

## BLOOD CREATININ FINDINGS IN FIVE CASES OF CORPUS STRIATUM DISORDER.\*

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The prominence of disturbance in muscle tonus and general motility characteristically obtaining in affections of the corpus striatum, is strongly suggestive, inferentially at least, of the possibility of concomitant alteration in muscle metabolism. It was deemed of interest, therefore, to study the blood creatinin in a series of such cases.

### PROCEDURE.

A group of five cases (table 1) was available for this study, including two cases of paralysis agitans, two of Huntington's chorea, and one of congenital double athetosis (Vogt's syndrome). These cases, males, were all typical as to specific disturbance and, with the exception of well compensated mitral lesions in two (1 and 4), were all, otherwise, clinically negative.

Preliminary blood urea and urine examinations, to exclude the possibility of retention or excretion defect due to renal disorder, showed (table 2) in the case of the former, values well within normal (1) limits and, as regards the latter, completely negative findings in cases 1, 4, and 5, and a trace of albumin in case 2 and a trace of albumin with an occasional granular cast in case 3, features of negligible significance from the standpoint of this study, particularly in view of the ages of these subjects and the definitely normal blood urea findings.

All of the patients comprising this series were placed upon a strictly meat free diet and kept at rest in bed, to preclude the possibility of interference dependent upon extrinsic activity.

Commencing on the sixth day of the diet, blood creatinin determinations (table 3) were made in each case (according to the technic of Myers and Killian, (2) utilizing the Myers colorimeter (3), on three occasions, at intervals of from one to three days. Because of collateral interest, study was also made of the blood sugar tolerance (table 4). This procedure was carried out on the basis of the

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TABLE 1  
CASES

CASE	NUMBER	DIAGNOSIS	AGE	DURATION
1—C. B. S.	18443	Paralysis Agitans	49	16 years
2—B. S.	16326	Paralysis Agitans	58	6 years
3—F. S.	17725	Huntington's Chorea	64	8 years
4—J. W. C.	14921	Huntington's Chorea	56	20 years
5—G. A. C.	18590	Double Athetosis	47	Congenital

TABLE 2  
URINE AND BLOOD UREA FINDINGS

CASE	DIAGNOSIS	BLOOD UREA (mg. per 100 c.c.)	DATE	URINE	DATE
1—C. B. S.	Par. Agit.	23.62	4/19/21	Negative	4/19/21
2—B. S.	Par. Agit.	34.62	4/19/21	Negative save for trace of albumen	4/18/21
3—F. S.	Chorea	28.25	4/19/21	Trace of albumin and occas. gran. cast	4/19/21
4—J. W. C.	Chorea	27.50	4/19/21	Negative	4/19/21
5—G. A. C.	Double Ath.	30.25	4/19/21	Negative	4/19/21

TABLE 3  
BLOOD CREATININ VALUES

CASE	DIAGNOSIS	BLOOD CREATININ (mg. per 100 c.c.)	DATE	BLOOD CREATININ (mg. per 100 c.c.)	DATE	BLOOD CREATININ (mg. per 100 c.c.)	DATE	AVERAGE
1—C. B. S.	Par. Agit.	0.404	4/22/17	0.388	4/23/21	0.475	4/27/21	0.405
2—B. S.	Par. Agit.	0.242	4/28/21	0.247	4/30/21	0.266	5/ 2/21	0.251
AVERAGE OF CASES 1 AND 2								
3—F. S.	Chorea	0.404	4/22/21	0.333	4/23/21	0.262	4/27/21	0.333
4—J. W. C.	Chorea	0.285	4/22/21	0.304	4/23/21	0.323	4/27/21	0.337
AVERAGE OF CASES 3 AND 4								
5—G. A. C.	Double Ath.	0.242	4/28/21	0.252	4/30/21	0.261	5/ 2/21	0.251

TABLE 4  
BLOOD SUGAR TOLERANCE

CASE	DIAGNOSIS	DATE	BLOOD SUGAR TOLERANCE				
			Fasting	After ½ hr.	After 1 hr.	After 2 hrs.	After 3 hrs.
1—C. B. S.	Par. Agit.	5/ 5/21	0.102%	0.121%	0.116%	0.129%	0.134%
2—B. S.	Par. Agit.	5/ 6/21	0.092%	0.200%	0.189%	0.121%	0.070%
3—F. S.	Chorea	4/28/21	0.110%	0.137%	0.113%	0.112%	0.100%
4—J. W. C.	Chorea	5/ 4/21	0.099%	0.190%	0.140%	0.140%	0.111%
5—G. A. C.	Double Ath.	5/ 7/21	0.095%	0.122%	0.185%	0.134%	0.097%

ingestion of 1.75 grams of glucose per kilogram of body weight, dissolved in 2.5 cc of water per gram of glucose, as recommended by Janney and Isaacson, (4) and the blood sugar estimations were made according to the technic of Myers and Bailey, (5) also with the utilization of the Myers colorimeter.

#### RESULTS.

It will be seen from table 3 that the blood creatinin values in all five cases show but little variation, in themselves, and as compared with one another except that they seem to be slightly lower in case 5 (double athetosis) than in the others. When compared with the so-termed standard norm (.8-2 mg. per 100 c. c. blood) 6, the findings, in these cases, representing corpus striatum disorder, will be seen to be very definitely and consistently below the normal minimum. The exact significance of this finding is not wholly clear altho it lends a certain emphasis to the presumption of the existence in these cases, of altered muscle metabolism. While it is probable that the somewhat diminished total muscle mass noted in such cases may be of some significance in this connection, yet, it will also be readily seen that no mean rôle is played by the change in muscle wear-and-tear dependent upon intrinsic disturbance of motility and muscular tonus, in the absence of the possibility of specific replacement, due to the restricted diet, and the generally lowered systemic vitality induced by the disease itself. This conception is borne out somewhat by the sugar tolerance curves which indicate, with the possible exception of case 1, relatively prompt utilization of the ingested glucose.

Of especial interest in this connection is the report by Janney, Goodhart, and Isaacson (7) of uniformly lowered blood creatinin values (.27-.55 mg. per 100 c. c. of blood) in a series of five cases of muscular dystrophy.

#### SUMMARY.

It appears from this study of five cases, representing three syndromes due to corpus striatum disorder, that the blood creatinin values obtaining in affections of this region are very definitely below the normal minimum, affording some indication thereby, of the possibility of concomitant alteration in muscle metabolism.

Grateful acknowledgment is made to Mr. A. Campbell, and Miss L. Cutler, of the Laboratory, for technical assistance in this work, and to Dr. H. Ostrander, Medical Superintendent, for permission to undertake and report this study.

## BIBLIOGRAPHY

- 1) Gilbert, Q. O.—Manual of Procedure for the Clinical Laboratory — Ann Arbor, M. 1919, p. 71.
- 2) Myers and Killian — Am. Jr. Med. Sci. 104-671 (1919).
- 3) Myers, V. C.— Jr. Lab. and Clin. Med. 760 (July) 1916.
- 4) Janney, N. W., and Isaacson, V. I.—A Blood Sugar Tolerance Test — J.A.M.A. 70 — 1131 — (Apr. 20) 1918.
- 5) Myers and Bailey — Jr. Biol. Chem. 24-147 (1916).
- 6) Henes E. Jr.—The Prognostic Value of Cholesterinemia in Chronic Nephritis — Arch. Int. Med. 25-411 (Apr.) 1920.