

COMPARATIVE BLOOD PRESSURES IN THE TWO ARMS

SOME CLINICAL OBSERVATIONS

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OUR attention was first called to the striking variation of the blood pressure between the two arms in the following case.

Mr. G. reported for examination because, to his surprise, he had been rejected by an insurance company on account of high blood pressure. A recent examination by his physician, he said, was normal. The blood pressure in the left arm was found, by us, to be within normal limits, *i. e.*, 130 millimeters of mercury systolic and 80 millimeters diastolic. As an afterthought, to check this finding, the blood pressure in the other arm was taken and found to be 165 millimeters systolic and 90 millimeters diastolic. This was repeatedly checked. On further questioning of the patient we learned that the insurance examiner had taken the pressure in the hypertension arm. Our suspicions were aroused as to the frequency of this occurrence. On consulting the literature we were surprised to find so meager information regarding such an important fact. The majority of statements predisposed, within a few millimeters, that the blood pressures were equal in both arms. The only article we found with direct bearing was Bodenstab,¹ in the *Lancet* of 1925, who described the differences in the readings of the two arms and commented upon the importance of his findings.

The material for this study was obtained from observations upon patients comprising a general medical practice, ranging from a single examination to a series of examinations over a period of a year. Readings were made by the same individual, using a Tycos sphygmomanometer, in the usual auscultatory manner, palpation also being employed. Observations were successive in the two arms and were made in the sitting or reclining position. They were checked by one of us within a five-minute period.

One hundred and twenty-five patients were studied and five hundred readings were made. Variation of differences of five to ten millimeters in the systolic and diastolic readings were considered within the normal. One hundred cases, or 80 per cent, were within normal limits, while twenty-five cases, or 20 per cent, were distinctly abnormal. All of these were fluoroscoped and many of them radiographically checked.

A brief summary of the abnormal cases is arranged in the accompanying table showing sex, age, diagnosis, blood pressure and, in a few instances, treatment and results.

COMMENT

A study of the table submitted reveals that the arteriosclerotic and hypertensive patients more often show these variations. It is also seen that the greatest differences of blood pressures are found in this class of patients, and especially those with angina pectoris and aortitis. The group which is second in importance are those patients who have vasomotor disturbances, such as occur in the menopause.

In the age column, patients above forty-five years have the most marked variations. In the five younger patients, the differences are not so great. Of these it may be noted that only one has no disease, two have evidences of infection, one has an early arteriosclerosis and one a mucous colitis.

Sex apparently plays no part, since there are about an equal number of males and females.

The right arm is highest in the majority of cases, although we have observed in the same individual that there may be an interchange. In several cases after treatment, such as rest, sedatives, diet, etc., it is seen that the systolic and diastolic pressures drop and tend to equalize in both arms, for example, Cases Nos. 1, 18, 19, 21, 22 and 25. It is interesting to note that some patients equalize in the space of a few minutes without treatment. In these instances recovery from nervousness and excitement incident to the examination, seems to us to be the principal factor.

In a few patients, in the arteriosclerotic group, observed over a prolonged period of time, we found variations were more or less constant, *i. e.*, 9, 20 and 23. Case No. 23 illustrates how equalization and variation may reinterchange at some periods.

The reason for the difference of the systolic and diastolic pressures in the two arms is problematical. The fact that the pressure may later equalize, to again vary, and later again to equalize, and that occasionally a higher pressure may later be found in the arm in which it was formerly lower, rules out fixed anatomical differences as the cause. Rather does it suggest that it is due to varying functional changes in the condition of the arterial walls and, perhaps, of the capillary beds in the two arms.

It is disconcerting to the physician to find a normal reading in one arm and then to discover a high pressure in the other. From a life insurance standpoint these discrepancies are quite significant. A systolic pressure of 130 millimeters and 165 millimeters is, obviously, the difference between a normal and an abnormal blood pressure.

We realize that the number of our readings is comparatively small, but we feel that the occurrence of the differences of blood pressure in the two arms is sufficiently frequent, and of such clinical importance, as to warrant calling attention to it.

TABLE 1.—*Showing Different Blood Pressures in Twenty-five Patients*

Case No.	Sex	Age	Diagnosis	Blood Pressure		Treatment	Blood Pressure	
				Right	Left		Right	Left
1	F	64	Hypertension Arteriosclerosis Menopause symptoms	150/80	180/90	Ovarian injections	150/80	145/80
2	M	60	Arteriosclerosis Endarteritis obliterans	180/120	160/100			
3	F	50	Arteriosclerosis	165/100	145/90			
4	F	24	Colitis, mucous	135/85	120/90			
5	M	54	Hypertrophied prostate	85/40	110/50			
6	F	45	Menopause Autonomic imbalance	135/80	120/80			
7	M	31	Normal	110/80	125/80			
8	F	54	Postthyroidectomy, residual Menopause	160/110	145/100			
9	M	58	Arteriosclerosis Hemiplegia, residual 9/ 6/28 10/24/28 10/31/28	165/100 142/90 170/100	185/110 140/85 155/90			
10	M	54	Arteriosclerosis Angina pectoris	170/80	150/80	Diet, rest Sedatives	140/80	110/60
11	F	66	Hypertension Arteriosclerosis Aortitis	190/110	175/110			
12	F	66	Arteriosclerosis Myocarditis Hypertension, chronic	200/120	180/120			
13	F	38	Arteriosclerosis, early Aortitis	160/80	140/70			
14	F	51	Arteriosclerosis Menopause	200/120	160/100			
15	M	54	Arteriosclerosis Angina pectoris	140/90	110/80			
16	M	49	Chronic bronchitis Obesity	160/90	174/94			
17	M	18	Intranasal catarrh	148/92	134/78			
18	M	50	Arteriosclerosis Hypertension, chronic Angina pectoris	180/110	145/90	Rest	134/78	134/78
19	M	48	Hypertension Angina pectoris Myocarditis Nervous instability	145/100	165/110	Sedatives 7/14/28 7/21/28 7/27/28	140/90 140/80 140/80	150/90 150/70 140/90
20	F	60	Aortitis Myocarditis Menopause	185/120	165/100	Sedatives 7/21/28 2/28/29	170/95 160/90	155/80 145/80
21	F	55	Arteriosclerosis Myocarditis Glandular dysfunction	150/90	170/110	Sedatives	140/90	140/90
22	M	21	Intranasal catarrh	140/92	128/80	Rest 15 mins.	130/78	124/82
23	M	69	Hypertension Arteriosclerosis Aortitis Cerebral accident 4/28/28 5/28/28 12/ 6/28 2/ 5/29	195/100 160/90 210/100 175/80	170/90 160/90 180/90 175/80			
24	F	57	Arteriosclerosis	200/120	160/100			
25	M	54	Arteriosclerosis Angina pectoris	140/90	110/80	Rest 10 mins.	115/85	110/80

CONCLUSIONS

1. Marked variations of blood pressure readings occur frequently between the two arms, and may be of clinical importance.

2. The incidence of the greatest frequency of these variations is found in arterial diseases and functional vascular changes in individuals above the age of forty-five.

3. We believe the cause of these differences to be varying functional changes occurring in the blood vessels of the two arms.

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REFERENCE

1. Bodenstab, W. H.: Blood Pressure—Difference of Readings in the Two Arms. *Lancet*, August 1, 1925, 45, 15, 360-361.