

Vascular Occlusion: Epidemiological, Pathophysiological and Therapeutic Aspects

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CLINICAL AND PROGNOSTIC EVALUATION AND THERAPEUTIC ATTITUDE IN ARTERIOSCLEROTIC LESIONS OF THE RENAL ARTERIES (179 PATIENTS)

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The great development of aortographic examination, now almost routine in patients affected by atherosclerotic disease of the lower extremities, allowed the demonstration of the high frequency of atherosclerotic lesions. These typically occur in the proximal renal artery adjacent to the aorta but, more rarely, can spread distally or even involve the primary branches of the renal artery in both normotensive and hypertensive patients. This finding raises various questions.

1. Does a consistent and direct relationship exist between the presence and the severity of renal stenosis and the diastolic blood pressure levels?
2. When is renal surgical revascularization indicated in hypertensive patients?
3. In patients with renal stenosis but with no evidence of renovascular hypertension, is it justified to perform prophylactic surgery to avoid subsequent renal ischemia?

The purpose of this paper is to summarize the conclusions drawn from the study of a wide series of aortorenal aortographies, to discuss our surgical attitude, and to report long-term results in 108 of 179 patients affected by renal stenosis.

CLINICAL MATERIAL

All the 1636 aortograms performed at "Padiglione Zonda" between 1972 and 1977 for diagnosis of aortoiliac occlusive disease or renovascular hyper-

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Table I. Total number of aortograms, 1636 (1972 / 1977).

Renal artery lesions		:	230
Occlusive arterial diseases (lower extremities)			179
Renovascular hypertension			51
Normotensive	Hypertensive		
131	48		

Table II.

	Hypertensive		
Arteriopathic patients with renal artery lesions	179	48	26.8%
Comparative arteriopathic sample without renal artery lesions	179	16	8.9%

Table III. Patients (total number) 108.

Aortography time	X ^a	Control time		
Normotensive	25	Normotensive	48	44.4%
Hypertensive	33	Normotensive (with drug therapy)	16	14.8%
Hypertensive	29	Hypertensive	24	22.2%
Normotensive	18	Hypertensive	8	7.4%
		Died in interval	12	11.1%

^aX = average time interval between aortography and control (months).

tension were reviewed. X-rays of 179 patients demonstrated characteristic features of atherosclerosis of one or both renal arteries. Out of 179 patients, 131 were normotensive, whereas the diastolic blood pressure of 48 patients was above 100 mmHg (Table I). This incidence of hypertension is considerably higher than that of a control population of patients affected by atherosclerotic disease (Table II). Only six of the 179 patients, all belonging to hypertensive group, underwent an operation (in four cases corrective vascular surgery was undertaken: in two it was necessary to carry out a nephrectomy). In order to follow up the clinical course of the 179 patients, they were all called back. When

direct patient follow-up was impossible reliable data were obtained from personal physicians; in this way the data of 108 patients were gathered (Table III).

Follow-up for the entire series averaged 26 months, ranging from 1 to 6 years. Table III shows that only eight patients (7.4%) developed a mild hypertension during the follow-up period. Of 40 initially hypertensive patients, 16 had a diastolic blood pressure (with drug therapy) in the normal range, whereas 24 patients (22%), even though receiving antihypertensive drug therapy, were found moderately hypertensive. Forty-eight patients (44%), initially normotensive, did not undergo any change in their pressure values at the control time (average control interval 25 months). Finally, 12 patients (11.1%) died; the cause of death in four patients being related to vascular disease.

DISCUSSION

The results of the study, on radiologically demonstrable renal artery stenosis in patients investigated by aortography, confirm that many subjects affected by narrowing of renal artery lumen often do not present with renovascular hypertension. A possible explanation of this behavior may be found in the fact that an atherosclerotic lesion developing chronically and extending to intrarenal arteries may cause a slow and gradual reduction of the amount of functioning renal parenchyma in parallel with the blood supply decrease, so that neither ischemia nor hypertension occurs (Eyler 1962). The question therefore arises whether it is right for these patients to undergo an operation and which kind of surgical management is more suitable with reference to the shape of the anatomical lesions.

In order to select the operative candidates, in addition to the investigative studies usually made in renovascular hypertension (excretory urogram, isotope renogram, selective angiography, bilateral ureteral catheterization), measurement of plasma renin activity (PRA) in the renal veins and in the inferior vena cava below the renal veins was also performed under basal conditions. In many cases, the PRA determination correctly detects a functionally significant stenosis of the renal artery. However, a normal renin ratio in the renal vein which is affected by stenosis is frequently found when the contralateral kidney is not capable of reducing the circulating volume of plasma.

In order to eliminate, or at least to reduce the false negative results, the infusion of trimetaphan has been recently used (Morganti *et al.*, 1975). The peripheral vasodilatation caused by this drug induces a redistribution of the circulating plasma volume, thus eliminating the volumetric component of the hypertensive disease. In this case, the values of P.R.A. tended to rise beyond the normal levels. In these conditions, the increased reninemia is the unique factor inducing hypertension. Other authors (Martorana *et al.*, 1979) suggest taking blood samples during acutely induced hypotension by sodium nitroprusside infusion.

On the other hand, it should be remembered that a reduction of renal blood supply necessarily involves a progressive decrease of the amount of functioning renal parenchyma. Therefore some authors (Constantini *et al.*, 1977) propose a thrombo-endoarterectomy of the proximal renal arteries when surgical revascularization of terminal aorta is required, even if there is no renovascular hyper-

tension, when the pressure gradient between aorta and renal arteries evaluated intra-operatively is over 25 mmHg.

CONCLUSIONS

From the analysis of the clinical material and from the results of the follow-up of patients, it seems to us that patients affected by arteriosclerotic lesions of the renal arteries may be schematically classified into the following groups.

(1) Hypertensive patients with focal arteriosclerotic renal artery disease, without important lesions affecting the residual arterial tree.

(2) Patients who are affected by mild or no hypertension, with arteriosclerotic lesions of the renal arteries, which may or may not be associated with extra-renal arteriosclerotic disease.

(3) Patients affected by lesions of renal arteries, with associated major arteriosclerotic aortic disease (aneurysm, subrenal barrage), who need renal revascularization with abdominal aortic aneurismectomy or aortofemoral bypass.

We believe, and the results of this study seem to validate our conclusions, that only the first and the third group of the patients are to be considered candidates to surgical revascularization. On the contrary, we are convinced that for the second group of patients the best policy is a non-interventionist behavior. Many reasons support our attitude.

Wollenweber (1968) documented that no significant difference existed in the five-year survival rate of this kind of patient when treated surgically or medically.

In the 20% of the patients older than 50 years the arteriosclerotic renal artery stenosis are a consequence of long-standing essential hypertension and are of no importance in the development or maintenance of the patients' hypertensive state (Ernst *et al.*, 1973).

Finally, when the main renal trunk or the extrarenal arteries are the site of severe stenosis, important stenosis is found also in a great percentage of intra-renal arteries.

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