A Comparison of Outcomes between Percutaneous Coronary Intervention versus Coronary Artery Bypass Surgery in Octogenarian Patients

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Background: *Percutaneous Coronary Intervention (PCI) is emerging as new revascularization procedure for coronary artery disease patients. The octogenarians are the most fragile and vulnerable age group for any type of revascularization therapy and usually discarded from any randomized trials. There is no consensus in the choice of treatment among octogenarians including PCI and coronary artery bypass grafting (CABG).*
Objective: *To compare PCI and CABG among Thai octogenarians ($\geq$ 80 years old) with coronary artery disease for immediate and 24-month clinical outcomes.*
Material and Method: *Retrospective cohort study was conducted at Siriraj Hospital from January 2005 to December 2007 to obtain a complete 24-month follow-up period after revascularization. From CALYSTO database, a list of all octogenarians was retrieved (n = 333); after cleaning of the data, 265 patients (PCI n = 202, CABG n = 63) were enrolled for the present study. The primary endpoint is defined as a 30-day major adverse cardiac and cerebral event (MACCE). Secondary endpoint is a 24-month major adverse event (MACE).*
Results: *The 30-day MACCE were 11.4% in PCI group vs. 44.4% in CABG group ($p < 0.001$), all cause-mortality was 2.5% in PCI group vs. 8.3% in CABG group (p = 0.05), cardiovascular mortality was 1% vs. 5% (p = 0.046), mortality from sepsis was 1.5% vs. 1.5% (p = 1.0). Recurrent MI was 5.4% vs. 4.8% (p = 0.74). Cerebrovascular event occurred in 0.5% vs. 1.6% (p = 0.10). There was a crossover treatment as 0.5% vs. 0% (p = 1.0). There was no repeat target revascularization at 30-day in both groups. Major vascular complication due to bleeding requiring $\geq$ 5 of pack-red cell transfusion was more common in CABG group (1.5% vs. 31.8%, $p < 0.001$).*

At 24-month follow-up, MACE were 35.2% in PCI group vs. 27.9% in CABG group (p = 0.36), all cause-mortality was 11.3% vs. 27.9% (p = 0.002), cardiovascular mortality was 1.5% vs. 11.5% ($p < 0.001$). Sepsis mortality was 2.5% vs. 11.1% (p = 0.05). MI occurred in 7.4% vs. 6.3% (p = 1.0). Repeat target revascularization was higher in PCI group (20.3% vs. 0%, $p < 0.001$). However, hospital stay was longer in CABG group (4.7 $\pm$ 9 vs. 16.8 $\pm$ 17.4 days, p = 0.01).
Conclusion: *The current revascularization strategy was evaluated. These results reflect our physician selection, patient willingness to undergo the treatment option. Lesser 30-day and 24-month all-caused mortality, cardiovascular mortality, hospital stay was observed in PCI treated octogenarians with a trade off of more frequent repeat target revascularization.*

Keywords: *PCI, Octogenarian, CABG*

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Elderly patients older than 80 years old or octogenarians are increasing in number and contribute to higher medical expenditures in Thai healthcare system. The prevalence of coronary artery disease is estimated as one-third among age over 80 years old; it has more complexity of target lesions and is frequently treated medically. Kappetein et al reported predominant three-vessel disease in this population and it is frequently treated by coronary artery bypass graft surgery[1]. In general, percutaneous coronary intervention is emerging as the preferred revascularization procedure to alleviate angina and reduce death or myocardial infarction[2]. However, PCI is not yet translated to the octogenarian age group, due to lack of evidence from randomized trial and this

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group is always excluded because of its different nature and anatomic features. The octogenarians are more fragile and vulnerable to any type of revascularization therapy. The current evidence for revascularization treatment is from observational studies, predominantly small case series[3]. To date the appropriate method of revascularization has not been determined. A systematic review and meta-analysis from available data indicated that revascularization could be performed in octogenarians with acceptable short-term and long-term outcomes, it was unclear whether octogenarians could obtain greater survival benefit from coronary artery bypass grafting (CABG) or from PCI due to different intervention types and pre-procedural risk profiles[3]. CABG remains the standard revascularization procedure in more complex lesions or in particular patient subsets as diabetes or poor left ventricular function. Serruys et al[5] reported better CABG outcomes in multivessel CAD or left main coronary artery disease compared with PCI in term of less major adverse cardiac and cerebral events. However, survival decreased as age increased and the fate of CABG outcomes has been observed[6]. The perioperative mortality rate was 1.4% for an isolated first coronary bypass procedure, 6.6% for reoperation. Vein graft patency was decreased with time. Internal mammary artery graft is better in term of patency but is of limited use to the octogenarian. However, Feldman et al[7] suggested that elective PCI in the elderly has both favorable outcomes and acceptable short-term mortality in the stent era. Elderly patients, in particular octogenarians undergoing emergency PCI, have a substantially higher risk of in-hospital death[7]. From observation, the elderly were at higher risk regarding renal failure, diabetes, hypertension, impaired left ventricular function and 3-vessel disease. Weimer et al[8] evaluated outcomes after PCI with sirolimus eluting stent implantation in the elderly. In-hospital and 6-month mortality rates were higher. However, there was no difference with respect to the rate of major adverse cardiac events (death, myocardial infarction, ischemia-driven target vessel revascularization) at 6-month follow-up. Panchavinnin, et al showed the low restenosis among patients over 65 years of age who received stent implantation[9]. Elderly patients paradoxically have greater absolute risk reductions associated with surgical or percutaneous revascularization than do younger patients[10]. From meta-analysis that included 13 trials with followed-up to 8 years, CABG was associated with lower five-year mortality, less angina, and fewer revascularization procedures than PCI[11]. There is no data in Thailand comparing CABG versus PCI in octogenarians.

Material and Method

Study population

Data were retrieved from our CALYSTO catheterization database for any PCI done in subjects older than 80 years old for PCI group and from surgical database from Cardiothoracic log book for CABG group. The case record form was structured for the present study, including demographic parameters, indication for revascularization, number of diseased vessels, number of revascularization per vessel, clinical outcomes and status during follow-up. Siriraj PCI registry or operating note and all in- and out-patient charts were also retrieved; all clinical events were reviewed by investigator. Exclusion criteria are those with severe valvular heart disease who underwent valve surgery, patients with life threatened conditions *e.g.* advance malignancy, liver cirrhosis, acute ST-segment elevation myocardial infarction (STEMI) within 7 days. This study was approved by Siriraj Ethics Committee.

Definition

Coronary artery stenosis was defined as any epicardial artery diameter stenosis $\geq$ 70% or $\geq$ 50% of the left main coronary artery. Number of each target vessel was defined as stenosis at epicardial artery and its branch. Complete revascularization was defined as complete treatment at all visualized target vessels. Cardiogenic shock was defined by any treatment with either intravenous inotrope or vasopressor agents and mechanical support with intra-aortic balloon pump to maintain adequate tissue perfusion. Acute renal failure (ARF) was defined as peak creatinine level of $\geq$ 1.5 mg/dl after treatment. Procedure-related myocardial infarction was defined as any new pathological Q waves in $\geq$ 2 electrocardiographic leads or elevation of CK-MB $\geq$ 3 times the upper reference limit in post-PCI or $\geq$ 5 times in post-CABG[12]. Major vascular complication was defined as any occurrence of coronary artery dissection, coronary perforation, arterio-venous fistula, cardiac tamponade, intracranial hemorrhage, retroperitoneal bleeding or TIMI major bleeding-defined as any hemoglobin drop $\geq$ 5 g/dl requiring $\geq$ 5 units of blood component.

Primary end point is defined as 30-day major adverse cardiac and cerebral events (MACCE), includes 1) death from all-cause, 2) recurrent myocardial infarction, 3) target vessel revascularization (TVR), 4) cerebrovascular disorder (cerebral infarction or transient ischemic attack (TIA) and 5) major vascular complication.

Secondary end points are defined as 2-year cumulative events, comprehensive of major adverse cardiac events (MACE) including 1) death from all-cause, 2) myocardial infarction, 3) target vessel revascularization and 4) major vascular complication.

Sample size calculation

Kaul TK et al reported in Angioplasty versus Coronary Artery Bypass in Octogenarians that cardiac event-free survival (deaths, myocardial infarction, repeat target lesion revascularization) at 3 years was 61% after PTCA and 81% after CABG ($p < 0.01$)[13]. Using these figures, the frequency of major adverse events after PCI was 39% and CABG 19%, respectively. The authors null hypothesis was PCI and CABG is not equivalent in term of survival (the difference in proportions, π_T-π_S, is 0.050 or farther from zero in the same direction) in favor of the alternative hypothesis that the proportions in the two groups are equivalent. To calculate for the number of subjects as a two-group large-sample with normal approximation test of proportions with a one-sided 0.050 significance level will have 80% power to reject the error, the sample size in PCI group should be 292 and CABG group should be 92.

Follow-up

Clinical outcomes were collected from in- or out-patient chart at 30-day and 2-year follow-up period. If the patient was attended at another medical facility, phone call were completed in all cases, using a planned simple question such as status of the subject such as alive or dead, repeat revascularization, any heart attack, any vascular event.

Statistical analysis

The clinical analysis consisted of a comparison between the two groups. All continuous variables were expressed as mean $\pm$ SD and were analyzed by Student's t-test. Categorical variables are expressed as number of subjects and percentages, and were analyzed by Chi-square test or Fisher's exact test, as appropriate. Differences were considered statistically significant at $p < 0.05$. The spread of constant characteristics between the two groups was compared using the Mann-Whitney U-test. Time to event was analyzed by Kaplan-Meier survival analysis and compared by Log rank test for univariate analysis. Hazard ratio was analyzed using Cox proportional hazard model. Statistical analysis was performed with SPSS, version 13.0.

Results

From January 2005 to December 2007, 333 octogenarians who received either PCI or CABG at our hospital were retrieved from CALYSTO IV database and surgical registry. After data cleaning, 265 patients with complete data were collected for analysis. Two hundred and two patients received PCI and 63 patients received CABG. Data were compared between PCI-group and CABG-group (Table 1, 2). Patients mean age was similar between the two groups. Female gender and stable angina status was more frequent in PCI group. History with prior congestive heart failure, myocardial infarction, acute coronary syndrome, number of disease vessel, presence of total occlusion, and complete revascularization were higher in CABG

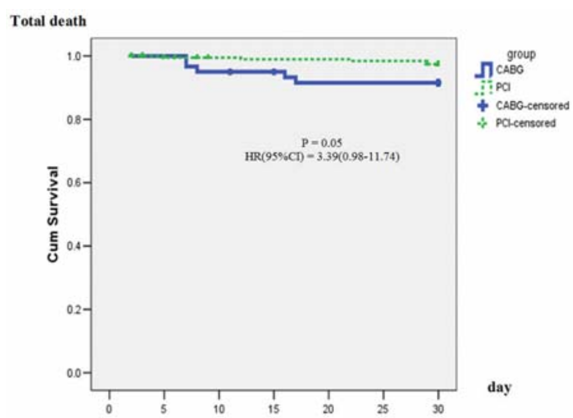

Fig. 1 Kaplan-Meier Curve for primary outcome all cause-mortality 30 days

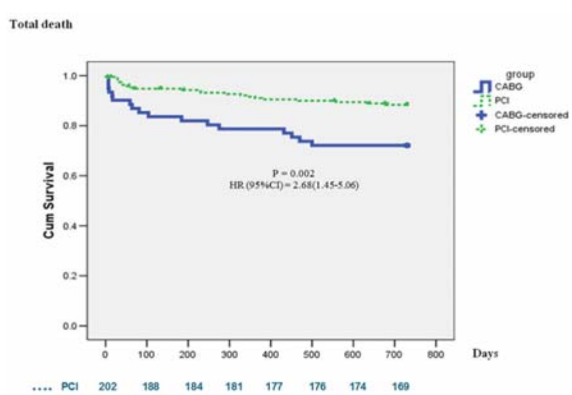

Fig. 2 Kaplan-Meier Curve for secondary outcome all cause-mortality 24 months

Table 1. Demographic data

	PCI (n = 202)	CABG (n = 63)	p-value
Age (mean $\pm$ SD) (years)	83.3 $\pm$ 3.0	82.7 $\pm$ 4.7	1.00
BMI (mean $\pm$ SD) (kg/m^2)	23.3 $\pm$ 3.9	22.3 $\pm$ 3.4	1.00
Female gender (%)	108 (53)	34 (38.1)	0.04
Past medical history (%)			
Family history of CAD	11 (5.4)	2 (3.2)	0.71
Prior CHF	68 (33.7)	32 (50.8)	0.01
Hypertension	181 (89.6)	57 (90.5)	0.81
Diabetes	87 (43.1)	29 (46)	0.77
Hyperlipidemia	153 (75.7)	47 (74.6)	1.00
History smoking	53 (26.2)	22 (34.9)	0.21
History stroke	15 (7.4)	5 (7.9)	1.00
Chronic obstructive pulmonary disease	12 (5.9)	4 (6.3)	1.00
Peripheral arterial disease	25 (12.4)	5 (7.9)	0.47
Chronic kidney disease (Cr $\geq$1.5 mg/dl)	52 (25.7)	12 (20.6)	0.49
Prior myocardial infarction	75 (37.1)	33 (52.4)	0.04
Anterior wall	40 (19.8)	10 (15.9)	0.58
Inferior wall	22 (10.9)	6 (9)	0.81
Presentation (%)			
Elective	153 (76.1)	43 (68.3)	0.27
Urgent	44 (21.9)	20 (31.7)	0.15
Emergency	4 (2.0)	0	0.49
Acute coronary syndrome	125 (61.9)	48 (76.2)	0.04
Stable CAD	66 (32.7)	9 (14.3)	0.002
STEMI > 7 days	11 (5.4)	6 (9.5)	0.28
LVEF estimation (mean $\pm$ SD) (%)	61.2 $\pm$ 16.9	48.2 $\pm$ 16.7	0.08
LVEF < 35%	50 (24.5)	17 (27)	0.87
LVEF = 35-50%	26 (13)	19 (30.1)	0.005
LVEF > 50%	125 (62.5)	27 (42.9)	0.007
Cardiogenic shock (%)	4 (2)	1 (1.6)	1.00
IABP (%)	3 (1.5)	1 (1.5)	1.00
Prior heart surgery (%)	0	0	NA
Logistic EuroSCORE (mean $\pm$ SD) (%)	11.3 $\pm$ 9.1	13.0 $\pm$ 9.2	0.22
Range of EuroSCORE (%)	3.5-55.6	3.7-51.5	
Percentile 25th	6.5	17.3	
Percentile 75th	5.4	13.3	

Table 2. Angiographic data

	PCI (n = 202)	CABG (n = 63)	p-value
Complete revascularization (%)	111 (55.4)	48 (75.8)	0.002
Presence of chronic total occlusion (CTO) (%)	56 (27.7)	27 (40.9)	0.07
Disease of vessel (%)			
Single vessel disease	76 (37.5)	0	< 0.001
Double vessel disease	67 (33.2)	3 (4.8)	< 0.001
Triple vessel disease	49 (24.30	32 (50.8)	< 0.001
Left main disease	2 (1)	1 (1.6)	1.00
Left main and other vessel disease	8 (4)	27 (42.8)	< 0.001

group.

During follow-up, 22.8% of PCI and 20.6% of CABG group were contacted by home call. There was 0.5% of PCI and 3.2% of CABG, which were lost to follow-up. Hospital stay in PCI was 4.7 $\pm$ 9.0 days and in CABG 16.8 $\pm$ 17.4 days ($p = 0.01$). The 30-day MACCE were 11.4% in PCI group vs. 44.4% in CABG group ($p < 0.001$), all cause-mortality was 2.5% in PCI group vs. 8.3% in CABG group ($p = 0.05$). After subtracting the data, cardiovascular mortality was 1% vs. 5% ($p = 0.046$), mortality from sepsis was 1.5% vs. 1.5% ($p = 1.0$). Recurrent acute MI was 5.4% vs. 4.8% ($p = 0.74$). Cerebrovascular event occurred in 0.5% vs. 1.6% ($p = 0.10$). There was cross over treatment as appearing as 0.5% vs. 0% ($p = 1.0$). There was no repeat target revascularization at 30-day in both groups. Major vascular complication due to bleeding requiring $\geq$ 5 of pack-red cell transfusion was more common in CABG group (1.5% vs. 31.8%, $p < 0.001$). None of these patients with major vascular complication died within 30 days. Other complications such as atrial fibrillation, acute renal failure or infection were more common in CABG group (Table 3).

At 24-month follow-up, MACE were 35.2% in PCI group vs. 27.9% in CABG group ($p = 0.36$), all cause-mortality was 11.3% in PCI group vs. 27.9 % in CABG group ($p = 0.001$), cardiovascular mortality was 1.5% vs. 11.5% ($p < 0.001$). Sepsis mortality was 2.5% vs. 11.1% ($p = 0.05$). MI occurred in 7.4% vs. 6.3% ($p = 1.0$). Repeat target revascularization was higher in PCI group (20.3% vs. 0%, $p < 0.001$). In detail causes of death of each case were shown in Table 5 and 6.

The subgroup analysis of all cause mortality and other secondary endpoints was compared between groups in diabetes (Table 7).

Discussion

The authors compared current experience in CAD treatment with either PCI or CABG in octogenarians. The two populations were well matched in baseline characteristic and co-morbidities. The differences between groups were the higher prevalence of acute coronary syndrome, poorer left ventricular function in CABG group at presentation, more triple vessel disease and more chronic total occlusion. These findings may result in the difference in choosing the treatment strategy or selection bias by operator. From another perspective, PCI was performed in more stable patients, with less severe angiographic target lesion. The parameter being used most for selection of each revascularization strategy is EuroSCORE. Rodes-Cabau J et al[14] showed that baseline EuroSCORE was the most important predictor of MACCE regardless of the type of revascularization. The authors population has matched logistic EuroSCORE between PCI and CABG group (11.3 $\pm$ 9.1 vs. 13.0 $\pm$ 9.2, $p = 0.22$). Intention to treat by individual operator was based on lesion complexity. CABG was performed more frequently in triple vessel CAD and chronic total occlusion compared to PCI. Complete revascularization was observed more in CABG than PCI (75.8% vs. 55.4%, $p = 0.002$). The less complete revascularization was also observed in a PCI registry in elderly[15]. However, in the present study, PCI achieved a lower MACCE and 30-day all-cause mortality than CABG (2.5% vs. 8.3%, $p = 0.04$), lower cardiovascular mortality (1% vs. 5%, $p = 0.046$),

Table 3. Major adverse cardiac and cerebral events at 30-day

Outcome	PCI (n = 202)	CABG (n = 63)	p-value
MACCE	23 (11.4)	28 (44.4)	< 0.001
All-cause death (%)	5 (2.5)	6 (9.5)	0.09
Target vessel revascularization (%)	0	0	NA
Major vascular complication (%)	3 (1.5)	20 (31.8)	< 0.001
Recurrent acute myocardial infarction (%)	11 (5.4)	3 (4.8)	1.00
Stroke (%)	1 (0.5)	1 (1.6)	1.00
Crossover treatment (%)	1 (0.5)	0	1.00
Sepsis death (%)	3 (1.5)	2 (3.2)	1.00
Cardiovascular death (%)	2 (1)	3 (4.8)	0.21
Atrial fibrillation (%)	10 (5)	29 (45.5)	< 0.001
Infection (%)	12 (5.9)	11 (18.2)	0.02
Acute renal failure (%)	13 (6.5)	19 (30.3)	< 0.001
Minor vascular complication (%)	21 (10.4)	0	0.003

Table 4. Cumulative major adverse cardiac events at 24-month

	PCI (n = 202)	CABG (n = 63)	p-value
MACE	69 (35.2)	17 (27.9)	0.36
All-cause death (%)	22 (11.3)	17 (27.9)	0.001
Target vessel revascularization (%)	41 (20.3)	0	< 0.001
Recurrent myocardial infarction (%)	15 (7.4)	4 (6.3)	1.00
Cause of death			
Pneumonia (%)	2 (1.0)	1 (1.6)	1.00
Sepsis (%)	5 (2.5)	7 (11.1)	0.05
Renal Failure (%)	2 (1.0)	1 (1.6)	1.00
Malignancy (%)	3 (1.5)	0	0.49
Cardiovascular death (%)	3 (1.5)	7 (11.5)	< 0.001
Other (%)	3 (1.5)	1 (1.6)	1.00
Unknown (%)	4 (2.0)	0	0.24
Loss of data (%)	8 (4.0)	2 (3.2)	1.00
Crossover treatment (%)	1 (0.5)	0	1.00
Hospital Stay (mean $\pm$ SD) (days)	4.7 $\pm$ 9.0	16.8 $\pm$ 17.4	0.01
Loss to Follow-up (%)	1 (0.5)	2 (3.2)	0.62

Table 5. Detail cause of deaths in PCI group

No.	Sex	Age	DM	Date of Procedure	Date of death	No. of Days from Procedure to Death	Cause of death
1	Male	96	Yes	5-Oct-2007	10-Oct-2007	5	Sepsis
2	Female	80	Yes	28-May-2007	19-Jun-2007	22	Sepsis
3	Female	84	Yes	28-Jun-2006	27-Jul-2006	29	Sepsis
4	Male	83	No	1-Oct-2006	30-Oct-2006	29	CVS, MI
5	Male	89	No	17-Aug-2007	15-Sep-2007	29	CVS, MI
6	Female	90	No	5-Jul-2006	12-Aug-2006	38	Unknown
7	Female	90	No	17-Jan-2007	24-Feb-2007	38	CA Gall bladder
8	Female	80	Yes	9-Aug-2007	22-Sep-2007	44	Unknown
9	Female	88	No	10-Jun-2005	10-Aug-2005	61	Unknown
10	Female	85	Yes	3-Mar-2005	14-May-2005	72	Pneumonia
11	Male	83	No	6-Sep-2005	7-Mar-2006	182	Delirium
12	Male	81	No	6-Apr-2006	17-Nov-2006	225	CVS, CHF
13	Male	82	No	2-Oct-2006	21-May-2007	231	Pneumonia
14	Female	81	Yes	14-Feb-2005	4-Dec-2005	294	Sepsis
15	Male	80	No	17-Mar-2006	7-Feb-2007	327	Unknown
16	Female	84	No	11-Jul-2006	17-Jun-2007	341	Infected CAPD
17	Male	90	No	16-Jun-2006	13-Jun-2007	362	CA Colon
18	Male	81	Yes	24-Dec-2007	7-Jan-2009	379	ICH
19	Male	83	No	26-Oct-2006	5-Feb-2008	467	Sepsis
20	Male	85	Yes	21-Jan-2005	1-Aug-2006	558	CA Lung
21	Female	80	Yes	24-Mar-2007	15-Dec-2008	631	Renal failure
22	Female	84	Yes	18-Mar-2005	25-Jan-2007	678	Renal failure

Table 6. Detail cause of deaths in CABG group

No.	Sex	Age	DM	Date of Procedure	Date of death	No. of Days from Procedure to Death	Cause of death
1	Female	81	No	18-Nov-2007	22-Nov-2007	4	Sepsis
2	Male	81	Yes	12-Aug-2005	19-Aug-2005	7	Sepsis
3	Male	87	No	12-Jul-2007	19-Jul-2007	7	CVS, MI
4	Female	81	Yes	23-Mar-2005	31-Mar-2005	8	Renal failure
5	Female	81	Yes	30-Mar-2005	15-Apr-2005	16	CVS
6	Female	80	Yes	16-Jun-2006	3-Jul-2006	17	CVS, MI
7	Male	81	Yes	28-Dec-2005	25-Feb-2006	59	Sepsis
8	Female	87	No	5-Dec-2005	7-Feb-2006	64	Sepsis
9	Male	86	No	12-Jan-2007	3-Apr-2007	81	Pneumonia
10	Male	88	Yes	18-Jul-2005	30-Oct-2005	104	CVS
11	Male	81	No	30-Jun-2006	31-Dec-2006	184	CVS, CHF
12	Male	81	No	15-Mar-2006	17-Nov-2006	247	CVS
13	Male	85	Yes	29-Sep-2005	1-Jul-2006	275	Sepsis
14	Female	89	No	23-Mar-2007	29-May-2008	432	CVS, MI
15	Male	80	Yes	25-Jan-2007	21-Apr-2008	451	UGIB
16	Female	83	No	19-May-2005	1-Sep-2006	470	Sepsis
17	Female	83	No	9-Dec-2005	23-Apr-2007	500	Sepsis

Table 7. End points among diabetic patients (n = 116)

	30 days			24 months		
	PCI (n = 87)	CABG (n = 29)	p-value	PCI (n = 87)	CABG (n = 29)	p-value
All cause of death (%)	3 (3.5)	4 (13.8)	0.03	10 (11.5)	8 (27.6)	0.004
Sepsis death (%)	3 (3.5)	1 (3.4)	1.00	4 (4.6)	3 (10.3)	0.28
CVS death (%)	0	2 (6.9)	0.01	0	3 (10.3)	0.004
Recurrent myocardial infarction (%)	3 (3.4)	1 (3.4)	1.00	4 (4.6)	1 (3.4)	0.72
Target vessel revascularization (%)	1 (1.1)	0	1.00	22 (25.3)	0	< 0.001

and a shorter hospital stay in PCI. This is contrary to other studies that indicated CABG survival outcome at 5-7 years was better due to complete revascularization[16,17]. The authors explanation might be the different definition of MACCE used in the present study that includes major vascular complication as one of the composites of MACCE. However, 30-day all-cause mortality was also in favor of PCI. This was the same trend as a previous study that showed CABG was also associated with poorer survival than PCI and was seen only during the first 6 months, but improved from 6 months to 8 years[16]. The other secondary outcomes such as procedure-related MI, repeat TLR or stroke are similar between the two groups. In contrary, major vascular complication, (1.5% vs. 31.8%, $p < 0.001$), especially TIMI major bleeding, atrial fibrillation, infection, acute renal failure also occurred more commonly in CABG. This result is similar to the German Cypher Stent Registry that reported higher periprocedural complications in CABG as 4% vs. 31% ($p < 0.001$), as well as higher stroke, major bleeding and infection[8].

The cumulative data at 24-month follow-up were similar to the 30-day result, or followed the same trend, as lower all cause-mortality and cardiovascular mortality was found in the PCI group, but higher rate of repeat target revascularization.

When focusing on the diabetic subset (Table 7), we observed lower 30-day all-cause mortality (3.5% vs. 13.8%, p = 0.03) and at 24-month (11.5% vs. 27.6%, p = 0.004) and 30-day cardiovascular mortality (0% vs. 6.9%, p = 0.01) and at 24-month (0% vs. 10.3%, p = 0.004) in the PCI group but there was a trade off with a higher target lesion revascularization at 24-month in PCI group (25.3% vs. 0%, p < 0.001). This may be due to the selection bias as previously mentioned; CABG carried higher risk of events due to more complex lesion selection. The other 4 major studies compared long-term outcomes after PCI and CABG among diabetic patients, including the RITA, EAST, CABRI and BARI studies[17-20]; that CABG was favored over PTCA for preventing all-cause death at 4 years but showed similar results with PCI after 6.5 years. However, there was no survival difference after CABG or PCI among non-diabetics at 4 or 6.5 year.

Limitation

The present study was retrospective non-randomized observation. There was a high amount of bias that led to revascularization selection. CABG was done in more difficult lesions. PCI was done in cases of less severe complexity with less complete revascularization, affecting the clinical outcomes measured. The other limitation was the small number of octogenarians being treated and too short a time of follow-up.

Conclusion

The current revascularization strategy was evaluated. These results reflect our physician selection and patients' willingness to undergo the treatment option. Lesser 30-day and 24-month all-caused mortality, cardiovascular mortality, hospital stay was observed in PCI treated octogenarians, with a trade off being more frequent repeat target revascularization.

Potential conflicts of interest

None.

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การศึกษาย้อนหลังเปรียบเทียบระหว่างการรักษาหลอดเลือดโคโรนารีผ่านสายสวนกับการผ่าตัดต่อทางเบี่ยงหลอดเลือดโคโรนารีในผู้ป่วยอายุมากกว่า 80 ปี

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ภูมิหลัง: *ผู้ป่วยโรคหลอดเลือดโคโรนารีตีบแข็ง (coronary artery disease, CAD) มีจำนวนเพิ่มขึ้น ปัจจุบันมีการรักษาผู้ป่วยกลุ่มนี้ ประกอบด้วยการรักษาหลอดเลือดโคโรนารีผ่านสายสวน (percutaneous coronary intervention, PCI) การผ่าตัดต่อทางเบี่ยงหลอดเลือดโคโรนารี (coronary artery bypass surgery, CABG) ในกลุ่มผู้ป่วยอายุมากกว่าหรือเท่ากับ 80 ปี (Octogenarians) นั้นเป็นกลุ่มที่มีความเสี่ยงสูงทั้งรอยโรคหลอดเลือดและโรคร่วมหลายอย่าง จึงยังไม่มีข้อสรุปการรักษาที่แน่ชัด*

วัตถุประสงค์: *เพื่อเปรียบเทียบผลของการรักษาโรคหลอดเลือดโคโรนารีตีบแข็ง ระหว่างการรักษาด้วย PCI กับ CABG ในผู้ป่วยอายุ $\geq$ 80 ปี โดยดูผลการรักษาที่ระยะเวลา 30 วันและ 24 เดือน*

วัสดุและวิธีการ: *เป็นการศึกษาย้อนหลังคัดเลือกข้อมูลจาก CALYSTO database โรงพยาบาลศิริราช ตั้งแต่ 1 มกราคม พ.ศ. 2548 ถึง 31 ธันวาคม พ.ศ. 2550 ระยะเวลาในการติดตามผู้ป่วยรวม 24 เดือน รวมได้ผู้ป่วยอายุ $\geq$ 80 ปีทั้งหมด 333 ราย หลังจากพิจารณาความครบถ้วนของข้อมูลแล้ว เหลือผู้ป่วยที่เข้าร่วมการศึกษา 265 ราย แบ่งเป็นกลุ่มPCI 202 รายและกลุ่ม CABG 63 ราย ได้เก็บรวบรวมถึงรอยโรค (angiographic characteristic & procedure outcome) จากรายงาน PCI และ CABG รวมถึงการติดตามผู้ป่วยหลังการรักษา (clinical assessment) จากเวชระเบียนผู้ป่วยนอกโดย primary endpoint ดูผลของ major adverse cardiac and cerebral event (MACCE) ที่ระยะเวลา 30 วัน และ secondary endpoint ดูผลของ major adverse event (MACE) ที่ระยะเวลา 24 เดือน*

ผลการศึกษา: *จากข้อมูลผู้ป่วย 265 ราย แบ่งเป็น PCI 202 รายและ CABG 63 ราย พบว่าค่าเฉลี่ยของอายุเท่ากับ 83.2 $\pm$ 3 vs. 82.7 $\pm$ 4.6 ปีตามลำดับ (p = 1.00) เพศหญิง 53% vs. 38.1% (p = 0.04) โรคหลอดเลือดโคโรนารีขาดเลือดเฉียบพลัน (ACS) 61.9% vs. 76.2% (p = 0.04) หลอดเลือดหัวใจตีบ 3 เส้น (triple vessel CAD) = 24.3% vs. 50.8% ($p < 0.001$) การเปิดหลอดเลือดโดยสมบูรณ์ (complete revascularization) = 55.4% vs. 75.8% (p = 0.002) โดยจะพบว่าในกลุ่ม PCI นั้นจะมีการบีบตัวของหัวใจ (LV systolic function) ที่ดีกว่ากลุ่ม CABG และลักษณะรอยโรคในกลุ่ม PCI เป็น single vessel disease มากกว่ากลุ่ม CABG ซึ่งมักเป็นกลุ่มรอยโรค เช่น triple vessel disease, left main vessel disease*

ผลลัพธ์ปฐมภูมิที่ 30 วันพบว่ากลุ่ม PCI เกิด MACCE 11.4% กลุ่ม CABG เกิด MACCE 44% ($p < 0.001$) ซึ่งอัตราการเสียชีวิตโดยรวม 2.5% vs. 8.3% (p = 0.05) อัตราการเสียชีวิตที่มีสาเหตุจากภาวะหัวใจขาดเลือด 1% vs. 5% (p = 0.046), การเกิดกล้ามเนื้อหัวใจตายเฉียบพลัน 5.4% vs. 4.8% (p = 0.74). การเกิดอัมพาตสมอง 0.5% vs.1.5% (p =1.0) ไม่พบการรักษาซ้ำที่หลอดเลือดเส้นเดิม (repeat target revascularization) หลัง 30 วันแรกในทั้งสองกลุ่ม ส่วนภาวะแทรกซ้อนทางระบบหลอดเลือด เช่น การได้รับเลือด (blood transfusion) $\geq$ 5 หน่วยพบได้บ่อยกว่าในกลุ่ม CABG ($p < 0.001$)

ผลลัพธ์ทุติยภูมิ ที่ 24 เดือน พบว่ากลุ่ม PCI เกิด MACE 35.2% ในขณะที่กลุ่ม CABG เกิด MACE 27.9% (p = 0.36) ซึ่งอัตราการเสียชีวิตโดยรวม 11.3 % vs. 27.9% (p = 0.001) อัตราการเสียชีวิตจากภาวะหัวใจ

ขาดเลือดเท่ากับ 1.5% vs.11.5% (p < 0.001) การเกิดกล้ามเนื้อหัวใจตาย 7.4% vs. 6.3% (p = 1.0) การรักษาซ้ำที่หลอดเลือดเดิม (repeat target revascularization) ไม่พบในกลุ่ม CABG ในขณะที่กลุ่ม PCI พบ 19.9% (p < 0.001). อย่างไรก็ตามระยะเวลาการนอนโรงพยาบาลในกลุ่ม CABG (16.89 ± 17.42 วัน) มากกว่ากลุ่ม PCI (4.75 ± 9 วัน) (p = 0.01)

***สรุป**: การเปรียบเทียบการรักษาโรคหลอดเลือดโคโรนารีตีบแข็งในกลุ่มผู้ป่วยอายุมากกว่าหรือเท่ากับ 80 ปี (Octogenarians) ระหว่าง PCI กับ CABG พบว่า MACCE ที่ระยะเวลา 30 วันในกลุ่ม PCI พบน้อยกว่ากลุ่ม CABG รวมถึงอัตราการเสียชีวิตโดยรวม และเสียชีวิตจากภาวะหัวใจขาดเลือด ทั้งที่ระยะเวลา 30 วัน และ 24 เดือนน้อยกว่าด้วย และพบว่าระยะเวลาการนอนรักษาในโรงพยาบาลของกลุ่มที่ทำ PCI น้อยกว่ากลุ่ม CABG แต่ก็พบว่าในกลุ่ม PCI นั้นมีอัตราการรักษาซ้ำที่หลอดเลือดเดิมสูงกว่า (repeat target revascularization) ทั้งนี้การตัดสินใจเลือกวิธีการรักษาขึ้นกับผู้ป่วยและแพทย์เป็นสำคัญ*