

## 招待講演

### KINETICS OF RADIOPHARMACEUTICALS IN THE KIDNEY AS A WHOLE AND IN DIFFERENT REGIONS OF INTEREST

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Various radioactive labelled compounds are eliminated either by glomerular filtration, tubular secretion or tubular reabsorption. Using a scintillation camera, a 4096 channel analyser with a digital magnetic tape (Inter technique system) and sometimes a computer the increase and diminution of radioactivity in the kidney was proved. After intravenous and occasionally after intraarterial injection of compounds the elimination was studied in the whole organ, selected areas or in pararenal tissues. With sequential scintigraphies the tracer inflow, its concentration, intrarenal transport and evacuation from the renal pelvis was demonstrated. Integral curves obtained from corresponding regions of interest facilitated the functional analysis of vascularization, tubular function, urine flow through the renal cortex and medulla and the dynamics of the upper urinary tract. In numerous studies in dogs the results with radioisotopic methods were compared with those of direct microscopic observations in the decapsulated kidney after simultaneous application of Lissamin-green, which is excreted only by glomerular filtration. The aim was to point out typical functional and morphologic signs in vascular, inflammatory and obstructive diseases of the kidney or upper urinary tract. In renal artery stenosis a reduced inflow, a slight delayed intrarenal transport and a delayed pelvic evacuation of glomerular filtrated and tubular secreted radiopharmaceuticals were observed. The tubular reabsorption was less affected. After increasing

pressure in the ureter we observed a delayed elimination of radioactivity from the renal pelvis. The inflow and renal concentration were untouched. Some additional informations were obtained in dogs with renal transplantation. In renal artery thrombosis a lack of radioactivity in the transplant was seen. In rejection a reduced inflow, a diminished extraction rate for radiohippuric acid and a delayed evacuation was the rule. A typical sign of ureteral fistula was the accumulation of radioactivity outside of the transplant and bladder. More than 4000 examinations in human confirmed the experimental results. The examination of 43 patients with renal artery stenosis, 45 patients with hydronephrosis and 236 patients with inflammatory diseases are presented. In more than 80 per cent of patients with pyelonephritis or glomerulonephritis a delayed intrarenal transport, reduced concentration or delayed evacuation were found. The data processing system has proved its clinical value in cases with circumscribed pyelonephritis, partially disturbed evacuation and renal transplantation. For these studies tubular secreted radiopharmaceuticals are suitable provided a sufficient diuresis. As shown in 27 patients, glomerular filtrated substances do not have advantages. However, it is better to examine the renal vascularization with pertechnetate or glomerular filtrated compounds. Comparing the renal angiography with sequential scintigraphy in 64 patients the values and limits of both methods are discussed.