

Influence of risk factors (cigarette smoking, hypertension and hyperlipidemia) on prognosis and long term results of reconstructive vascular surgery

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BIASI G., P. PIGNOLI, S. ZOPPI, V. RAMPOLDI, L. BERETTA, P. MINGAZZINI, S. MIANI and U. RUBERTI. *Influence of risk factors (cigarette smoking, hypertension and hyperlipidemia) on prognosis and long term results of reconstructive vascular surgery.* — Aim of the present study, in which 186 patients have been followed from 2 to 9 years after surgical reconstruction, is to demonstrate the influence of some factors (hypertension, hyperlipidemia and cigarette smoking) and long term patency of surgical treatment of aorto iliac occlusive disease.

The data seem to indicate a direct correlation between persistence of the considered risk factors present at the time of operation and late postoperative failures of the arterial reconstructions.

These data, (recorded in all our patients), contribute to better understanding the different rates of progression of the disease in each single patients and consequently long term results of the surgical treatment.

Late occlusions of vascular grafts are mostly due to the evolution of the atherosclerotic plaques proximally or distally to the graft inducing a drop in the blood flow through the prosthesis and its subsequent thrombosis.

These basic considerations have been well known for a long time and have suggested the possibility whether any kind of intervention on the risk factors any time before or after operation

might induce a reduction on late postoperative graft failures.

A lot of skepticism is reported on this matter. Quoting from a report of a Select Senate Committee on dietary goals for the United States², «once... arteriosclerosis or heart disease are manifest there is in reality little medical science can do»⁴.

The purpose of the present study is to evaluate the way to possibly influ-

ence the risk factors (hypertension, high blood lipid level and cigarette smoking) on the prognosis and the long term patency of vascular grafts.

MATERIAL AND METHODS

A group of 187 patients was followed in the postoperative period after bilateral aorto-femoral by-pass for a period from 2 to 14 years (from 1965 to 1979).

All patients at the time of operation were affected by severe aorto-iliac occlusive disease and lesser involvement of the distal arteries below the groin [type A of our classification¹ which includes patients with major involvement only of the proximal arteries (aorta and iliacs)].

At the time of operation all the patients selected for this study were heavy smokers (20 or more cigarettes per day), had high blood lipid level (blood cholesterol higher than 250 mg/100 ml and blood triglycerides higher than 172 mg/100 ml) and hypertension (blood pressure higher than 150/90)³.

Standard surgical techniques (aorto-femoral by-pass and endarterectomy) were employed compatibly with the staff experience acquired through out the years.

All the patients at the time of discharge from the hospital, were recommended to stop smoking and to follow a diet or medical treatment for their hyperlipidemia and hypertension.

Every patient was evaluated clinically and biochemically at least once a year.

RESULTS

The results of our study are reported in Tables 1, 2 and 3. The rationale was to evaluate the incidence of the three above mentioned risk factors, all present at the time of operation, at the 2nd, 5th and 9th year of postoperative follow-up, and compare it with the long term patency rates of the reconstructed segments.

At first, we consider (Table 1) the patients in which no reduction at all of their pre-existing risk factors was observed at long term post-operative follow-up (3-3: patients who remained heavy smokers with no improvement of their hyperlipidemia and hypertension in the years following the operation).

Two years follow-up (187 patients evaluated) showed that both: occluded (24 patients) and patent (163 patients)

TABLE 1

Persistence rate of the various risk factors in the bilaterally patent revascularized segments (PRS) and in the bilaterally occluded revascularized segments (ORS).

3-3: persistence of all the risk factors
3-2; 3-1: reduction but not disappearance of the risk factors
3-0: disappearance of the risk factors

2nd year control (patients no. 187)		
	PRS (n=163)	ORS (n=24)
3-3	31%	36%
3-2	38%	45%
3-1		
3-0	30%	18%

TABLE 2
(See Tab. 1 for symbol).

5th year control (patients no. 122)		
	PRS (n=84)	ORS (n=38)
3-3	30%	64%
3-2	28%	26%
3-1		
3-0	42%	18%

groups presented more or less the same rate of persistence of risk factors (36% and 31% respectively) (Table 1).

At 5 years follow-up (122 patients evaluated), however, a significant difference in the rate of persistence of the risk factors between the two groups of patients was found. The three factors all together were present in 30% of the 84 patients with patent revascularized segments (PRS) and in 64% of the 38 patients with bilaterally occluded revascularized segments (ORS).

Conversely 42% of the PRS patients did not show persistence of anyone of the three risk factors under study, while this occurred in only 18% of the ORS patients (Table 2).

Finally, we have a series of 30 patients with a postoperative follow-up of 9 years or more; in this group we observed only a 10% occlusion rate which can presumably be explained on the base of the extremely low number of cases in this group.

However the trend observed at the 5th year control was furtherly confirmed at the 9th year control when all

the three patients with ORS had all the three risk factors, compared with the 32% of the 27 patients with PRS (table 3).

The relatively small number (27) of patients with a monolateral occlusion of a bilaterally revascularized segment (MORS) at control is not sufficient for a clear understanding of this interesting group of patients.

The data collected (Table 4) seem to show a behaviour qualitatively in-

TABLE 3
(See Tab. 1 for symbols).

9th year control (no. 30)		
	PRS (n=27)	ORS (n=3)
3-3	32%	100%
3-2	28%	—
3-1		
3-0	40%	—

TABLE 4
(See Tab. 1 and ex for symbols)

MORS no. 28			
	2nd year control n=18	5th year control n=7	9th year control n=3
3-3	33%	14%	33%
3-2	45%	57%	33%
3-1			
3-0	27%	29%	33%

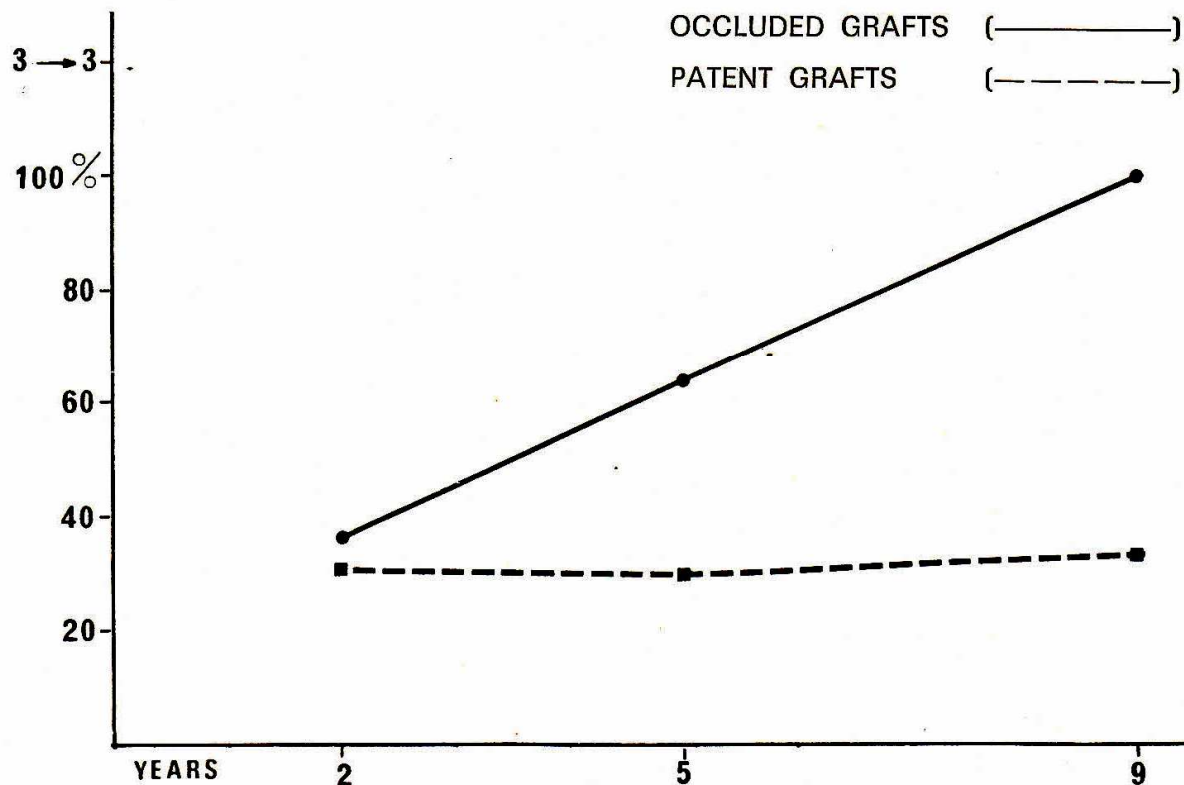


Fig. 1.

intermediate between the other two groups (patients with bilateral PRS and patients with bilateral ORS).

DISCUSSION

Our data seem to provide some support for a direct, strict correlation between risk factors persistence and late revascularization failures. The correlation is evident in the long term period (five years or more), when the relinquish of the smoking habit becomes probably more effective as well as the normalization of the other factors (Fig. 1)

The existence of a group of patients with monolateral occlusion is mostly related to the coexistence of systemic risk factors with local hemodynamic parameters as influencing factors on the evolutive fate of the graft in long as well as in early failures.

Patients in which, during the post-operative course, flow reduction in the revascularized segment could be detected, either by means of a control angiogram or non invasive diagnostic techniques, should be highly recommended to treat their risk factors; prophylactic surgical correction might also be indicated to prevent impending acute occlusion of the graft.

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