the surrounding alveoli. The "O_2 sensing device" has nothing to do with a higher center such as the central nervous system. However, in the normal lung, a peripherally located "CO_2 sensing device" is under control of a higher center which inhibits the vasodilating impulse from the "CO_2 sensing device" to the vascular smooth muscle when exposed to hypercarbia in the presence of hyperoxia. In the denervated lung, this inhibition cannot work and hypercarbic vasodilation takes place.

An Analysis of Cortical Renal Blood Flow by Means of Early Image on 99mTc-DMSA Renal Scintigram

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It is well known that ^{99m}Tc-DMSA renal scintigram can provide a good qualified static image due to the preferential cortical accumulation of DMSA. The early dynamic image of DMSA renal scintigram reveals an initial cortical perfusion, reflecting a nuclear angiography with Tc compounds. Renal counting was initiated immediately after the administration of 2mCi of DMSA and each count was recorded in the data store play back system which was connected with the minicomputer. After ROI was set with a subtraction of renal back ground, renal counts were traced during 90 sec. to obtain a curve of DMSA renogram from each kidney. Then, four parameters were extracted from this curve as follows: i) T_{max} of maximum peak time on this curve, ii) C_{max} of counts at Tmax, iii) tan θ of an angle of the upslope part of the curve (C_{max}/T_{max}) and iv) Tplateau (Tpl) of the time when a constant count was obtained on the curve after passing a peak. In this study, those four parameters were investigated in the variety of renal diseases and the implications were discussed.

In the case of renal cell carcinoma with neovascularity of the cortex, T_{max} and Tpl were prolonged, Cmax increased and tan θ was normal. In the case of hypertensive kidneys, while T_{max} and Tpl were prolonged, C_{max} was within normal limits. However, in the case of nephrosclerosis, C_{max} and tan θ decreased associated with prolonged T_{max} and Tpl.

In the case of mild hydronephrosis, while C_{max} and T_{max} decreased, Tpl increased and tan θ was within normal limits. On the extension of the severity of hydronephrosis, Tpl and tan θ were prolonged or decreased. In the cases of glomerulonephritis and pyelonephritis with moderate lesions, while T_{max} and C_{max} decreased, Tpl and tan θ were still within normal limits. In the advanced cases of such diseases and in the case of diabetic nephropathy, all parameters were decreased.

In the cases of solitary renal cyst and congenital small kidney, while C_{max} decreased, other parameters were within normal limits.

From this study, T_{max} indicates initial cortical blood flow rate, C_{max} initial cortical distribution volume, Tpl effective perfusion rate and tan θ effective perfusion area. While abnormalities in Tmax and Tpl reveal pathologic changes in the cortical vascularity, those in C_{max} and tan θ indicate cortical parenchymal pathologies. Particularly, tan θ may indicate a functional balance between cortical perfusion rate and area.

In conclusion, various combinations of the four parameters can allow to classify renal cortical diseases on the basis of renal hemodynamics.