

THE TREATMENT OF PERIPHERAL VASCULAR DISEASES BY ADRENOMEDULLECTOMY COMBINED WITH LUMBAR SYMPATHECTOMY

By

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As is well known the results of the treatment hitherto employed for the serious arteriospastic and degenerative diseases in the blood vessels of the extremities (Raynaud and Buerger's diseases and in arteriosclerosis) have not been favourable. As a rule the final stage comprises the loss of a major or minor part of one or both extremities. Or the patients suffer an advanced degree of invalidity owing to pain, difficulty in walking and chronic ulcerations. Very often the therapeutic measures adopted up to now—whether operative or conservative—have only been able to postpone this final stage. The reason for this lies to a certain extent in our still incomplete knowledge of the pathogenesis and etiology of these diseases.

We think what we are justified, therefore, in giving a trial to each new therapy which may possibly have a favourable effect on the course of these diseases, even if the theoretical basis of the therapy is uncertain. Bearing these considerations in mind, we in the Orthopaedical Hospital, Copenhagen, have employed since 1952, in individual and selected severe cases of the three diseases mentioned, the treatment with adrenomedullectomy which is described in particularly by the French.

In 1927, W. A. Oppel (6) proposed unilateral adrenalectomy for the treatment of Raynaud's disease, but the results did not seem convincing. The same operation was later suggested by Leriche (cf. Bøggild (1)), combined with sympathectomy in the treatment of hypertension. Durante (cf. Bøggild (1)) in 1936 performed unilateral adrenomedullectomy simultaneously with denervation of the opposite supra-

¹ Chief Surgeon A. Berthelsen, Med. Dr., The Orthopaedic Hospital, Department 1, is thanked for permission to include three cases from Department 1.

renal gland in Raynaud and Buerger's diseases. He observed good results at once. Over here D. H. Bøggild (1) published in 1948 a report on two cases of arteriospastic disease treated by bilateral adrenomedullectomy and showing good effect after the patients had previously been treated by lumbar sympathectomy without permanent effect.

In an article in 1949 R. Leriche (5) described his experiences with 98 adrenomedullectomies and later L. Durante (3) reported on 510 cases of adrenomedullectomy, of which only 38 were bilateral. 102 cases of Raynaud's disease were treated, of which, however, only two underwent bilateral adrenomedullectomy. The author states that the effect—in contrast to sympathectomy—is lasting. 235 cases of Buerger's disease were treated, the majority of which were given unilateral adrenomedullectomy. In those cases where the intervention was bilateral, the effect is declared to have been lasting. M. Servelle and others (7) recently gave an account of a fairly large series of 450 cases of Buerger's disease, where adrenomedullectomy was performed in 43 cases. The author gained the impression that the arteritic process was halted by the intervention and that the gangrene was limited more effectively.

The theoretical basis for the employment of adrenomedullectomy in the treatment of these diseases is found in several articles—first and foremost by R. Leriche—in which a hypertrophy of the adrenal gland medulla and signs of its hyperfunction are demonstrated in Raynaud and Buerger's disease. W. A. Oppel (6) believes that he can demonstrate the existence of hyperadrenalinemia in Raynaud's disease and, related to the occurrence of gangrene, in endarteritis.

Recently R. Tingaud & J. Carles (8) in an article published in 1952 made histological examinations of adrenal glands removed from patients with juvenile thromboangiitis and found in these hypertrophy of the medulla and infiltration of lymphocytes in the medulla. Similar changes were found in arterial hypertension and can presumably be regarded as the manifestation of a hyperfunction of the medulla and thus provide grounds for using an adrenomedullectomy in the treatment of these diseases.

G. A. Vasilyeff (3) in rabbit experiments with the implantation of "homografts" of adrenal glands attempted to produce endarteritic changes, but was unable to demonstrate any. In an article in 1952. E. Hasner (4) could not demonstrate signs of hyperfunction of the adrenocortex, in patients with Buerger's disease.

In the Orthopaedical Hospital, Copenhagen, Departments 1 and 2, altogether eleven cases with severe vascular diseases of the extremities have been treated with adrenomedullectomy since March, 1952.

A short account of the case histories, the effect of the operation and the observation period is given in the table.

(a) *Raynaud's Disease*. 5 cases, all of which were treated with bilateral adrenomedullectomy combined with lumbar sympathectomy. As can be seen, improvement of both the lower extremities and the upper extremities exists only in one case. This was a 36 year old woman who had had very pronounced symptoms in both the upper and lower extremities.

(b) *Buerger's disease*. Five cases are concerned, all men. In three cases the intervention was unilateral; in two of these the disease advanced despite the intervention, in one case the condition was stationary. In the remaining two cases bilateral adrenomedullectomy was undertaken. In the one case a bilateral lumbar sympathectomy was undertaken previously with temporary effect, in the other no lumbar sympathectomy had been performed previously, nor was this performed in combination with the adrenomedullectomy. In both these cases an improvement was reported which still remained 1 and 1¾ years after the operation.

(c) *Arteriosclerosis*. One case only is involved, a man aged 61 years. Bilateral adrenomedullectomy and lumbar sympathectomy were performed. The patient reports improvement continuing 1¾ years after the interventions.

Discussion: The lumbar sympathectomies were in all cases undertaken as lumbar ganglionectomies, removing one and two lumbar ganglions together with the adjoining portion of the sympathetic trunk. The adrenomedullectomies were performed according to the technique described by Durante (3).

Since the series is very small, no definite conclusions must be made, but the after-examinations seem to show that the effect of the adrenomedullectomy in the case of Raynaud's disease is exceedingly doubtful, for true improvement was only seen in one of the five cases. Improvement in the two remaining cases occurred only in the lower extremities. Since the adrenomedullectomy—if it is effective—must be considered to have an overall effect, the improvement in these two cases must clearly be ascribed to lumbar sympathectomy. In the one case it is uncertain whether the improvement following the adrenomedullectomy (affecting all four extremities) will remain—it has persisted so far for one year. Thus this is scarcely more than what a thoracic sympathectomy would yield, so that one cannot conclude that the adrenomedullectomy possesses a more lasting effect than the sympathectomy.

In Buerger's disease the operations seem, on the other hand, to

TABLE 1

Case no. Record no.	Sex and age	Diagnosis	Duration	Previous treatment	Effect	Symp-	
						Pain	Vascular changes
1. 12570/52	Fem., 29	Raynaud	6 yrs.	÷	÷	××	÷
2. 7244/53	Fem., 31	do.	24 yrs.	÷	÷	×	÷
3. 10433/52	Male, 54	do.	30 yrs.	Smithwick bilat. Etylon, Vasodil	÷	×	×
4. 9499/52	Male, 50	do. & arterio- sclerosis	?	÷	÷	×	×
5. 1467/53	Fem., 36	Raynaud	20 yrs.	ACTH	÷	××	÷
6. 1447/53	Male, 53	Mb. Buerger lues antea, artscl.?	4 yrs.	Sympathicus blocks	(×)	××	××
7. 10899/51	Male, 52	Mb. Buerger	3 yrs.	Amp. & reamp. fem. sin.		×	×
8. 2290/30	Male, 54	do.	24 yrs.	Hyperton. NaCl.	÷	×	×
9. 1553/53	Male, 56	do.	15 yrs.	Sympathect. bilat. hydergin	÷	×	×
10. 5485/51	Male, 37	do.	4 yrs.	Klianyl	÷	×	×
11. 5067/52	Male, 61	artscl.	8 yrs.	÷	÷	×	×

TABLE 1

Trophics		Operation		Symptoms				Effect	Observation period
Trophic changes	Ulc. gangrene			Pain	Vascular changes	Trophic changes	Ulc. gangrene		
×	×	Medullect. & sympathect. bilateral.	LE ¹ UE ²	÷	÷	÷	÷	Healed No effect, improvement only after Smithwick bilat.	1 year
×	×	do.	LE UE	÷ ×	÷ ÷	÷ ×	÷ ÷	Healed Unchanged	3 months
×	×	do.	LE UE	×	×	×	×	Unchanged Unchanged	1 year
×	×	do.	LE UE	×	×	×	×	Worse Worse	¾ year
×	×	do.	LE UE	÷ ÷	÷ ÷	÷ ×	÷ ×	Improved Improved	1 year
×	÷	Medullect. & sympathect. sin.		×	×	×	÷	Worse	¾ year died after double amput. of fem.
×	×	Medullectomy dxt.		×	×	×	×	Worse	1 ½ year amp. fem. dxt. 1 year after
×	÷	Medullect. & sympathect. dxt.		×	×	×	÷	Unchanged	1 year
×	×	Medullectomy bilateral.		(×)	×	×	÷	Improved	1 year
÷	÷	do.		(×)	÷	÷	÷	Improved	1 ½ year
×	÷	do. with sympath. bilateral.		÷	(×)	÷	÷	Improved	1 ½ year

¹ Lower extremities. ² Upper extremities.

have had some effect where the intervention was bilateral, but not where a unilateral intervention was concerned. As already pointed out, the observation period is certainly too short yet for any opinion to be expressed as to how much more lasting is the effect of an adrenomedullectomy than that of a sympathectomy alone.

It is doubtful to what extent the effect on the arteriosclerosis in the one case may be attributed to the sympathectomy or the adrenomedullectomy, since the point can hardly be overlooked that a lumbar sympathectomy is still capable of persisting in effect 1¾ years after the operation is performed.

A more reliable evaluation of the adrenomedullectomy's effect would be gained by comparing a series treated purely by sympathectomy with a series treated only by adrenomedullectomy. As the effect of the latter operation alone, both according to the experiences given in the literature and according to our own experiences, seems to be uncertain, we have so far refrained from doing this. If the adrenomedullectomy should prove ineffective and if, in consequence, one wished to supplement the treatment with sympathectomy, these previously much-burdened patients would undergo four operations. We find this absurd, since the lumbar sympathectomy can be so easily performed during the same session as the adrenomedullectomy. With these points in mind we thought it right to publish this series, which merely illustrates the effect of the combined intervention, while fully aware that the conclusions which can be drawn are very uncertain.

As already stated the theoretical basis upon which the adrenomedullectomy rests, consists in the hyperplasia demonstrated in these diseases and the hyperfunction of the adrenal medulla presumably connected with this. If one assumes a causal connexion to be present between these adrenal gland changes and the existing vascular changes one may reasonably expect a unilateral operation to have no effect. The presence of aberrant medulla tissue which may possibly also show hyperplasia and hyperfunction reveals perhaps that bilateral operations are not effective in all cases either.

Even if the results of the operations in the present series are not convincing it seems reasonable to us to supplement the lumbar sympathectomy in particularly difficult cases with the adrenomedullectomy, both because in the existing series we cannot demonstrate adverse subsidiary effects of the adrenomedullectomy and because in these diseases—and this concerns cases of Buerger's disease especially—we face a situation where we have everything to gain and nothing to lose.

SUMMARY

Adrenomedullectomy was performed on eleven patients with advanced vascular diseases (two men and three women with Raynaud's disease, five men with Buerger's disease and one man with arteriosclerosis). In seven cases a bilateral operation was undertaken and accompanied in five of these by a simultaneous lumbar sympathectomy. In four cases a unilateral operation was performed, simultaneously with lumbar sympathectomy, in three of these cases.

In two cases (both Raynaud's disease with bilateral operation) the symptoms were seen to heal in the lower extremities although in the upper extremities no effect was obtained. In four cases (one Raynaud's disease with bilateral operation, two Buerger's disease and one arteriosclerosis with bilateral operation) improvement of the symptoms was seen. In the other five cases (three Buerger's disease with unilateral operation, two Raynaud's disease with bilateral operation) no improvement was found. The observation period varied from three to twenty one months.

RESUME

L'adrénomédullectomie a été pratiquée chez 11 malades souffrant de maladies vasculaires avancées (deux hommes et trois femmes souffrant de la maladie de Raynaud, cinq hommes de la maladie de Buerger et un d'artériosclérose). Dans sept cas l'opération a été bilatérale et dans cinq de ces cas elle a été accompagnée simultanément de sympathectomie lombaire. Dans quatre cas l'opération a été unilatérale et fut accompagnée dans trois de ceux-ci de sympathectomie lombaire simultanée.

Dans deux cas (tous deux de la maladie de Raynaud avec opération bilatérale) les symptômes ont disparu dans les membres inférieurs, alors qu'aucun effet n'a été obtenu dans les membres supérieurs. Dans quatre cas (l'un de la maladie de Raynaud avec opération bilatérale, deux de la maladie de Buerger et un d'artériosclérose avec opération bilatérale) on a constaté une amélioration des symptômes. Dans les cinq autres cas (trois de la maladie de Buerger avec opération unilatérale, deux de la maladie de Raynaud avec opération bilatérale), aucune amélioration n'a été constatée. La période d'observation a varié entre trois et vingt-et-un mois.

ZUSAMMENFASSUNG

Adrenomedullectomie wurde an elf Patienten mit fortgeschrittenen Gefässerkrankungen vorgenommen (zwei Männer und drei Frauen mit

Raynauds Erkrankung, fünf Männer mit Bùrgers Krankheit und einer mit Arteriosklerose). In sieben Fàllen wurde die Operation beiderseitig ausgefùhrt, in fünf von diesen mit gleichzeitiger lumbaler Sympatektomie kombiniert. In vier Fàllen wurde eine einseitige Operation ausgefùhrt, die in dreien von diesen mit gleichzeitiger lumbaler Sympatektomie verbunden wurde.

In zwei Fàllen (beide Raynauds Erkrankung mit beiderseitiger Operation) verschwanden die Symptome in den unteren Gliedmassen, wàhrend sie in den oberen unbeeinflusst blieben. In vier Fàllen (einer mit Raynauds Erkrankung und doppelseitiger Operation, zwei mit Bùrgers Krankheit und eine arteriosklerotische Erkrankung mit doppelseitiger Operation) wurde eine Besserung der Symptome beobachtet. In den fünf anderen Fàllen (drei Bùrger mit einseitiger Operation, zwei Raynaud mit beiderseitiger Operation) wurde keinerlei Besserung gefunden. Die Beobachtungsdauer schwankte zwischen drei und einundzwanzig Monaten.

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