

the same pH and indicator. The amount of 0.2 N HCl required to give the endpoint with a control in which water replaces the urine is subtracted. Of the organic acids known to be present in urine in quantitatively significant amounts, the titration measures from 93 to 100 per cent. of each. It also includes very weak bases, but apparently of this class of substances only creatine and creatinine are significant; they are titrated to nearly 100 per cent. The titration figure, corrected for the amounts of these two bases, represents the organic acids.

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Some significant chemical changes in the blood coincident with malignant tumors.

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With the view of ascertaining the systemic effect of malignant neoplasms upon the organism, a series of sixty cases of various types of malignancies have been studied and contrasted with benign tumors. The data accumulated comprise determinations of the uric acid, urea, creatinine, sugar, diastatic activity and carbon dioxide combining power of the blood; the phthalein excretion; the occurrence of proteinuria and casts; and the blood pressure.

Two thirds of our cases of malignancies present evidence of an impairment of kidney function. The appearance and progress of this renal insufficiency follows the order characteristic of interstitial nephritis, described by Myers and his co-workers. The nitrogenous waste product first to be retained is uric acid, later urea and finally creatinine, and paralleling the accumulation of these nitrogenous substances there was noted a drop in the carbon dioxide combining power of the blood. A hyperglycemia and an increased diastatic activity pointing to a lowered carbohydrate tolerance, were encountered only in those cases mani-

festing a nitrogen retention, and as this retention became more marked, the hyperglycemia and increased diastatic activity kept pace with it. Apparently, then, the hyperglycemia and lowered carbohydrate tolerance, as gauged by the diastatic activity of the blood, must be attributed not specifically to the malignant new-growth but rather to the impairment of renal function. A further evidence of this impairment of kidney function was furnished by the decreased phthalein excretion, and the presence of protein and casts in the urine. Hypertension was noted in only a few instances.

This renal involvement was found to be associated invariably with general carcinomatosis; in 90 per cent. of carcinomata of the bladder, prostate, uterus and rectum and in about 50 per cent. of gastric carcinomata. On the other hand, carcinomata of the breast and epitheliomata produced no such changes. Of the small number of sarcomata coming under our observation, but one, a sarcoma of the kidney, disclosed a renal impairment. In all cases of non-malignant tumors no impairment of kidney function was noted. Further, the removal of the new-growth did not decrease the concentration of the nitrogenous substances in the blood, but in many instances, anesthesia and surgical procedures provoked an acute exacerbation of the condition. The termination of some of our cases was typically uremic. It is worthy of note that the chemical changes described bore no relation to the age of the patients.

Three cases of carcinoma of the pancreas have been studied by us. In two instances the diagnoses have been confirmed at autopsy. In all three cases, a hyperglycemia and a markedly increased diastatic activity were found, but in one instance only was there evidence of renal involvement. In this particular case there was an extreme asthenia and cachexia. All three cases showed glycosuria.