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Research Article

Approach to Patients With Coronary and Carotid Artery Disease: Single Center Experience and Clinical Results

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Abstract

Objectives: This study is an examination of revascularization methods used in cases of carotid and coronary artery disease, comparing the results of combined surgery and hybrid treatment.

Methods: A total of 19 patients who underwent combined surgery (coronary artery bypass surgery with concomitant carotid endarterectomy) and 17 patients who received hybrid treatment (carotid artery stent and coronary artery bypass surgery on the same day) between January 2015 and January 2017 were enrolled and the results were examined retrospectively.

Results: A hemorrhage revision was performed in 2 patients due to mediastinal bleeding (586.84±600.8 cc) in the combined surgery group, while hemorrhage revision (464.7±300.28 cc) was not required in the hybrid therapy group. No significant difference was observed between the 2 groups.

The length of intensive care and hospital stay in the combined surgery group was 2.78±1.8 days and 6.94±1.6 days, respectively, while it was 1.64±0.33 days and 4.82±1.72 days, respectively, in the hybrid therapy group. A significant difference was found in the duration of both intensive care and total hospital stay ($p<0.01$).

No minor or major neurological event or mortality was observed in either group.

Conclusion: Considering the available data and information, the strategy to be utilized should be determined according to the clinical condition of the patient, as well as the experience of the team. An experienced team can apply a hybrid approach in appropriate cases with an acceptable level of mortality and morbidity and with the benefit of a shorter hospital stay.

Keywords: Bypass; carotid artery; coronary artery; hybrid treatment; minimally invasive direct coronary artery bypass.

The treatment to be made in coexistence of carotid and coronary artery disease is still open to question although the presence of thousands of patient analyses. While the prevalence of coronary artery disease (CAD) with multivessel lesion and symptomatic carotid artery stenosis (CS) is reported to be 2.8-22%, significant CS is seen in 3-10% of patients for whom coronary artery bypass surgery (CABG) is planned.[1, 2] The most important non-cardiac complication observed in patients with CABG and which can cause death is stroke. 50% and above presence of CS constitutes risk for stroke.[3] As such, presence of CS should be investigated in patients to whom CABG is planned and revascularization strategies should be established.

There are numerous strategies and discussions for revascularization. Our target in this study was to present the results obtained from our patients to whom we applied carotid endarterectomy (CEA) with concomitant CABG and our patients to whom we applied hybrid therapy.

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Methods

19 patients who underwent CABG with concomitant CEA and 17 patients who received carotid artery stent (CAS) before and underwent CABG on the same day were examined retrospectively. The preoperative risk factors, operative technic, perioperative morbidity and mortality and the mid-term clinical outcomes of the cases were evaluated.

The mean age of the patients was 63.4±6.8, and 13 (36.11%) and 23 (63.88%) of them were female and male respectively. Stable angina was present in 25 patients (69.44%) in the preoperative period while transient ischemic attack (TIA) was found to be present in 17 patients (47.22%) in the neurological examination (Table 1).

Color doppler ultrasonography was utilized for evaluation of carotid arteries routinely in all patients in the preoperative period and bilateral carotid conventional angiography was performed for anatomic evaluation in cases in which significant stenosis was detected.

CEA was conducted first in all cases as a surgical technic and subsequently was applied in the combined approach. Median sternotomy was applied to all patients because heparin would be administrated before proceeding to CEA. During CEA, firstly stump pressure was measured and shunt was used in 6 (31.57%) cases with less than 50 mmHg. CABG was performed with standard median sternotomy and in all of our patients with cardiopulmonary bypass (CPB).

8F introducer was placed to the main unilateral femoral artery and 8F guiding catheter was placed to the side to be treated to our patients who underwent CAS procedure before, under local anesthesia in all cases by our cardiology team in our angiography unit. Electrocardiography was performed by blood pressure monitorization and monitoring anesthesia. Embolism preventing filter was utilized in all cases. Stenting and balloon dilatation procedures were conducted by virtue of the guide wires after the passage of the lesion by the filter itself and guide wires adjusted to the filter. The brands of stents and filters used were EPI-Wallstent (Boston Scientific), Angioguard-Precise (Cordis) and EmboShield-Xact (Abbott). Each patient was administrated 5000 IU intravenous heparin during the procedure. Our patients were taken to the operating room after the process and CABG was applied.

Table 1. Demographic data

	Combined surgery	Hybrid therapy	p
Age	62.5±7.6 (45-77)	64.2±8.8 (50-81)	0.553
Gender			
Male	11 (61.1)	11 (68.8)	0.642
Woman	7 (38.9)	5 (31.3)	
Number of bypass			
2	3 (16.7)	1 (6.3)	0.180
3	6 (33.3)	11 (68.8)	
4	9 (50.0)	4 (25.0)	
BMI	27.9±3.1 (24-34)	28.2±3.1 (23.5-33)	0.807
Cigarette	8 (44.4)	7 (43.8)	1.000
DM	8 (44.4)	5 (31.3)	0.429
COPD	6 (33.3)	7 (43.8)	0.533
HT	10 (55.6)	8 (50.0)	1.000
EF	46.9±7.1 (35-60)	45.9±7.6 (35-60)	0.725

BMI: Body mass index; DM: Diabetes mellitus; COPD: Chronic obstructive pulmonary disease; HT: Hypertension; EF: Ejection fraction.

Findings

The mean clamp time in combined surgery was found as 9.94±3.8 minutes for carotid, 33.78±15 minutes for aorta, and 33.11±13 minutes for aortic crossing in the hybrid therapy group. The period of surgery was determined as 303.68±42.1 minutes and 201.47±58.5, respectively in both groups.

The carotid stenosis and length of the patients who underwent CEA were 84.47±10.8 and 1.89±1.8 cm, respectively, and 83.82±12.4 and 1.64±1.8 cm in the CAS group (Table 2).

Hemorrhage revision was made in 2 patients due to mediastinal bleeding (586.84±600.8 cc) in the patients who underwent CEA while hemorrhage revision (464.7±300.28 cc) was not made in the CAS group. No significant difference was observed between the two groups.

The times of intensive care and hospital stay in the CEA group were 2.78±1.8 and 6.94±1.6, respectively, while it was found as 1.64±0.33 and 4.82±1.72 in the CAS group respectively and significant difference was detected in terms of both duration of intensive care and hospital stay (Table 3).

No minor or major neurological events or mortality were observed in both groups.

Our patients were followed up with clopidogrel 75 mg as well as acetylsalicylic acid (ASA) 100 mg subsequent to discharge. No stenosis was observed in any of our patients in their six- month carotid Doppler USG examinations.

Table 2. Stent indications in carotid artery stenosis

Indication	n	%
High carotid lesion	9	52.94
Obese and short-neck patient	5	29,41
Radiotherapy story	2	11.76
CEA story	1	5.88

CEA: Carotid endarterectomy.

Table 3. Postoperative data

	Combined surgery Mean±SD (Min-Max)	Hybrid therapy Mean±SD (Min-Max)	p
CPB time (min)	87.3±11.4 (55-105)	87.9±5.5 (75-95)	0.753
Cross-clamp time (min)	35.7±8.2 (15-50)	35.2±7.1 (27-48)	0.858
Surgery time (min)	320.6±23.4 (290-390)	214.1±16.5 (195-250)	<0.001
Carotis clamp time (min)	10.5±1.6 (9-14)		-
Extubation time (hour)	11.0±2.3 (8-16)	6.0±1.8 (4-10)	<0.001
IC Stay period	2.9±0.6 (2-4)	1.8±0.4 (1-2)	<0.001
Drainage	619.4±342.2 (200-1600)	493.8±112.4 (300-700)	0.244
Number of days of discharge	7.3±0.5 (7-8)	5.1±0.3 (5-6)	<0.001

CPB: Cardiopulmonary bypass; IC: Intensive care.

Discussion

The risk of cerebrovascular event development is considered high in patients with carotid artery stenosis having coronary bypass surgery. Much as both carrying out both operations in a combined manner is generally accepted, discussions on how best approach should be still continue.[4] It has been reported that the combined mortality rate varies between 2 and 2% while the stroke rate varies between 1 and 15% in coronary artery bypass grafting and carotid artery endarterectomy operations.[5] Mortality or morbidity was not observed in our study, in patients to whom combined surgery was applied.

The endovascular treatment method, indications of which were limited and open to question due to the risk of cerebral embolism, now finds widespread areas of application thanks to the developments in stent and balloon angioplasty catheter technology and utilization of cerebral protection systems preventing cerebral embolism. It is becoming increasingly obvious that it can be applied in high-risk patients in terms of surgery and at the same time it can be an alternative treatment method to surgery in low-risk cases.

Concomitant or progressive CAS has been started in CABG in order to reduce mortality and morbidity, and stroke and death results considered to be acceptable have been reported.[6, 7] This has been associated with the less invasive nature of CAS as well as the utilization of dual antiaggregant therapy. However, since antiaggregant treatment should be discontinued prior to 5-7 days in patients who will undergo CABG, this may lead to problems in unstable patients. This issue has been effective on the commencement of hybrid therapy.[8, 9] Timaran et al.[10] have evaluated 27.084 patients who have undergone carotid revascularization and CABC between 2000-2004. Much as CAS and CABG group as well as CEA and CABG groups have similar hospital mortality by 5%; it has been reported that the stroke rate was lower in the stent group. No stroke or mortality was observed in any our patients in both groups.

Velissaris et al. have not given antiaggregant before stenting in their 90-cas CAS and CABG series and administrated 1 gr iv. Aspirin after the patient has been taken to intensive care. They have applied aspirin and clopidogrel orally for 1 year beginning from the first day of the operation. They have given the 30-day mortality, stroke and MI rate as 2.2%.[11] Barrera and colleagues also performed CAS prior to CABG and did not report death, stroke, or MI after 30 days.[12] Chiairello et al.[13] have found the results quite good compared to the patients with valve disease in their cases to whom they have applied concurrent CAS and CABC in their 132-case series. Much as different antiaggregant protocols have been done in these small-scale studies performed recently, no problems have been encountered with the application of carotid stent. Clopidogrel was not given before CAS to the patients to whom hybrid treatment was applied and systemic heparinization was performed during the process. Subsequently, our patients were followed up with ASA 100 mg and clopidogrel 75 mg.

The biggest advantage in endovascular treatment perhaps is superior cosmetic results and rapid recovery period. Patients' both intensive care and hospital stay periods were found to be significantly lower in the CAS group. We think that the reason for this occurrence is that the operation time is shorter and consequently the extubation times in the intensive care unit are shorter compared to the CEA group.

Conclusion

As a result, much as there are numerous treatment strategies which can be implemented in togetherness of carotid and coronary diseases artery the best method is still open to question. It is observed in the light of existing data and information that the strategy to be utilized should be de-

termined according to the patient's current clinical situation as well as the experience and results of the team. We think that hybrid approach can be applied with low mortality, morbidity and shorter hospitalization periods in appropriate patients and by experienced teams.

Disclosures

Ethics Committee Approval: The study was approved by the Local Ethics Committee.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

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