

# Coetaneous Open Heart Surgery and Carotid Artery Stenting (CAS)

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## ABSTRACT

**Background:** Some admissions of the patient for cardiac surgery have concomitant carotid artery disease and their treatment options remains disputable. The customary methods engage staged or amalgamated carotid endarterectomy and cardiac surgery. The study assesses the possibilities and carotid angioplasty safety to reduce the risk of perioperative stroke in treatment of carotid stenosis in patients undergoing cardiac operations.

**Am:** To assess the feasibility to decrease the peril of perioperative stroke.

**Methods:** This non-randomized and prospective study was carried out at Department of Cardiothoracic Surgery, Shaikh Zayed Hospital, Lahore from 1<sup>st</sup> January 2016 to 31<sup>st</sup> December 2017. We evaluate 92 continuous patients who needs heart surgery with concomitant acute carotid artery illness. We experienced one stage carotid artery stenting and heart surgery. All patients arranged for heart surgery and before operation screened by colour duplex ultrasonography for carotid illness. In indicative patients carotid stenoses  $\geq 60\%$  and  $\geq 70\%$  in symptomless patients cured by using carotid artery stenting (CAS) beneath local anesthesia instantly before open heart surgery. In all the cases, brainy protections were used. Clopidogrel and aspirin did not received by patients before starting the procedure.

**Results:** Even though the high baseline risks profile, outcomes of our study were inspiring. In all patients, carotid stenting was successful. During procedure of carotid stenting, there was no occurrence of neurologic complexity. Death / Stroke rate is 2.2% in which 1 death and one contralateral stroke. There seems no occurrence of myocardial infarction (MI) which generally known as a heart attack. During intermediate follow-up, zero rate of carotid restenosis was found.

**Conclusion:** In our experience, instantly cardiac surgery and carotid artery stenting (CAS) is safe as well as symbolize a sensible option for chosen patients presenting with acute carotid illness and coronary illness.

**Keywords:** Open heart surgery, Carotid artery stenting, Coronary disease, Perioperative stroke,

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## INTRODUCTION

In cardiac surgery, carotid artery stenosis is a risk element for perioperative stroke which is very well known.<sup>1-6</sup> The optimal management of patients who needs heart surgery with instantaneous acute carotid illness remains disputable and debatable. There are many probable healing options prevailed. Proofs recommend to perform carotid endarterectomy (CEA) before heart surgery as a staged or instantaneous operations of both to decrease the perioperative stroke risk.<sup>6-12</sup> There are many literatures claiming that such type of patients requiring no carotid intervention in co-occurrence/conjunction with patients coronary bypass process.<sup>13-15</sup>

Before this study, our procedure with patients was combined cardiac surgery / carotid artery surgery. Although our outcomes have been reasonable for rate of stroke or death or heart attack at thirty days 9%. We also think that carotid artery stenting (CAS) is an alternative of carotid endarterectomy (CEA) used in carotid artery disease to attain the similar objective/aim. Carotid angioplasty with cerebral protection pursue instantly by heart surgery might depict a less insidious and secure option that be linked with few snag. We select one stage method to shun the trouble as well as possible difficulties of staged method because of delay of cardiac surgery and early termination of anti-platelet therapy after carotid artery stenting and before cardiac surgery.

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## MATERIALS AND METHODS

This non-randomized and prospective study was carried out at Department of Cardiothoracic Surgery, Shaikh Zayed Hospital, Lahore from 1<sup>st</sup> January 2016 to 31<sup>st</sup> December 2017. We included 92 patients that undergo one stage carotid artery stenting and heart surgery. The baseline attributes of all patients included in our study. Before carotid angioplasty the signs for heart surgery were established. All the patients arranged for cardiac surgery and before operation screened by colour duplex ultrasonography for carotid illness. The degree assessments of carotid stenosis establish on Nicolaides criteria.<sup>16</sup> Our strategy is to deal  $\geq 60\%$  indicative carotid stenosis patients and  $\geq 70\%$  symptomless stenosis. If both carotid arteries concerned, then indicative side could be treated or acute stenosis side in symptomless patients.

Our standard policy is to treat important carotid stenosis through percutaneous angioplasty and patients stenting who need cardiac surgery. These patients excluded from the protocol in which carotid endarterectomy is used. Further, it is also informed to all patients that in case of failed carotid angioplasty then without any delay they should be treated through cardiac surgery / coeval carotid endarterectomy.

Before open heart surgery, vascular surgeons instantly performed endovascular procedure. By using a C-arm in cardiac surgery room, the patients with active pain in chest, angina instability or left stem stenosis undergo carotid artery stenting. In catheterization laboratory stable patients undergo carotid artery stenting and after the procedure shifted to operation room. The procedure of endovascular was performed with femoral access under local anaesthesia and followed by induction for heart

surgery under general anesthesia. Procedure for carotid artery stenting: Before procedure patients not take aspirin or plavix or Clopidogrel due to which patients were not anesthetized. In all cases, through femoral artery access of carotid artery stenting was obtained. Followed by intravenous heparin administration 5000IU, A7/8F introducer sheath was put-in. In the 1<sup>st</sup> step an angiogram of aortic arch was attained, the carotid arteries, and intracranial flow to verify the level of carotid stenosis and verify probable anatomical contraindications for carotid artery stenting. Patients also examined for thirty days after discharge from hospital. Further, by the use of colour duplex ultrasonography, the carotid arteries were checked with the interval of 24 weeks. In all patients, carotid stenting technically remained fruitful as residual stenosis were less than 15% that shows excellent results of angiography. Seven patients excluded from the process of carotid artery stenting in the first step after the angiogram diagnostics on anatomical basis. In all patients, grading stenosis associated with measurement of angiography, duplex criteria was used in selection for carotid treatment level of stenosis. The treated stenosis are those assessed on angiogram by using methodology named as North American Symptomatic Carotid Endarterectomy Trial.<sup>17</sup> The devices of embolic protection were used in all patients. Ensnare noticeable debris found in nine. In this study, carotid tapered nitinol stent of different kind were used. The selection of kind of stent / filter based on the vessels anatomy and characteristics of carotid plaque<sup>18,19</sup>. Post-dilation was executed with 5mm or 5.5mm balloon and atropine was administered after the positioning of stent. When the process completed, carotid and intracranial angiography was executed to ensure the success of carotid stenting. Instantly after the process, neurologist clinically check the patients. If no any proof of neurologic snag, the general anesthesia gives to patients for open heart surgery. The data was entered in SPSS-20 and analyzed.

**RESULTS**

The demographic information of the patients, acuteness as well as severity of cardiac illness and carotid and cardiac surgeries were depicted in Tables 1-3. Death, stroke, myocardial infarction (MI) in thirty days are shown in Table 4. The single stroke was slight incident which showed in male patients as a light left sided weakness, these patients undergo for stenting of left carotid artery (stenosis 95%, symptomless). The level of stenosis of his right untreated carotid artery is 60%. The patient completely recovered in thirty days. Another patient has a dissimilar neurologic occurrence; suffering lenient strength diminution of the left hand. This situation happened in a male patient who underwent for right carotid artery stenting and determine in twenty four hours also known as transient ischemic attack attached. In both patients, before open heart surgery procedure, there was no any proof of neurologic occurrence after carotid artery stenting. After shifted from general anesthesia in intensive care unit, discrepancy of neurologic deficit exists. During and after the collective treatment, there seems no myocardial infarction (MI) . Due to massive pulmonary embolism, 1 patient died in sixteen days after the procedure and seven days after discharge in

accordance with necrotomy report. All patients checked with duplex ultrasound. Zero rate of restenosis was found. Hyperplasia found exclusive of hemodynamic sequel in four cases.

Table 1: Patients baseline attributes

Age mean	69.5	(53-86)
Male	70	76.08%
Smoking patients	35	38.0%
Hypertension	66	71.7%
Diabetes mellitus	47	51.08%
Lipidemia	45	48.9%
History in family	28	30.4%

Table 2: Acuteness / severity of cardiac illness and carotid

<b>Carotid stenosis treated degree</b>		
60% ----- 79%	32	34.78%
80% ----- 89%	24	26.09%
90% ----- 99%	36	39.13%
<b>Contralateral carotid stenosis degree</b>		
≥ 50 %	22	23.91%
< 50 %	53	57.60%
Occluded	16	17.39%
Symptomatic	12	13.04%
Symptomless	77	83.69%
<b>Carotid artery disease (CAD)</b>		
Left main stem illness	23	25%
3-vessel illness	62	67.39%
Unstable angina pectoris	13	14.13%
Previous coronary artery bypass grafting (CABG)	6	6.52%
Only Valvular illness	0	-
Coronary artery bypass + Valvular illness	17	18.47%
Poor function of left ventricular {Ejection Fraction (EF) <25%}	17	18.47%

Table 3: Cardiac surgeries for total 92 patients

<b>Cardiac surgery</b>	<b>No.</b>	<b>%</b>
<b>Coronary artery bypass</b>		
1 (Graft)	7	7.7
2 (Grafts)	12	13.0
3 (Grafts)	23	25.0
4 (Grafts)	29	31.5
5 (Grafts)	7	7.7
Coronary artery bypass grafting + aortic valve replacement	4	4.3
Off-pump	6	6.5
Coronary artery bypass grafting + mitral valve surgery	4	4.3

Table 4: Death, stroke, transient ischemic attack (TIA) and myocardial infarction (MI) incidence

Death	1 (1.1 %)
Stroke	1 (1.1 %)
Transient ischemic attack	1 (1.1 %)
Myocardial infraction	-
Death or Stroke	2 (2.2 %)
Death or Stroke or Myocardial infraction	2 (2.2 %)

**DISCUSSION**

Important variation in the restoration strategy of symptomatic obstructive coronary artery illness observe in past with a considerable shift towards percutaneous coronary intervention, mostly in patients having double or

single sickness on coronary angiography.<sup>20</sup> However, CABG (coronary artery bypass grafting) keeps the patients care standards with 3-vessels or left major coronary sickness and preferred in diabetics<sup>21</sup>. Regardless horrific risk profile of patients mention for coronary artery bypass grafting, our results with carotid artery stenting and coronary artery bypass grafting and other cardiac surgery procedures in place of CEA are inspiring. As compared to previous studies, our rate of death, stroke and myocardial infraction lesser then the reported rate in previously published data of collective or staged endarterectomy and heart surgery<sup>8,12,22,23</sup>.

Our results agrees with previous studies that carotid artery stenting may give a safe option for patients population i.e. patients anatomic characteristic that put them at bigger risk for carotid surgery. A considerable percentage of stenting and angioplasty protection in patients at high risk for endarterectomy population had coronary comorbidities. Further, old studies shows that carotid artery stenting pursued by open heart surgery is a safe method than collective CEA and heart surgery.<sup>24-27</sup> The details for little/ poor actions in patients which undergo carotid artery stenting in place of CEA is not obvious. Lengthy surgery time and great period of general anesthesia in carotid endarterectomy, collectively with reduction of surgical shock in carotid artery stenting almost the significant factor. The results of Mendiz et al<sup>28</sup> and Versaci et al<sup>29</sup> of carotid artery stenting instantly heart surgery beneath aspirin in thirty and thirty seven patients respectively and depict the possibility and safety of this procedure.

In Ziada et al<sup>25</sup> study, carotid artery stenting performed thirty nine days before surgery and one week before clopidogrel was stopped. In our view pertaining to these patients, antiplatelet agent should not discontinue during early period of post-stenting because it may reason snag from coronary arteries. Further CABG delay in patients who have unstable angina or multi vessel coronary artery illness, is not a safer method. Death due to cardiac reasons have been reported when patients wait for the procedure of cardiac bypass surgery.<sup>30</sup> In our study, significant population of treated patients are asymptomatic/symptomless (84%) concerning the carotid sickness. The advantage from invasive cure in asymptomatic patients with >72% carotid stenosis are fine documented, give peri-procedural stroke rate and death is 3% or less.<sup>31-33</sup>

## CONCLUSION

This study gives additional assistance from making decision process in patients with concurrent acute carotid artery sickness and cardiac illness which needs surgery. One stage carotid artery stenting propose less rate of complexity and heart surgery tender a safe therapeutic choice in these patients.. As compared to carotid artery surgery with concomitant cardiac surgery procedures, it may be a safe approach. The restrictions of our study are familiar, however, data / record added to limited literature on carotid artery stenting instantly before heart surgery.

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