

Hepatic Blood Flow in Hepatic Bilharzial Fibrosis Before and After Surgery

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SUMMARY

This review confirms that in hepatic bilharzial fibrosis the hepatic blood flow (HBF) values obtained indirectly by the depuration constant of ^{131}I rose bengal are within the limits of normality.

The variations of the HBF before and after splenectomy and splenorenal shunt were also studied.

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The values of hepatic blood flow (HBF) are important in the studies of portal hypertension.

The radio-isotopic measurements of HBF with ^{198}Au colloid or ^{131}I rose bengal, which have the advantages of technical ease and comfort for the patients, are suitable for correlation studies between HBF and portal hypertension.

Several authors have suggested that in bilharzial fibrosis the HBF values are within normal limits.^{1,2} In the present study this statement is reaffirmed and the variations of HBF for periods up to 2 months after splenectomy and splenorenal shunt are also shown.

Although it is claimed to have disadvantages compared with ^{198}Au colloid, ^{131}I rose bengal has been used in this study. It became apparent that for our local conditions the efficiency of depuration by the liver of ^{131}I rose bengal has less individual variation than is the case with ^{198}Au colloid.

THEORY OF THE METHOD

The HBF can be calculated using a single injection of ^{131}I rose bengal if the depuration constant of the dye K_{RB} , the efficiency of dye depuration by the liver C_{RB} , and the volemia are known by the equation

$$\text{HBF} = \frac{K_{\text{RB}}}{C_{\text{RB}}} \cdot V$$

The efficiency of depuration C_{RB} depends on the functional state of the hepatic parenchyma and varies from 0,2 in

severe liver deficiency to about 0,4 of the value found in normal subjects.³

For ^{198}Au colloid the depuration efficiency C_{AU} is generally near unity, and it is supposed to be independent of the functional state of the liver. So the HBF is obtained approximately from $\text{HBF} = K_{\text{AU}} \cdot V$ where K_{AU} is the depuration constant of the colloid.

In work previously published⁴ it has been described that in a group of 39 Black individuals with no symptomatology of hepatic disease, the mean value of the depuration constant K_{AU} for ^{198}Au colloid was $K_{\text{AU}} = 0,203 \text{ min}^{-1}$ which is considerably less than the values found by other authors.³

In another work⁵ the values of the depuration constants for ^{198}Au colloid and ^{131}I rose bengal K_{RB} were compared in a group of 20 patients with hepatic bilharzial fibrosis. It was found that in about 50% of the cases the values of K_{AU} were below the normal values generally accepted, although in all the cases the values of K_{RB} were normal.

This discrepancy between the values of K_{AU} and K_{RB} suggests that the efficiency of depuration C_{AU} for the ^{198}Au colloid is less than unity in a large number of cases and that under our local conditions the hepatic depuration of colloids is bound to have more individual variations than K_{RB} .

In this article two assumptions are made, firstly, that individuals with normal values of K_{RB} have normal HBF values; and secondly, that the variations of K_{RB} before and after splenectomy and splenorenal shunt are proportional to the variations in HBF. In other words, it is assumed that the efficiency of depuration C_{RB} is unaltered after surgery.

PATIENTS AND METHODS

The values of K_{RB} were determined using the method of external detection of the hepatic activity: the response of a collimated scintillation detector aimed at the upper portion of the right lobe of the liver in function of time was recorded by a pen recorder and K_{RB} calculated graphically.

An activity of 25 μCi of ^{131}I rose bengal was used except in the determinations before surgery where scanning was carried out simultaneously. In these cases 150 μCi of ^{131}I rose bengal were administered.

The values of K_{RB} were determined in 39 normal subjects and 21 patients with hepatic bilharzial fibrosis. The clinical diagnosis of these patients was established by hepatic biopsy and bilharzia eggs in faeces and urine.

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RESULTS

The mean value of K_{RB} obtained in 39 normal subjects was $K_{RB} = 0,113 \text{ min}^{-1}$, SD 2 (normal range $0,061 - 0,165 \text{ min}^{-1}$).

In the group of 21 patients with hepatosplenic bilharzial fibrosis, K_{RB} values determined before surgery were within the normal limits, with the exception of cases 5, 17 and 21 whose values were slightly lower, as seen in Tables I and II, which also show the time intervals between the determinations immediately before and after surgery.

Only case 14 showed a value of K_{RB} decreased below 50% of the value before surgery. An increase occurred 5,7 months after surgery. The rest of the patients in this group, studied from 1 to 6 months after surgery, showed increased K_{RB} values.

In the 6 patients subjected to splenorenal shunt (Fig. 2) 3 showed a decrease in K_{RB} and the remaining patients an increase after surgery.

TABLE I. SPLENECTOMY

Patient No.	Before (min^{-1})	After (min^{-1})	Time (months)
1	0,124	0,144	10
2	0,091	0,112	4
3	0,121	0,108	3,4
4	0,117	0,071	1,1
		0,110	4,2
5	0,058	0,115	3,2
6	0,099	0,068	1,6
		0,068	6,4
7	0,112	0,053	1,1
		0,102	9,1
8	0,062	0,040	1,7
9	0,066	0,086	3,2
10	0,063	0,077	1,4
11	0,112	0,074	3
12	0,087	0,102	0,9
13	0,096	0,064	2,6
14	0,139	0,094	1
		0,040	2,6
		0,079	5,7
15	0,084	0,041	1,7

TABLE II. SPLENORENAL SHUNT

Patient No.	Before (min^{-1})	After (min^{-1})	Time (months)
16	0,068	0,082	1
17	0,055	0,043	0,5
		0,102	2,6
18	0,067	0,071	2,7
19	0,069	0,054	2
		0,069	4,5
20	0,082	0,067	0,7
21	0,040	0,059	1,2

Of the 21 patients 15 were subjected to splenectomy with ligation of collateral circulation, and 6 to splenorenal shunt.

Fig. 1 shows the variation of K_{RB} v. time normalised to a unitary value of K_{RB} before surgery in the case of splenectomy. Of the 15 patients subjected to splenectomy 9 showed a decrease in K_{RB} after surgery. In 4 of these there was further recuperation with increase of K_{RB} .

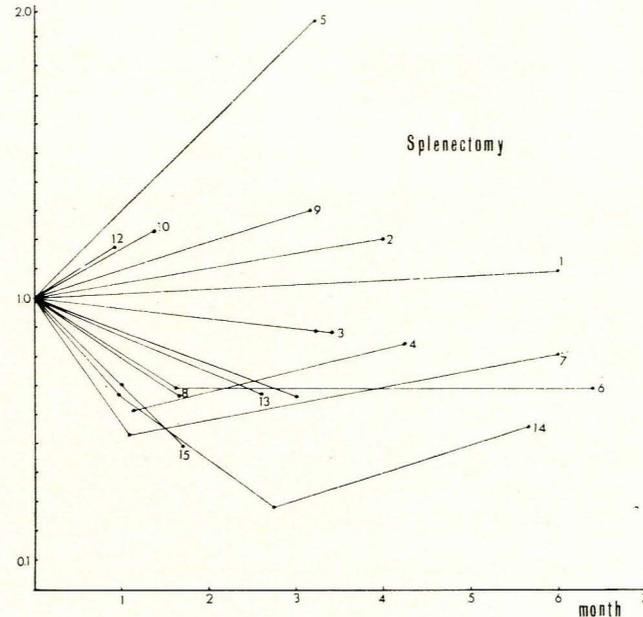


Fig. 1. The variation of K_{RB} v. time normalised to an unitary value of K_{RB} for the patients subjected to splenectomy.

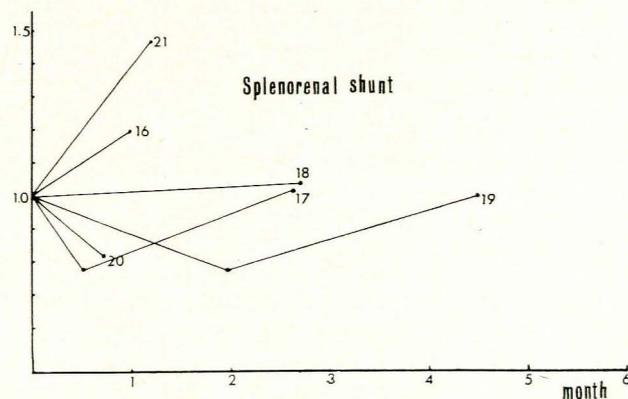


Fig. 2. The variation of K_{RB} v. time normalised to an unitary value of K_{RB} for the patients subjected to splenorenal shunt.

CONCLUSIONS

The values of K_{RB} obtained in 21 patients with confirmed hepatic bilharzial fibrosis before surgery, are in agreement with the accepted idea that in this disease the K_{RB} values are within the normal range.

The comparison of the K_{RB} values before and after splenectomy and splenorenal shunt showed individual variations mainly when the values of K_{RB} after surgery are obtained shortly after the operation. In all the patients studied for periods longer than 3 months, and in whom there was a decrease in K_{RB} at first determination a short time after surgery, an increase in K_{RB} values was later observed.

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