Renal Hemodynamic Studies using Simultaneous Double Isotope Technique

S. YOSHIDA and Y. NAKANISHI

Department of Radiology, Kobe University, School of Medicine, Kobe

Serial renal scintigraphy was performed by using intravenous injection of a bolus of ^{99m}Tc-Pertechnetate (80 μ Ci/kg) and ^{131}I-Hippuran (8 μ Ci/kg). With the patient in a sitting position, ^{99m}Tc-Perfusion serial scintiphotos were taken in every 5 seconds during first 25 seconds. Serial scintiphotos of ^{131}I-Hippuran were taken in every 10″–30″, 1′–3′, 4′–6′, 14′–16′. All findings were stored on the computer on line system.

Using the "Region of Interest" technique on kidney, renal ^{99m}Tc-Perfusion curve during first 50 seconds and ^{131}I-Hippuran renogram for 16 minutes were obtained. Mean renal transit time was calculated from the ^{99m}Tc-Perfusion curve based on the Hamilton and Lilienfield method.

As a parameter for a renogram we calculated secretory angle(θs), Tmax(time from inj. to peak), $T_{75}\%_{max}$ (time from inj. to 75% of peak). Well correlation was found between the mean renal transit time and secretory angle ($r=-0.61$ ($p<0.01$)), T75%max ($r=+0.57$ ($p<0.01$)), Tmax ($r=+0.52$ ($p<0.05$)).

5 sorts of types of ^{99m}Tc-Perfusion curves during first 50 seconds were recognized in controls and various renal diseases.

In the first type steep curves were noticed in both build up and disappearance phase, which was seen on normal subjects.

In the second type gradual build up and disappearance were recognized which was seen on decreased renal perfusion diseases.

The third type showed gradual build up phase without decreased phase, which was often seen renal vascular diseases.

In the fourth type build up phase rapidly reached plateau, which was seen on avascular renal tumors.

The fifth type showed the steep build up and gradual decrease, which was rapidly followed with plateau. This means tumof stain.

Analysis not only from the images but also from the patterns of ^{99m}Tc-Perfusion curves and mean renal transit time was confirmed much useful and important for obtaining the detail information of the renal blood supply and the tubular function.