Management of coexistent carotid and coronary artery occlusive atherosclerosis

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Coexistent carotid and coronary artery disease is being recognized with increasing frequency in patients with symptoms primarily referable to one or occasionally both of these systems. This has posed a difficult question as to which surgical approach will minimize the risk of stroke or myocardial infarction in these sick patients.

We have, therefore, reviewed the clinical course of 92 consecutive patients in whom surgically treatable carotid and coronary arterial lesions had been diagnosed angiographically prior to surgical treatment of either system. There were 68 men and 24 women with a mean age of 59 years, range 38 to 78 years.

The preoperative status of these patients is shown in *Table 1*. In general, these patients were about 9 years older and had somewhat more severe coronary arterial disease than the overall group of patients undergoing coronary artery bypass from which they were derived. On the other hand, while the majority of patients had symptoms referable to their carotid lesion, over 40% (37/92) had asymptomatic bruits. Several bilateral carotid lesions were present in 16% (14/92) of the patients.

In 44 patients carotid endarterectomy and

Table 1. Preoperative status of 92 patients with coexistent carotid and coronary occlusive disease

	Group I 44 patients	Group II 35 patients	Group III 13 patients
Clinical presentation			
Unstable angina	9% (4/44)	14% (5/35)	23% (3/13)
Stable angina	86% (38/44)	83% (29/35)	77% (10/13)
Previous MI	25% (11/44)	26% (9/35)	15% (2/13)
TIA	39% (17/44)	60% (21/35)	54% (7/13)
Frank stroke	11% (5/44)	9% (3/35)	15% (2/13)
Asymptomatic bruit	50% (22/44)	31% (11/35)	31% (4/13)
Angiographic findings			
Left main stenosis	7% (3/44)	3% (1/35)	0%
Single vessel disease	4.5% (2/44)	20% (7/35)	0%
Double vessel disease	45% (20/44)	40% (14/35)	31% (4/13)
Triple vessel disease	43% (19/44)	37% (13/35)	69% (9/13)
Abnormal ventricle	50% (22/44)	57% (20/35)	46% (6/13)
Normal ventricle	50% (22/44)	43% (15/35)	54% (7/13)
Unilateral carotid disease	89% (39/44)	80% (28/35)	85% (11/13)
Bilateral carotid disease	11% (5/44)	20% (7/35)	15% (2/13)

coronary bypass were performed simultaneously (Group I). In 35 patients, carotid endarterectomy was performed first and coronary bypass planned as a later procedure (Group II). Coronary bypass was performed first in 13 patients with carotid endarterectomy planned as a later procedure (Group III).

As *Table 2* indicates, the best results were obtained in Group I with a 4.5% operative mortality and no permanent neurologic deficits. The worst results were obtained in Group II. Although there were no strokes, there was an overall mortality of 20%. Of these patients, three died of myocardial infarction immediately after carotid endarterectomy and three died after subsequent coronary bypass. In Group III a fatal stroke occurred following coronary bypass in one patient.

Of the 14 patients with bilateral carotid lesions, five were in Group I, seven in Group II, and two in Group III.

In Group I patients, the more severe lesion was corrected at the time of coronary bypass in four patients with the other side being corrected at a later procedure. In only one patient were both lesions corrected simultaneously at the time of coronary bypass. In Group II, both carotid lesions were corrected at separate operations prior to coronary bypass in all patients. In Group III, following coronary bypass, both carotid lesions were corrected in stages in these two patients.

In the early experience of managing these potentially life-threatening lesions of the carotid and coronary vessels, the decision as to which system to operate upon initially was based upon an attempt to judge clinically which lesion presented the greatest risk to the patient. Thus, carotid endarterectomy was frequently performed as an initial, isolated procedure. It was soon apparent that the risk of myocardial complications was great with this approach and that preoperative judgments of this nature were unreliable.

Table 2. Postoperative complications

	Group I	Group II	Group III
MI	0%	8.5% (3/35)	0%
TIA	0%	0%	0%
Stroke	2% (1/44)	0%	8% (1/13)
Mortality (30 day)	4.5% (2/44)	20% (7/35)	8% (1/13)

In view of the relatively good risk associated with asymptomatic carotid bruits, coronary bypass was therefore performed first in a small number of patients at high risk from their coronary disease without prior carotid reconstruction in an attempt to minimize the procedure in this select group. Unfortunately, this approach, although successful in avoiding myocardial infarction, carried a significant risk of fatal stroke as shown by the results in Group III. Thus, our current approach of simultaneous revascularization has evolved as the standard technique for the management of these coexistent lesions. Significant bilateral carotid lesions are managed by unilateral carotid endarterectomy of the more severely diseased or dominant side at the time of simultaneous coronary bypass. The second carotid lesion is then repaired as a subsequent procedure.

In conclusion, coexistent carotid and coronary artery occlusive disease was managed in a consecutive series of 92 patients over a 7-year period. Simultaneous carotid artery reconstruction and myocardial revascularization was carried out in 44 patients with only two perioperative deaths (neither directly cardiac related) and one transient neurologic deficit. The operative sequence of carotid repair before myocardial revascularization was elected in a group of 35 patients with seven deaths, a mortality of 20%. Three patients died of myocardial infarctions after carotid artery reconstruction and before coronary surgery could be carried out. Three others died of cardiac-related causes and one of a stroke. In 13 patients coronary revascularization was carried out as the first procedure. One patient died of a stroke following coronary artery surgery in the early postoperative period before carotid endarterectomy could be performed. Our experience indicates that simultaneous carotid endarterectomy and coronary revascularization offer the most effective means of avoiding cerebral injury and myocardial damage.