crease both flow velocity and tubulent flow. In man blood flow imagings were observed at the places where blood was static such as the left atrium of the patients with mitral valvular stenosis and left ventricular aneurysm of myocardial infarction. Thus MRI flow imagings were applicable to the assessment of the cardiovascular system.

-200-

QUANTIFICATION OF BLOOD FLOW VELOCITY USING MAGNETIC RESONANCE IMAGING

T. Matsuda, S. Hashimoto, H. Nonogi,
T. Sakurai*, S. Tamaki** and C. Kawai

Third Division, Department of Medicine, and
* Department of Biomedical Informatics,
Kyoto University, ** Takeda Hospital

A new method to quantify flow velocity using Magnetic Resonance Imaging (MRI) was evaluated in a flow phantom and in human abdominal aorta. A small mass of flowing fluid in a tube or a vessel was selectively excited as a tagged plug by MRI. After a certain period of time, the plug moved along the flow direction and the displaced plug was directly visualized by a new pulse sequence. Then flow velocity was calculated as the displacement distance measured on the image divided by the known time between excitation and visualization.

In a phantom (U-shaped vinyl tube, 12 mm inner diameter) study, the reliability of quantitative measurement by the new MRI method was evaluated using steady water flow of known flow rates. The flow rate by MRI was calculated as measured velocity multiplied by the cross sectional area of the phantom. The calculated flow rate by MRI correlated very well with the actual flow rate up to 20 l/min (3 m/sec) ($r=0.999$). The displaced fluid showed a shape like an arrow head, probably representing parabolic distribution of flow within the tube. In the volunteer study, blood flow velocity in the abdominal aorta was measured at every 50 msec. through one cardiac cycle using electrocardiographic gating, and was compared with the measurement by ordinary Doppler ultrasound. The absolute value of velocity as well as the pulsatile flow pattern showed good agreement among these two methods.

The new MRI method is a useful non-invasive measurement of blood flow, and further application such as evaluation of intravascular velocity distribution is also suggested.

Chairmen

201-208 K. Konishi, *Kaizuka*
S. Ogawa, *Tokyo*

-201-

SERIAL ELECTROPHYSIOLOGIC STUDIES WITH MULTIPLE DRUGS USING TRANSESOPHAGEAL ATRIAL PACING IN INFANTS AND CHILDREN WITH PAROXYSMAL SUPRAVENTRICULAR TACHYCARDIA

Yoshiki Fujiseki, M.D., Masahiko Okuno, M.D.,
Hidetoshi Fujino, M.D., Masanori Hattori, M.D.,
Morimi Shimada, M.D.

Department of Pediatrics
Shiga University of Medical Science
Setatsukinowa, Ohtsu, Shiga JAPAN

Ten infants and children with paroxysmal supraventricular tachycardia (PSVT) underwent serial electrophysiologic studies using transesophageal atrial pacing (EPS-EP) to determine

the predictive value of EPS-EP in the selection of antiarrhythmic regimen and to establish the therapeutic efficacy of available drugs.

In each patient, PSVT could be reproducibly initiated by burst and premature stimuli. After control EPS-EP, the effects of serial drugs (diltiazem, disopyramide, procainamide, propranolol, digoxin) on the ability to initiate PSVT or the change of tachycardia zone were examined. Mechanisms of PSVT were also studied using esophageal electrogram and EPS-EP.

Five patients had reentry via a bypass tract, two with intra-atrial reentry, one with reentry via unidirectional bypass tract and one with AV nodal reentry.

Drug responses were variable. Tachycardia were not inducible after one or two drug administration in almost all cases. A chronic oral drug was started in six patients by the drug by which tachycardia zone was disappeared or narrowed except one infant. All patients were successfully followed for at least six months. Three had no recurrences and other three have had recurrences of PSVT, but frequency and duration of PSVT were decreased in two patients.

This study suggests that serial EPS-EP provides rapid identification of successful antiarrhythmic therapy and may enable predict that in which patients conventional therapy would be ineffective.

-202-

APPLICATION OF TRANSESOPHAGEAL ATRIAL PACING IN THE CHOICE OF DRUGS FOR LONG TERM TREATMENT OF PAROXYSMAL SUPRAVENTRICULAR TACHYCARDIA

F. Kiya, M. Tanigawa, C. Ueyama, K. Kitano,
M. Fukutani, K. Yano, K. Hashiba.

The Third Department of Internal Medicine,
Nagasaki University School of Medicine

The results of acute drug testing by using transesophageal pacing were compared with those of long-term oral therapy in cases of paroxysmal supraventricular tachycardia (PSVT).

The induction of PSVT before and after intravenous or 4-days oral administration of the following drugs, could be performed within 10 days in 12 cases: procainamide (11 cases), disopyramide (4 cases), aprindine (1 case), flecainide (4 cases), propranolol (6 cases), verapamil (6 cases) and diltiazem (10 cases). Out of all 12 cases, procainamide (1 case), propranolol (1 case), verapamil (2 cases), and diltiazem (3 cases), of which intravenous administration prevented induction of PSVT in each case, was given orally for 4 to 12 (mean 8.7) months in 7 cases with one or more episode a month. Two of these 7 cases have been free of PSVT and the other 5 cases showed only self-limited tachycardia and/or significant reduction of the episodes of PSVT while receiving long-term oral therapy.

Five of these 7 cases also underwent induction of PSVT after 4-days oral administration of the drugs. Four of these 5 cases did not show any induction of PSVT and the remaining one had induction of sustained tachycardia.

In conclusion, the transesophageal pacing is available for performing acute drug testing repeatedly within several days to predict the drugs for long-term treatment.