Comparison of the Precordial Method with Single Injection of Rb-86 with Nitrous Oxide Method for Measurement of Coronary Blood Flow[1]

Introduction. A method for measuring coronary blood flow (CBF) by means of precordial counting after single intravenous injection of Rb-86 or K-42 has recently been described[2]. The method has several potential advantages, namely the possibility of large application at clinical level, since it does not require catheterization of the coronary sinus, and the fact that every volume unit of the myocardium, no matter how well perfused or by which way it is drained, contributes to the measured CBF value. In consideration of its potential interest, it was thought advisable to compare the results of the Rb-86 single injection technique with those obtained by the nitrous oxide method and coronary sinus catheterization.

Material and methods. (A) Technique: The method for measuring CBF by means of precordial counting has been previously described[2]. This method has been slightly modified, in the sense that a double counting unit composed of two scintillation counters, looking at the heart from front and back, was used in place of the previously described precordial method. This modification will be described in detail elsewhere[3].

The nitrous oxide method as modified for coronary sinus flow was used for comparison purposes[4].

(B) Experimental procedure: All the experiments were performed on resting, fasting subjects, without premedication. The coronary sinus was cannulated using a Goodale-Lubin catheter, and a Cournand needle was inserted in the brachial artery. MCK was measured by the usual technique, immediately before and after measurements of CBF with nitrous oxide.

(C) Experiments performed: Eleven cases were examined: 8 of them were cardiovascular normals, and 3 had ischaemic heart disease. People with myocardial infarction or with marked signs of regional heart ischaemia were purposely excluded from the study.

Results. The values for coronary blood flow obtained by the nitrous oxide method and those obtained with external counting are reported in the Table and in the Figure. It can be noted that all the values are comprised within a $\pm$ 20% deviation from the identity line. The averages were 72.4 $\pm$ 16.8 (S.D.) and 68.6 $\pm$ 16.1 ml/min/100 g of myocardium for the nitrous oxide and the rubidium methods respectively.

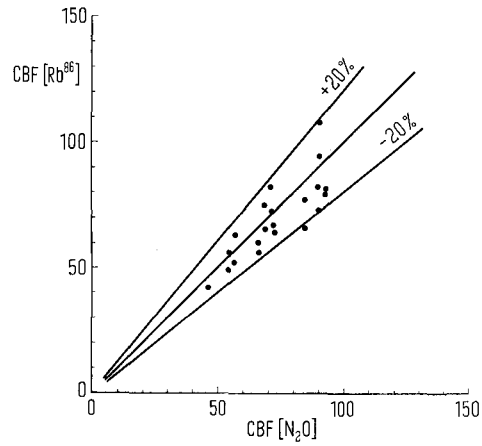
Discussion. Comparison of the values obtained with nitrous oxide with those derived from the Rb-86 single shot method shows a highly satisfactory agreement between the two approaches.

The agreement of the two methods under the present conditions, and over a wide range of values explored, seems to confirm previous conclusions concerning the adequacy of the Rb-86 single shot method for measurement of CBF.

It should be pointed out that in choosing the subjects for this comparative study, those in whom the history or the ECG data indicated the presence of marked perfusion inequalities were purposely discarded, since it is known that the nitrous oxide method may be deceptive in such conditions.

The present results seem to confirm that the Rb-86 single shot method may be considered to represent an adequate technique for CBF studies on large series at clinical level.

Case	CBF (RB-86) 1	2	m	CBF (N_2O)
1	74.3	81.9	78.1	71.1
2	94.8	108.2	101.5	90.5
3	65.5	77.0	71.3	84.7
4	79.4	80.2	79.8	91.7
5	66.8	64.7	65.8	71.9
6	75.3	65.5	70.4	69.0
7	72.6	82.1	77.4	90.0
8	55.7	59.8	57.8	66.4
9	52.1	64.4	58.3	56.7
10	48.9	56.5	52.7	54.3
11	41.9	–	41.9	46.1
Mean	–	–	68.6	72.4
S.D.	–	–	16.1	16.8



Comparison of the coronary blood flow (CBF) as measured by the RB-86 and N_2O methods.

Riassunto. Il confronto tra i valori del flusso coronarico ottenuti con il metodo della clearance miocardica del Rb-86 e quelli osservati con il metodo del protossido d'azoto è risultato altamente soddisfacente. È stata, pertanto, ulteriormente confermata la validità del metodo della clearance miocardica del Rb-86 nello studio del flusso coronarico nell'uomo.

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