Hy of PVD	9,96	10,06	12,25	11,68	12,15
Hy of heart failure	3,72	3,90	4,39	3,64	4,75

Hy of renal failure	5,42	6,42	7,46	7,42	7,45
Hy of valvular disease	3,88	4,70	4,47	5,34	5,47
Current Smoker	7,02	6,88	6,60	5,58	6,27
Former Smoker	25,35	24,48	23,42	26,12	24,56
Diabetes w Insulin	4,74	5,30	5,53	4,65	4,79
Diabetes w drugs	16,01	15,78	15,88	17,02	16,22
Hypertension	60,41	62,36	64,27	65,51	66,98
Hypercholesterolemia	51,35	53,24	54,78	58,12	57,33
PPCI(+facil/resc)	12,03	14,64	12,93	13,85	13,83
nonSTEMI/UAP	15,95	15,62	14,18	13,52	14,88
stable ACS	23,26	20,04	21,26	19,55	20,20
stableAP	45,73	47,26	48,02	49,59	47,03
Cardiogenic shock	3,30	3,02	2,21	2,69	2,64
Resuscitation	2,11	1,88	1,44	1,62	1,26
Haemodynamic support	2,03	1,52	1,10	1,25	1,34
LVEF<40%	12,93	13,92	14,40	14,33	15,93
npts w LVEF	75,25	71,82	67,58	70,51	66,84
1VD	34,28	34,76	35,23	38,33	38,46
2VD	31,49	31,60	31,00	30,10	30,35
3VD	31,36	30,62	30,36	28,24	27,16
ad hoc PCI	64,63	69,68	66,67	63,90	64,61
Staged PCI	6,51	5,72	6,74	6,57	6,21
femoral access	85,12	82,44	78,97	79,06	71,79
radial access	7,02	9,36	12,79	17,40	22,66
closure device	7,78	15,56	31,92	33,31	32,71
N balloons	1,04	1,04	1,08	1,15	1,16
N BMS	0,98	0,92	0,89	0,91	0,85
N DES	0,51	0,38	0,35	0,37	0,41
1VxPCI	81,96	83,86	83,36	83,38	82,73
2VxPCI	7,55	6,56	6,30	7,40	7,43
3VxPCI	0,35	0,12	0,26	0,20	0,27
LMPCI	3,53	3,14	3,75	3,88	4,23
SVGPCI	6,18	5,94	5,84	4,95	4,75
vascular complications	1,93	1,56	1,62	1,17	1,30

In-hospital complications are depicted on figure 2. Overall, mortality was unchanged and a trend toward fewer Q wave MI and acute stent thrombosis was noted.



## CONCLUSIONS

The elderly account for a large and growing proportion of patients undergoing PCI. This population has shown to have an increased incidence of PCI induced complications.

It is well recognized that the population of elderly patients undergoing PCI is characterized by a larger proportion of female and lean persons. These patients are more often hypertensive but less often smokers. They also have a past medical history with more cardiovascular events and interventions.

This population is also characterized by a more advanced coronary disease (more multivessel disease) and a poorer left ventricular function.

Although the rate of primary PCI is lower in this age group as compare to their younger counterparts, PCI for unstable coronary syndrome (stabilized or not) is higher than in the rest of the population

The current report offers a contemporary view of current practice and complication rates from 2006 to 2010. In-hospital mortality is less than 0,7% for patients below 63,6 years, it rises gradually among older age groups and reaches 3,6 % in the group of patients older than 77,9 years. Beside age, these patients present with more vascular and cardiac co-morbidities which account for. Similarly, the rate of stroke, dialysis, major bleeding and vascular complications are also age-related. The rate of unplanned or urgent CABG increases with age up to the fourth quintile. The overall rate of acute stent thrombosis and Q wave MI post PCI doesn't seem correlated with age.

Evolution over these past 5 years is characterized by a sharp reduction in the number of reported vascular complications. A favorable trend was also observed for stroke, acute stent thrombosis Q wave MI post PCI, major bleeding complication and need for dialysis. In-hospital mortality, however, was not significantly reduced. Use of vascular closure devices and radial access for catheterization may have play a role in reducing the rate of observed vascular complications. Better anticoagulant and antiplatelet management could have influenced favorably other complications such as stent

thrombosis, stroke or q wave MI. Interestingly, there were no major shift in PCI practice regarding use of BMS or DES during this 5 years period. Use of balloon angioplasty increased gradually during this period which could indicate either a better vessel dilation prior stenting or a more frequent use balloon dilation post stenting.

### **Limitations**

The limitations of this study are similar to other multicenter registries in that it offers observational data on selected patients undergoing PCI, with no verification of source documents, however. Specifically, this may lead to underestimation of the complications and clinical events who occurred following PCI.