by the Fick method) in the pulmonary curves with a coefficient of correlation +0.85. In order to eliminate the influence of the original flow in which the shunt flow does not partake half-time was divided by build-up time (T½/ BT). T½/ BT was better correlated with left-to-right shunt ratio than T½ in both precordial and pulmonary curves. Especially in the latter a remarkably high correlation was observed with a coefficient of correlation +0.92, giving a regression equation:

\[ X = 29.88(Y - 1.61) + 47.66 \]

where X represents shunt %, and Y T½/ BT. The standard deviation of the differences between the values of the shunts determined by the Fick method and by this T½/ BT method was 7.79 per cent. In the pulmonary curves C(p+2BT)/Cp was better correlated with shunt % than C(p+BT)/Cp.

Since Prinzmetal described radiocardiograms, many attempts have been made to analyse the externally recorded dilution curves; Shapiro et al. employed DT/BT, Cornell et al. DT*BT, and Braunwold et al. C(p+BT)/Cp. However, no attempt has been made to quantitate the studies as yet. We have shown in this report that T½/ BT of the pulmonary curves can be used not only for the screening of the patients with heart murmur but also for the approximation of the left-to-right shunt ratio. We also feel that this method is highly valuable in the detection of a postoperative residual shunt and in the cardiac evaluation of infants in whom cardiac catheterization is too hazardous to perform.

Clinical and Experimental Studies on Comparison of Pulmonary Blood Flow in Various Respiratory Diseases with Radiocardiogram

A. YAMAGUCHI, T. HAGIHARA, S. NAKAJIMA, S. NISHIJIMA, I. KASE,
H. FUKAYA and T. IZUKA

The First Department of Internal Medicine, Nihon University School of Medicine

The pulmonary circulation of various respiratory diseases were studied from the standpoint of the pulmonary blood flow on measuring R-L time, HB-HS time, total circulating blood volume, pulmonary blood volume and cardiac output clinically and experimentally with radiocardiogram.

The following results were obtained.

1. 20 normal clinical cases showed on an average 5.0 seconds in R-L time, 23.5 seconds in HB-HS time, 4700 ml in total circulating blood volume, 410 ml in pulmonary blood volume and 4.9 l/min. in cardiac output; and 37 normal experimental cases showed 2.7 seconds in R-L time, 16.8 seconds in HB-HS time, 1300 ml in total circulating blood volume, 181 ml in pulmonary blood volume and 36 l/min. in cardiac output on an average.

2. The values in these normal cases were little influenced by the variety of ages, but the weight in these cases influenced on total circulating blood volume and pulmonary blood volume, and the increase of weight was relative to them directly. The pulse was relative to R-L time and HB-HS time inversely. The increase of pulse shortened R-L time, but it showed the tendency of increased total circulating blood volume, pulmonary blood volume and cardiac output.

3. Pulmonary tuberculosis in pulmonary diseases and the worse of focus in pulmonary abscess and lung cancer caused to prolong R-L time and HB-HS time but to decrease pulmonary blood volume and cardiac output.

4. In bronchiectasis, R-L time and HB-HS time did not show marked differences, and pulmonary blood volume and cardiac output volume showed the tendency of decrease. In bronchial asthma, in attack-free interval, they showed little difference to them in normal cases, but during attack, R-L time tended to be prolonged and pulmonary blood volume and cardiac output to be increased.

5. In pleurisy, compared with the normals, pulmonary blood volume showed the decrease, but cardiac output showed the increased tendency when pleural effusion raised high. Experimental pleurisy and pneumothorax

Presented by Medical*Online
showed little difference in their pulmonary blood flow.

6. In experimental pulmonary blood volume decreased temporary, but after three weeks, it increased again. It was thought that it correlated to the remarkable increase of bronchial arterial blood flow, added increased pulmonary blood volume in non-diseased lung.

A Study of Radiocardiogram During General Anesthesia

M. ENDO, M. KOZAKI, T. MIYAKE and et al.

Department of Anesthesiology, Tokyo Medical College, Tokyo

A very few literatures have been reported on variations of mean pulmonary circulating time during anesthesia with relatively new anesthetics such as Fluothane or Penthane. Therefore, comparative study was carried out by the author on the radiocardiograms which were traced during fluothane, penthane, ether or thiamylal anesthesia and their emergence after a rapid infusion of RISA (50 μCi at each time) using experimental animals. From those radiocardiograms, the author analysed mean pulmonary circulating time, pulmonary blood volume and cardiac output with the Stewart-Hamilton's method. Circulating blood volume was measured by a Well typed counter.

The following results were obtained from the above experiments.

1) Under spontaneous respiration, mean pulmonary circulating time in Fluothane or Penthane anesthesia was prolonged twice to 3 times the normal value.

2) Circulating blood volume decreased during surgical stage and increased on emergence in either anesthetics. The author presumes that probably this phenomenon may be caused by primary congestion (pooling) of circulatory blood volume in some organs during anesthesia.

3) Cardiac output reduced during deep anesthesia and increased on emergence without distinction of anesthetics.

4) Pulmonary blood volume increased rate was penthane, fluothane and thiamylal. On the contrary, pulmonary blood volume was not so reduced on emergence from fluothane or penthane anesthesia though it was markedly decreased on emergence from ether or thiamylal anesthesia.

Several Considerations on Continuous Recording of Pulmonary Blood Volume Using with External Counting Method of RISA

J. ATARASHI, M. YOSHIMURA, K. HARA, A. TERASHI, T. MIYAZAKI, M. YAMATE,
T. KIUCHI, H. IWASAKI, T. YAMANO, T. TACHIBANA and T. MIYAZAKI

The Second Department of Internal Medicine, Nihon Medical School, Tokyo

We have already reported the continuous recording technique of pulmonary blood volume.

In order to explain the physiopathological behavior of pulmonary circulation in normal subjects and chronic pulmonary diseases (bronchial asthma, chronic bronchitis and so on), we tried the continuous recording of PBV with above method.

When 4% CO₂ gas was given, PBV in each group decreased gradually and then maintained almost steady levels until CO₂ was removed.

Analising these behaviors in each groups which was brought with 4% CO₂ inhalation, we found some prominent drifts of PBV re-