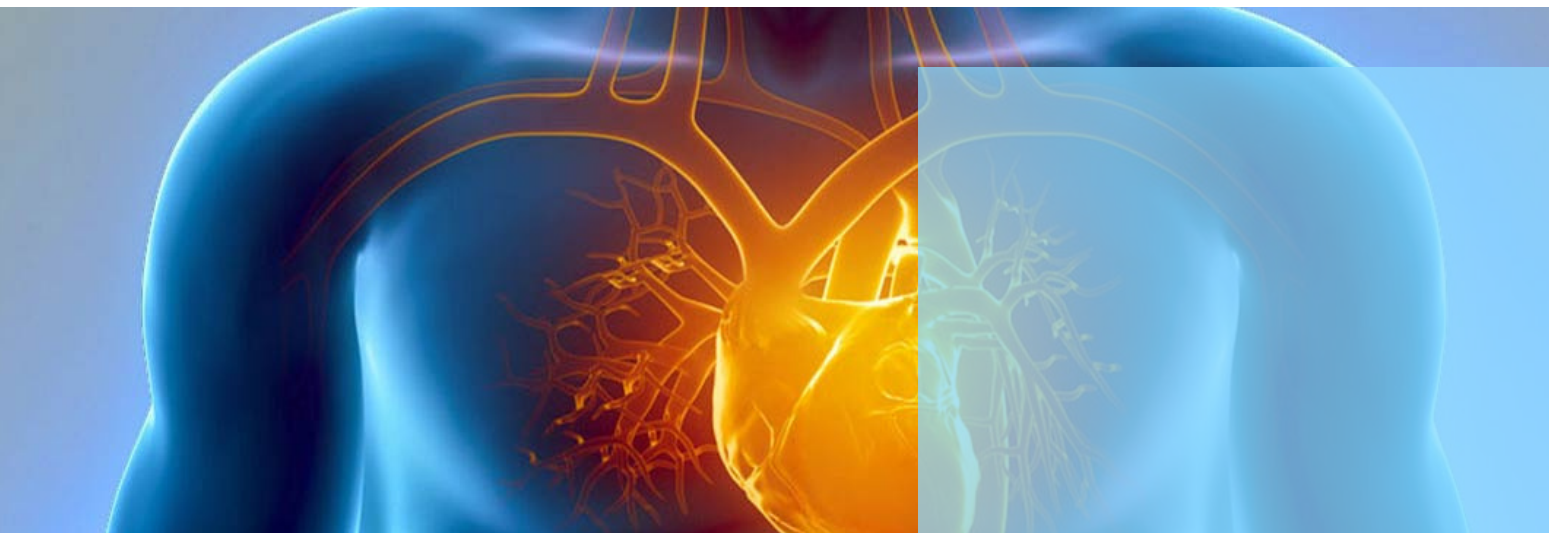


ECONOMIC-EVALUATION OF PERCUTANEOUS CORONARY INTERVENTION AS COMPARED TO CORONARY ARTERY BYPASS GRAFTING IN LEFT MAIN CORONARY ARTERY DISEASE



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Introduction

Cardiovascular diseases (CVDs) are one of the leading causes of mortality in India. Among CVDs, coronary artery disease (CAD) is the major cause of cardiovascular mortality and morbidity globally. Coronary Artery Disease (CAD) refers to the pathological narrowing of arteries that supply blood to heart muscles. Individuals with coronary artery disease have different phenotypic variations. At present, Coronary Artery Bypass Graft surgery (CABG) and Percutaneous Coronary Intervention (PCI) are commonly available treatment options for Left Main coronary artery Disease. Although CABG is considered as a gold standard treatment for left main coronary artery disease (CAD). PCI has also gained attention in recent years as an alternative approach for the treatment of these coronary artery diseases. However, the best approach for the treatment of stable patients of these complex coronary artery diseases is still a subject of debate. This study evaluated the economic and health outcomes of CABG vs PCI for left main coronary artery disease over the lifetime of a patient in Indian healthcare settings. This study is a model based estimation of incremental costs and QALYs gained in CABG group and percutaneous coronary intervention group in LMCAD patients (figure 1,2,3). We used two separate Markov models to estimate the overall costs and health outcome for the comparison. Data pertaining to the costs, clinical effectiveness and Quality of Life was taken from the secondary literature.

SUMMARY

Coronary artery disease (CAD) is the major cause of mortality and morbidity globally, causing approximately 7 million deaths annually. Coronary Artery Bypass Graft surgery (CABG) and Percutaneous Coronary Intervention (PCI) are commonly available treatment options for Left Main coronary artery Disease. Aim of this Study was to conduct a full economic evaluation of Percutaneous Coronary Intervention in patients with stable Left Major Coronary Artery Disease as compared to Coronary Artery Bypass Graft in Indian healthcare setting. CABG is found more clinically effective and also cost-effective as compared to PCI.

RECOMMENDATIONS

- **In cases of Left Main Coronary Artery Disease, the mainstay treatment should be centered on Coronary Artery Bypass Graft.**
- **PCI may be considered as the second line of treatment in cases requiring revascularization as per clinical experts' opinion.**

Figure 1. Conceptual framework for the economic evaluation for PCI versus CABG

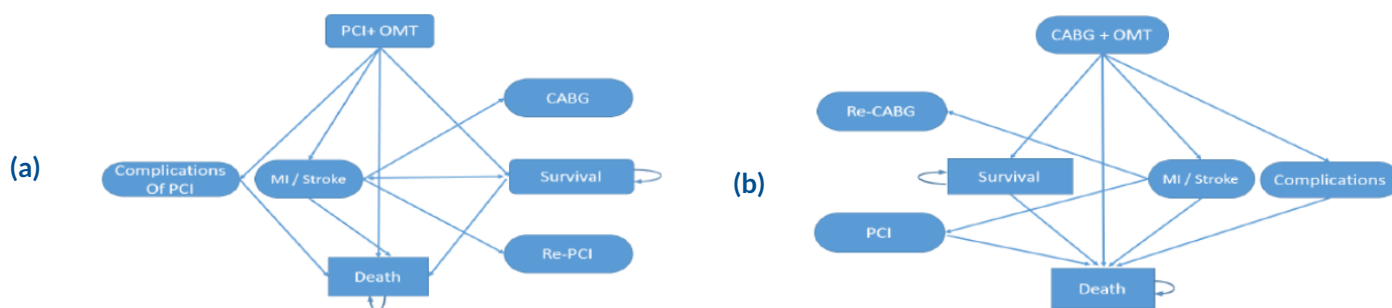
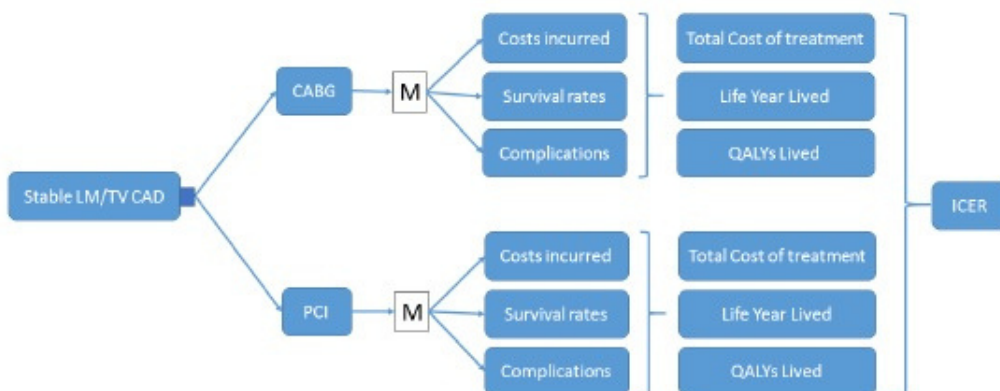


Figure 2. Markov's Model used for the (a) PCI Scenario and (b) CABG Scenario

Results

The analysis was done for both scenarios with four different time horizons (1yr, 5yr, 10yr, lifetime). In the first case, when estimations were done using a one-year time horizon, these results are favoring PCI as there are almost the same mortality and significantly lesser cost than CABG and for a longer period, especially for the twenty years period, results actually change. One year and lifetime horizon results per patient are summarized in the table 1.

Table 1: Total cost of PCI versus CABG for one year and lifetime horizon

TIME HORIZON	PCI (1 year)	CABG (1 year)	PCI (life time)	CABG (life time)
Cost OMT	4506	3572	74837	60557
Cost CABG	0	123307	52452	149844
Cost PCI	122319	0	125593	7626
Cost MI	2552	2537	35432	11200
Cost Stroke	571	1407	6707	8875
Cost Re-opening for bleeding	18	398	171	104
Cost Surgery for Sternum Infection	0	106	45	27
Cost Surgery for access complication	6	13	6	4
Total Cost	129973	131339	295243	238236
Discounted Cost			255295	211869

When comparing the costs and QALYs gained, over the first year; the ICER of PCI versus CABG is -5,22,023, which is primarily due to more upfront cost of CABG as compared to PCI and comparatively lesser peri-procedural complications in PCI than CABG. In the five years, 10 years, and 20 years' time horizon, PCI yields less health outcomes in terms of QALYs lived and has the incremental costs as shown in the table. Hence, at five years, 10 years, and 20 years' CABG dominates as PCI is not a cost-effective strategy as compared to CABG.

Sensitivity analysis (OWSA) was conducted for life time horizon by varying key parameters by twenty percent of their base value; except for mortality of PCI and CABG follow-up, which was varied to the upper and lower bound of studies included in the meta-analysis (figure 4).

Table 2: ICER of PCI versus CABG over four different time horizon

ICER at 1 year

Cost with PCI	129973	Incremental Cost	Incremental QALYs	ICER
Cost with CABG	131339			
QALYs with PCI	0.839	-1366	0.002617	-5,22,023
QALYs with CABG	0.837			

ICER at 5 years

Cost with PCI	160083	Incremental Cost	Incremental QALYs	ICER
Cost with CABG	150619			
QALYs with PCI	3.857	9464	-0.033419	-2,83,196
QALYs with CABG	3.891			

ICER at 10 years

Cost with PCI	202948	Incremental Cost	Incremental QALYs	ICER
Cost with CABG	176206			
QALYs with PCI	6.827	26742	-0.107237	-2,49,373
QALYs with CABG	6.934			

ICER at 20 years

Cost with PCI	255295	Incremental Cost	Incremental QALYs	ICER
Cost with CABG	211869			
QALYs with PCI	10.927	43426	-0.248610	-1,74,674
QALYs with CABG	11.176			

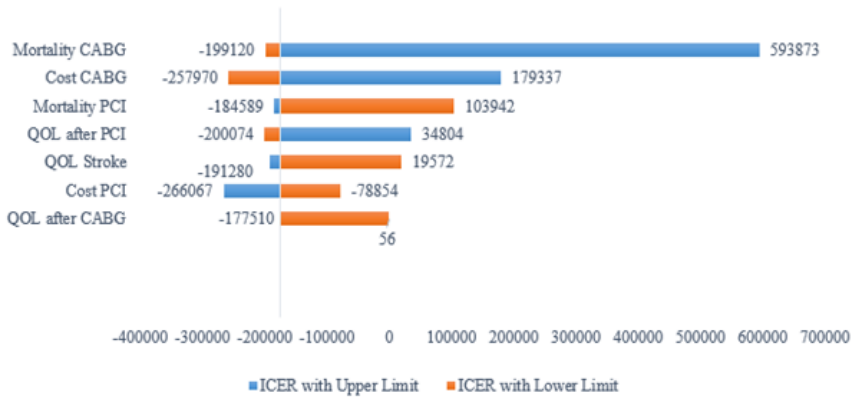


figure4:One Way Sensitivity Analysis results for lifetime horizon

CONCLUSION

As evident from results of our study, upfront cost of CABG is more in the first year as compared to PCI with and there is not much difference in the clinical outcomes of these interventions. However, in the subsequent years, i.e. 5 years horizon, 10 years horizon and lifetime (twenty years' time) horizon; CABG is more clinically effective and also cost-effective as compared to PCI. Although, there is only a marginal difference in the health outcome of CABG over PCI in management of stable LM CAD patients in terms of QALYs gained, the overall cost of CABG is significantly less as compared to PCI due to difference in the need of repeat revascularization subsequently.