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Cardiac Output in the Pick Syndrome.

ALICE B. MALTBY. (Introduced by C. S. Beck.)

From the Laboratory of Surgical Research, School of Medicine, Western Reserve University, Cleveland.

The cardiac output of patients with the Pick syndrome was determined by means of the Grollman[1] indirect acetylene method. This procedure is applicable to such patients in spite of their reduced vital capacity if the volume of the gas mixture to be rebreathed is decreased and if the rebreathing period is slightly increased.

The cardiac output per minute per square meter of body surface Grollman[1] calls the cardiac index. He has found that under basal conditions the normal person has a cardiac index of 2.2 ± 0.3 liters per minute. Any deviation of the index from the normal 2.2 greater than 15%, when determined by the acetylene method, is considered pathological.

Mrs. S., age 54 years, with Pick's disease, who should have had an output of 3.50 liters per minute (calculated by multiplying the patient's surface area by 2.2), had an average output of 2.26 liters per minute, 36% below normal. The estimated normal output per beat is 47 cc.; she had an average beat output of 20 cc., her heart rate being 114 per minute.

Mrs. M., age 32 years, was operated on for the Pick syndrome. Her output normally should have been 3.04 liters per minute. Before operation she had an average minute output of 1.79 liters, 41% below normal. The tests after operation were carried out over a 2 weeks' period starting a month and a half after operation. Although there was not a striking increase in the average minute output of 1.84 liters (39% below normal), 5 of the 12 tests after operation reached a value never attained before operation. An average of the best 6 tests after operation gives an output of 2.05 liters per minute, only 33% below normal. This tendency toward improvement indicates that her heart has a reserve power and leads to the belief that as time goes on this patient's output will continue to improve. Before operation her beat output averaged 24 cc., her average heart rate being 75 per minute. After operation her beat output averaged 26 cc., the average heart rate being 71 per minute.

Mr. R., age 28 years, had a computed normal value of 4.25 liters

[1] Grollman, A., *The Cardiac Output of Man in Health and Disease*, Charles C. Thomas, Baltimore, 1932.

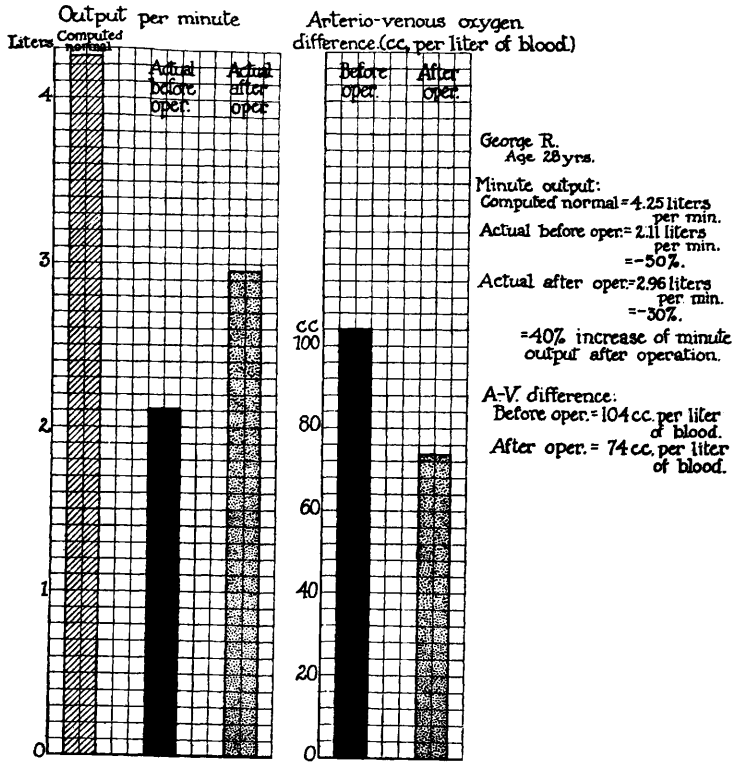

FIG. 1.

per minute. Before operation his average output was 2.11 liters per minute, 50% below normal. Six weeks after operation the output averaged 2.96 liters per minute, 40% above the preoperation output and only 30% below normal. (See chart.) In 3 of the tests after operation the output was practically normal *i. e.*, only about 15% below the computed normal value. Before operation his beat output averaged 28 cc.; his heart rate averaged 75 per minute. After operation his beat output averaged 34 cc.; his heart rate averaged 86 per minute.

The tests on F., a 17-year-old boy, are particularly interesting because they indicate the impovement of the patient 3 years after operation. (Unfortunately it was not feasible to get cardiac output tests on this boy before operation.) His computed normal output was 3.74 liters per minute and his average actual output of 3.27 liters per minute was only 12% below the computed normal value and therefore within the accepted normal range. His computed normal beat output was 53 cc. and his actual beat output of 46 cc. was only 13% less than his computed normal value and therefore within the accepted normal range.