

Late clinical results of coronary artery surgery

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Eleven years of coronary artery surgery were surveyed through a computerized cardiovascular information registry. Longevity information from our first experience (1967 to 1970) was compared with a later series (1971 to 1973). These comparative series constitute our early and long-term results in elective isolated bypass graft operations. Patients with histories of heart failure, recent unstable angina or infarction, and those who had left main coronary obstruction were included. However, emergency operations, reoperations, and combined procedures were excluded.

A review of preoperative clinical characteristics indicates a rising median age: 1967 to 1970, 50; 1973, 53; 1976, 55; 1978, 56. Other preoperative clinical variables did not change appreciably from year to year. The extent of coronary atherosclerosis, documented by angiography, changed markedly after the first experience. From 1967 to 1970, 56% of patients had single-vessel disease; thereafter the prevalence of multiple-vessel disease rose consistently to 89% in 1978. The prevalence of critical left main coronary artery lesions ranged from 8% to 12%. Left ventricular asynergy occurred in 41% in the first series and increased to 54% in 1978. Angina is the prime indication for revascularization. Congestive heart failure alone is a relative contraindication.

The operative mortality was highest from 1967 to 1970 (3%). In the first 11.5 years the operative death rate was 1.1% and from 1971 through 1978 was 0.9%. The number of grafts per patient steadily increased from 1.5 in the first series to 2.5 in 1978. In the face of a higher risk population, morbidity has diminished.

Major morbidity listed for representative years shows statistically significant differences in all variables, except for stroke, when the first series is compared to the 1978 experience (*Table 1*). Rea-

sons for this decline in morbidity will be discussed.

Graft patency for saphenous vein conduits and internal mammary artery grafts is shown in *Tables 2* and *3*, respectively.

The trend toward a rising graft patency rate, results of serial vein and mammary graft patency, and catheterization results for patients with multiple grafts will be presented in detail.

Five-year actuarial survival is complete for all cohorts from 1967 to 1973. The data represent gross survival only

Table 1. Morbidity after myocardial revascularization (1967-1978)

Morbidity	1967-1970, percent	1972, percent	1975, percent	1978, percent
Perioperative infarction	7.1	4.3	3.4	1.2
Postoperative bleeding	10.0	7.0	10.0	3.0
Blood units/case	11.0	9.1	7.4	2.1
Respiratory insufficiency	5.0	1.8	2.1	0.7
Stroke	2.0	1.3	1.6	1.7
GI bleeding	1.2	2.6	0.3	0.0
Wound complication	2.0	2.4	1.6	0.8

Table 2. Vein graft patency* (1971-1973)

Interval between surgery and catheterization, mo	Patients studied	Grafts studied	Number patent	Percent patent
< 7	122	191	138	72.25
7-12	426	733	597	81.45
13-24	557	977	815	83.42
25-36	101	168	144	85.71
37-48	74	129	94	72.87
> 48	200	341	240	70.38
Total	1480	2539	2028	79.87

* Computed from last catheterization in serial studies; mean interval, 23 months.

Table 3. Internal mammary artery graft patency* (1971-1973)

Interval between surgery and catheterization mo	Patients studied	Grafts studied	Number patent	Percent patent
< 7	59	59	53	89.83
7-12	131	133	130	97.74
13-24	148	150	140	93.33
25-36	25	26	26	100.00
37-48	23	23	21	91.30
> 48	38	38	36	94.74
Total	424	429	406	94.64

* Computed from last catheterization in serial studies; mean interval, 14 months.

Table 4. Five-year actuarial survival

	1967-1970, percent	1971-1973, percent
Composite	89.6	92.2
Single vessel	91.6	96.5
Double vessel	88.0	93.6
Triple vessel	85.0	89.8
Completeness		
Complete revasculariza- tion		93.8
Incomplete revasculari- zation		88.0
Left ventricular contrac- tion		
Normal or mild impair- ment		93.0
Moderate or severe im- pairment		84.2

and none have been withdrawn. *Table 4* summarizes 5-year survival for the two periods under study with reference to the extent of coronary atherosclerosis,

completeness of revascularization, and preoperative left ventricular contractility. In the 1971 to 1973 category of single-vessel disease, patients with anterior descending artery disease fared best (98.3% alive after 5 years) in contrast to 93.0% for isolated right coronary artery and 88.7% for isolated circumflex artery diseases.

A low risk of operative mortality, a clear trend toward declining morbidity, and high 5-year survival is documented. These improved results are attributed to greater technical experience, changing techniques, and improved patient management rather than greater selectivity of cases.

References

1. Loop FD, Cosgrove DM, Lytle BW, et al: An 11-year evolution of coronary arterial surgery (1967-1978). *Ann Surg* **190**: 444-455, 1979.