It revealed 70 to 80% in normal control. There seems to be some correspondence between $r_h$/MTc and cerebral vascular state. For the wide distribution of $r_h$/MTc, 40 to 90%, we think that the use of transportation lag only (mode transit time) or first order system only (decrement slope) as a substitution of cerebral mean transit time can not avoid a indefinite deviation of measurement in each cases.

**Intrarenal Distribution of Blood Flow in Patients with Heart Disease**

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The mechanisms by which patients with congestive heart failure show reduced renal plasma flow and increased filtration fraction are still not well understood.

Materials and Methods:
In twenty-five subjects with valvular heart disease, $^{133}$Xe washout curves were performed. Six hundred microcuries to one millicurie of $^{133}$Xe in saline were injected into a renal artery through a red Kifa catheter. Te resultant curves were analized into four components in normal and three to four ones in patients with heart disease. Auto-radiograph in dogs with heart failure was undertaken to relate each component to the anatomical background of the kidney.

Results
Total renal blood flow derived from $^{133}$Xe washout curves was in good correlation with cardiac output ($r = 0.60$ p less than 0.01). Instead RBF derived from renal clearance did'nt show any correlated with cardiac output ($r = 0.51$, p less than 0.01). There is a positive correlation between total renal blood flow and RBF ($r = 0.51$, p less 0.01), and no significant relation between total renal blood flow and GFR ($r = 0.32$ p more than 0.10). The means and SD of total renal blood flow in control and in patients with heart disease are $369 \pm 49 \text{ ml/min/100 g}$ and $209 \pm 67 \text{ ml/min/100 g}$, respectively (p less than 0.01). The percent distribution to outer cortex and the flow rate in controls and subjects with heart disease is $88 \pm 3\%$ and $66 \pm 22\%$, respectively (p less than 0.001), and $414 \pm 71 \text{ ml/min/100 g}$ and $307 \pm 73 \text{ ml/min/100 g}$ (mean $\pm$ SD). The renin secretion rate is inversely related to the percent distribution to outer cortex.

Conclusion
Total renal blood flow and outer cortical flow were decreased in pararell with cardiac output. Total renal blood flow showed a greater correlation with cardiac output than RBF and PSP test did. The washout curve has an advantage over the conventional clearance method as it is possible to easily perform the $^{133}$Xe washout curve in oliguric patients with severe heart failure during diagnostic cardiac catheterization.