

Evaluation of Carotid Artery Disease in Patients with Coronary Artery Disease Eligible for Coronary Artery Bypass Graft Surgery

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Abstract: ***Introduction:** There is an increased incidence of TIA and stroke in patients undergoing Coronary Artery Bypass Grafting (CABG). The risk of stroke is increased in patients with significant carotid artery stenosis. Because most of the patients with significant carotid stenosis are asymptomatic, it is mandatory to screen the status of carotid arteries prior to CABG. **Aims and Objectives:** Study the occurrence of carotid artery disease in patients who are candidates for CABG. **Study Design:** Cross sectional observational. **Results and Observations:** The prevalence of carotid artery disease 50-70% was 7.1% and >70% was 6.2%, based on Doppler. 18.75% patients who were having 50-70% stenosis based on doppler found to have insignificant stenosis on selective carotid angiography. While 7.1% patient who were having >70% stenosis based on doppler, have insignificant stenosis on carotid angiography. So actual prevalence of carotid artery disease 50-70% was 6.6% and >70% was 5.8%, based on carotid angiography. **Conclusion:** This study showed a high proportion of marked carotid artery disease in patients who were for CABG. Carotid doppler can be used as screening test for carotid artery disease. Selective carotid angiography should be done who are having significant carotid stenosis on carotid doppler in same setting while patient undergo for coronary angiography.*

Keywords: Coronary Artery Bypass Grafting, carotid artery disease, Carotid doppler, carotid angiography

1. Introduction

Atherosclerosis is a systemic process affecting not only coronary blood vessels but also other vessels including aorta, carotid arteries, iliac arteries etc [1, 2]

In many patients, atherosclerotic narrowing of the coronary and carotid artery occurs simultaneously. The simultaneous involvement of these two anatomic sites is reported to be from 2.3% to 54% in different reports. [3-7]

There is an increased incidence of Transient Ischemic Attack (TIA) and stroke in patients undergoing Coronary Artery Bypass Grafting (CABG) surgery [2, 8]. The risk of stroke is increased in patients with significant carotid artery stenosis. Because most of the patients with significant carotid stenosis are asymptomatic, it is mandatory to screen the status of carotid arteries prior to CABG [10].

There are many methods to diagnose the carotid artery disease. Amongst all, the most accurate test is carotid angiography.

Aims and Objectives

To study the occurrence of carotid artery disease in patients with coronary artery disease who are candidates for coronary artery bypass graft surgery.

2. Materials And Methods

Cross sectional observational study

Angiography of patients was done as per the department protocol.

Screening carotid doppler were done after patient found eligible candidate for bypass graft surgery in cath lab. if they had >50% stenosis by doppler their carotid angiography were done in same sitting with two orthogonal angiographic views. Carotid stenosis severity were evaluated by visual severity assessment.

Severe significant carotid stenosis were defined on angiography as
≥ 50% in symptomatic patients with a carotid stenosis [11]
≥ 60% in asymptomatic patients with carotid stenosis

Study Population

30 patients (n=30) with CAD who were candidates for CABG with > 50% carotid stenosis by doppler were included in this study.

Inclusion Criteria

Patients of 18 to 80 years of age with coronary artery disease who are eligible for coronary artery bypass graft surgery with > 50% carotid stenosis by carotid doppler will be included in this study

Exclusion Criteria

- Patients with renal dysfunction.
- Patients with coronary artery disease not a candidate for CABG.
- Patients with coronary artery disease and candidate for CABG but having < 50 % stenosis by carotid doppler.

Carotid Doppler

Screening carotid doppler done after patient found eligible candidate for bypass graft surgery in cath lab.

Carotid Angiography

Carotid angiography were carried out in all patients who were having >50% stenosis on carotid doppler. Carotid stenosis severity was evaluated by visual severity assessment. The percentage diameter stenosis was assessed in different projections.

3. Results and Observations

Total 224 patients screened by doppler ultrasound ,30(13.3%) patients found to have > 50% carotid stenosis out of which 16 (7.1%)patients were found to have 50-70% stenosis and 14(6.2%) patients were found to have >70% stenosis.

Stenosis of 50% to 70 % in right common carotid, right internal carotid, left common carotid and left internal carotid were detected in 17% (n=5), 27%(n=8), 10% (n=3) and 17% (n=5) of cases respectively.

Stenosis of >70% was detected in the left internal carotid artery in 33% (n=10) of cases and in the right internal carotid artery in 13% (n=4) and right common carotid 3% (n=1), left common carotid 13% (n=4).Out of 33% (n=10) cases of the left internal carotid artery who were having >70%, 2 were having 100% occlusion.

The prevalence of carotid artery disease 50-70% was 7.1% and >70% was 6.2% ,based on Doppler.3 out of 16 (18.75%) patients who were having 50-70% stenosis based on doppler found to have insignificant stenosis on selective carotid angiography. While 1 out of 14 (7.1%) patient who were having >70% stenosis based on doppler found to have insignificant stenosis on selective carotid angiography. So actual prevalence of carotid artery disease 50-70% was 6.6% and >70% was 5.8%, based on carotid angiography. While 1 out of two patients who were having 100% occlusion on basis of Doppler found to had 95% stenosis.

5 patients who were having LM with DVD or TVD,all were having significant carotid artery disease on selective carotid angiography

4. Discussion

Coronary revascularization in patients without evidence of carotid atheroma carries 1-2% risk of stroke, but in the presence of unoperated major carotid artery stenosis it is associated with a 14% risk of perioperative stroke. [12-13]

Various studies have evaluated carotid disease as a risk factor for postoperative stroke. Das P et al in their study found that as high as one third of post CABG strokes occur as a result of carotid artery disease. [14]

The prevalence of >50% carotid artery stenosis in our study (> 50% stenosis) was found in 12.4% and critical stenosis (> 70% stenosis) was found in 5.8% in patients suitable for CABG. It was 9% for > 50% stenosis and 3.7% > 70% stenosis in study by Rath P C et al. [15]

In our study there were no complication observed related to carotid angiography similar to Thiex et al [16]

Adnan I et al 17 studied Role of conventional angiography in evaluation of patients with carotid artery stenosis demonstrated by doppler ultrasound in general practice and observed a relatively high proportion of non-significant carotid stenosis in patients who were referred on the basis of carotid doppler ultrasound. The proportion of non-significant stenosis was highest in patients with 50% to 69% stenosis by carotid doppler ultrasound. Almost half of all patients referred on the basis of 50% to 69% stenosis by Doppler ultrasound did not have significant stenosis. However, a significant proportion (22%) of patients with 70% to 99% stenosis also had non-significant stenosis.

5. Conclusion

This study showed a high proportion (12.4%) of marked carotid artery disease in patients who were found suitable for CABG.

Carotid doppler can be used as screening test to rule out significant carotid artery disease.

Selective carotid angiography should be done who are having significant carotid stenosis on carotid doppler in same setting while patient undergo for coronary angiography. So future management can be planned accordingly.

However, larger, longitudinal, multi-centre studies are required to establish the exact association between carotid and coronary artery disease in ischemic heart disease patients.

6. Future Scope

This study had a few limitations including selection bias and limited number of patients. Patients were selected from one hospital only.

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