

### **Application of the Disposable Centralvenouspressure-Manometer Set to the RI Diagnosis of Vesicoureteral Reflux**

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Cystourethrography combined with fluoroscopy is usually employed for detection of vesicoureteral reflux (VUR). Apperson and associates reported isotope cystogram with intravesical pressure and vesical volume determination in 1963. We tried to apply a disposable manometer set (Sumidas') infusion-centralvenouspressure-manometer) for this purpose. The equipment and procedure to detect the activity was the same as the standard renography. The patient was placed prone. The bladder was emptied of urine through Foley balloon catheter. Five to 15  $\mu\text{Ci}$  of  $^{131}\text{I}$ -Hippuran was diluted with 200 ml. of saline or electrolyte solution. The bottle of RI solution was placed 100 cm. above the level of the bladder and connected to the catheter with the manometer set. The solution was instilled into the bladder until the patient complained of a severe urgency to void. Then he was asked to exert abdominal pressure and compressed lower abdomen with manual procedure. After these observations,

the solution was drained by a siphon effect. The infused volume and intravesical pressure were measured frequently throughout these procedure. The activities of reflux were easily detected by the probes directed towards each kidney. This procedure was repeated few times to show reproducibility of reflux. The catheter was removed following recovery of the solution into the bottle. We performed this procedure in 5 children with chronic urinary tract infection.

We recognized three types of VUR. The first was the low-pressure type, which detected soon after the infusion was started as if the bladder and the pelvis are freely communicated. The second was the high-pressure, transient type. And the third was the high-pressure, continuous type. In this type, reflux was observed for few minutes after the bladder had been emptied.

This procedure can detect VUR easily without special equipment and offers useful information about its pathophysiology.

### **Hemodialysis Monitor Using Radio Isotopes**

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The recent diffusion of hemodialysis has been remarkable. In performing hemodialysis, its efficiency is judged through biochemical examina-

tions, mainly by examining the levels of BUN and creatinine. While in the case of long-term dialysis, a certain duration for dialysis is deter-

mined beforehand on the basis of data on each case. If it is possible to easily detect momentary dialysis efficiency, it will be useful for regulating dialysis time and examining patients. Based on the idea, a hemodialysis monitor taking advantage of RI has been developed.

Our experiment was performed with 6 normal dogs and 15 uremic dogs of 10 kg to 20 kg weight, using  $\text{Na}^{99\text{m}}\text{TcO}_4$ , and  $^{99\text{m}}\text{Tc}$  (Sn)-DTPA as RI substance. In the experiment, a Mera-coil type dialysis apparatus was used. RI in blood was measured by a scintillation detector ( $1/2 \times 1$ " crystal) installed 0.5 cm apart from the dialysis circuit.

- (1) For normal dogs, examinations were made on temporal decrease of  $\text{Na}^{99\text{m}}\text{Tc}$  (Sn)-DTPA in blood flow and on excretion into urine. The detected decrement curve proved to have three phases.
- (2) For undialysed uremic dogs, detection was made on the decreasing rate and distribution of RI. 200 minutes after injection, RI activity

was found in bile juice and gastric juice. The RI decrement in the undialysed uremic dogs was slower than that in normal dogs.

- (3) Dialysis was performed on 9 uremic dogs, and relationship between RI clearance in blood and BUN/creatinine values. As a result, it was revealed that the RI level showed a correlation with BUN/creatinine levels. In the case of dialysed uremic dogs, the decline of decrement curve was apparently larger than that of undialysed uremic dogs.

#### **Conclusion:**

- (1) Fundamental experiment was carried out on a monitor designed to detect momentary dialysis efficiency, taking advantage of RI.
- (2) In the case of dialysed uremic dogs, a correlation was recognized between the temporal decrease of BUN/creatinine and that of RI.
- (3) Selection of RI suitable for clinical applications and simplification of this monitor is now under consideration.