

THE EFFECT OF TEMPORARY OCCLUSION OF RENAL CIRCULATION ON RENAL FUNCTION *

R. FITZ, M.D. AND L. G. ROWNTREE, M.D.
BALTIMORE

Of great importance in relation to the surgery of the kidney is the question concerning the length of time that the renal vessels may be clamped without permanent injury to renal function or renal tissue. The question is dealt with here experimentally. The renal vessels in rabbits and dogs have been clamped for varying periods of time, and subsequently renal function has been tested by the excretion of phenolsulphonephthalein, lactose, potassium iodid, salt and water. The presence or absence of albumin and casts in the urine has been observed. The results of such functional studies have been controlled by histological examination of the kidneys.

The effect of obstruction to the renal circulation on the urinary picture and the histology of the kidney has already been investigated. Robinson¹ showed that tying of the renal vein resulted in the appearance of albumin, blood, or both, in the urine, and in enlargement of the kidney. This has been confirmed by other observers. Paneth,² Munk³ and de Souza⁴ have shown that following ligation of the renal vein, the urine is small in amount. Ludwig⁵ found that clamping the renal vessels for a period of minutes frequently interfered with the secretion of urine for hours. Heidenhain⁶ found that on freeing the vessels after a temporary clamping the secretion of urine did not begin at once. Litten⁷ observed after clamping both renal vessels for periods up to two hours, that the kidney became enlarged and congested. If the renal artery alone was tied for one-half or one hour, albumin and casts appeared in the urine. Pathologically, the tubules were affected as shown by their

* Submitted for publication March 20, 1913.

* From the Medical Clinic, of the Peter Bent Brigham Hospital, Boston, and the Pharmacological Laboratory of the Johns Hopkins University, Baltimore.

* For review of literature concerning partial or complete obstruction to renal circulation see our previous paper, Rowntree, Fitz and Geraghty: Studies of Renal Function in Experimental Chronic Passive Congestion, THE ARCHIVES INT. MED., 1913, xi, 121.

1. Robinson: Med. Chir. Tr., 1843, xxvi, 51.

2. Paneth: Pflüger's Arch., 1886, xxxix, 515.

3. Munk: Berl. klin. Wchnschr., 1864, i, 333.

4. De Souza: Jour. Physiol., 1900, xxvi, 139.

5. Ludwig: Physiologie, 1856, ii, 416.

6. Heidenhain: Hermann's Handb. d. Physiol., 1883, v, Teil 1, 321.

7. Litten: Ztschr. f. klin. Med., 1880, p. 131.