A study of liver function in females with toxic goiter by using ^{131}I Rose Bengal

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الخلاصة:

تم فحص 26 مريضة من المصابات بتضخم الغدة الدرقية من اللواتي تتراوح أعمارهن تقريب مابين 22 – 65 سنة ان عشرة منهن مصابات بالغدة العقدية وستة عشر مصابات بالغدة الدرقية المتجانس . ستة منهن كانت وضيفة الغدة الدرقية طبيعية وتسمم الغدة الدرقية الشديد احدى عشر مريضة وتسمم الغدة الدرقية المعتدل تسعة مريضات.

وقد تم في البحث استخدام الاختبار الحساس روز بنكال المرتبط باليود المشع 131 لتقييم عمليتا الامتصاص و الافراز لخليا الكبد والدورة الدموية داخل الكبد .

اظهرت النتائج ارتفاع في تجمع المادة المشعة في الدورة الدموية داخل الكبد وكذلك في خلايا الكبد في 25 % من المرضى بينما كان 45% - 50 ٍ% من المرضى طبيعيا .

وقد تم ظهر اخماد حاد لوظائف الكبد في افراز المادة المشعة لحالتين ، وقد وجد في هذة الدراسة زيادة في الحد الاعلى لوقت تجمع المادة المشعة في الكبد في كلتا الحالتين التسمم الشديد والمعتدل للغدة الدرقية .

Abstract:

26 consecutive female patients with goiter their age range between 22 – 65 years. Nodular forms were 10 patients, diffuse goiter were16 patients, euthyroid form were 6 patients, with sign of thyrotoxicosis (severe thyrotoxicosis 11 patients, moderate 9 patients).

Sensitive test, Rose Bengal conjugated with ^{131}I was used for evaluation the absorption & excretion by liver cells and intrahepatic blood circulation.

The results showed increase blood flow, liver accumulation of isotope in 25% of the patients and in 45-50% of patients were normal.

The excretion of conjugated Rose Bengal with ^{131}I shows severe suppression of liver function in 2 cases.

In this study we found an increasing the maximum accumulation time of isotope ^{131}I in the liver, both in severe & moderate thyrotoxicosis.

Introduction:

In most patients with hyperthyroidism, the thyroid gland is increased 2-3 times than normal size with tremendous hyperplasia and enfolding of the follicular cell lining into the follicles, so that the number of cells is increased greatly [(1)].

Thyroid dysfunction is always followed by liver dysfunction which is evaluated according to the metabolism of the liver [(2)].

Liver function tests help us to decide the severity and dynamic changes in the liver and as well as prognosis with recovery.

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Studies of liver function and blood flow ^{131}I Rose Bengal and colloidal gold 198 normal and diseased subjects. The leveled Rose Bengal hepatogram provided an improved method for diagnosing jaundice blood clearance half- time for intravenously injected Rose Bengal ^{131}I and colloidal were study to asses liver blood flow and cell function [3, 4.,5,.6]. Quantative liver imaging using ^{131}I Rose Bengal as an index of liver function and prognosis [7]. Sodium Rose Bengal labeled with ^{131}I is a usefull radio active tracer in the

determination of liver function test. Sodium ^{131}I is available under the trade name of Robengatope and also by generic name [8].
The aim of the study was to evaluate the function of endothelial cells of the liver in cases of toxic goiter.

Methods:

This test was done by using DCU-61 apparatus which has two probes,

1st. probe at the site of the heart to measure the clearance.
2nd. Probe at the right side of the liver to study absorption and excretion of ^{131}I by liver cells [3].
The graphic registration of this process done in the same time with multi channel analyzer control (B11) in the 1st. 3rd., 5th minute then every 5 min. for one hour ,then other two readings one after 2 hours and the other after 4 hours after intravenous injection of 0.15 microcurie of Rose Bengal conjugate iodine ^{131}I per Kg.
The radiation was (0.1- 0.2 rad).

This study include:
1. Measurement of the appearance time of accumulation in the liver (Tm).
2. Maximum degree of accumulation in step 15/5 (rate of absorption in the 15th. minute. in relation to 5th. minute) and the clearance of isotope from the blood in the 3rd. and 10th.minute.
3. evaluation of residual process activity of isotope after one hour then four hour

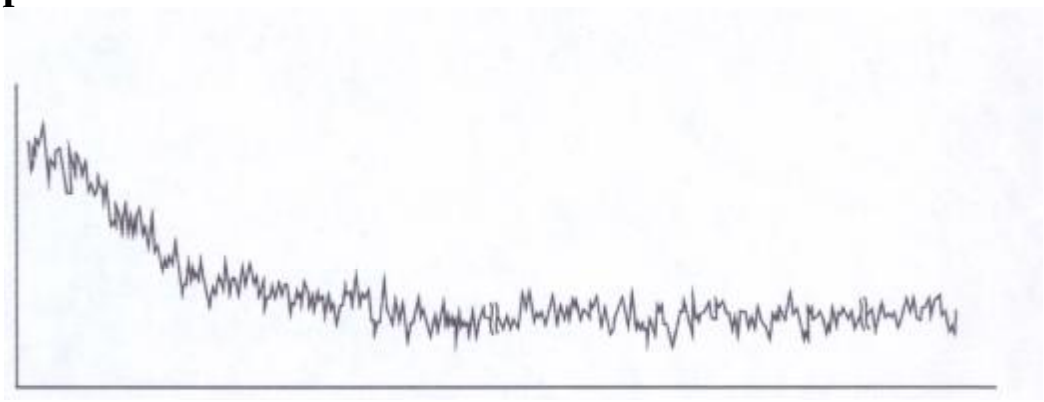
Results:

The results showed a sharp rise up (exponential phase) of isotope in the vessel then sharp decline which is the result of dilution of isotope in blood ,then this decline become more slowly in relation to increase
liver cells absorption

Liver curve divided into four parts:

a. **Sharp rise up due to the presence of isotope in the vessels, this evaluates the rate of blood flow of the liver.**
b. **Reflect the isotope accumulation polygonal cells of the liver.**
c. **Horizontal curve show dynamic balance between accumulation and excretion process.**
d. **Gradual decline show the excretion of the isotope from the liver (fig. no. 1).**

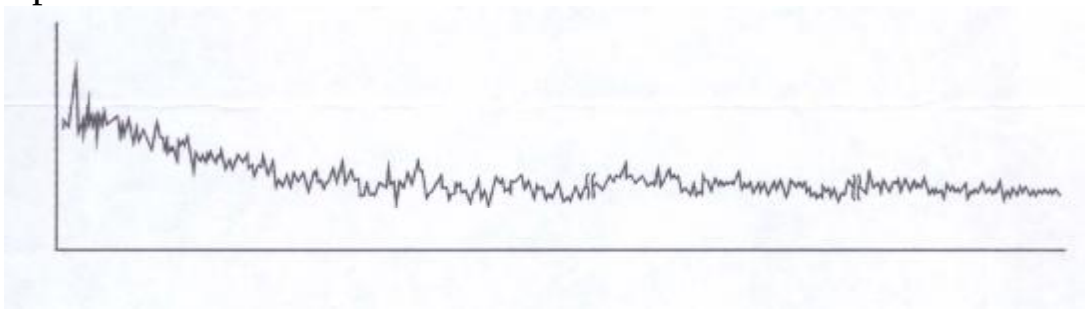
impulse



time

Fig. no. 1
Normal curve of clearance of isotope ^{131}I

impulse



time

Fig. no.2
The curve of clearance in severe toxic goiter

Table 1
Alterations of the liver function (Absorption-excretion) In goiters

	Liver				clearance			
Patients	deg. m/ 1 min. (%)	deg. 15/5 min. (%)	Tm	deg. Bl.fl. (%)	2h./ m (%)	4h./ m (%)	2h./ m (%)	4h./ m (%)
Normal	216.5	45.7	23.2	4.6	73.5	51.8	72.5	50.7
Euthy.	222.6	49.5	22.0	3.9	68.4	55.8	67.7	39.1
Mod.to tox xic goi.	207.9	41.2	22.5	5.7	78.8	35.2	73.5	54.1
Severe tox.goi.	179.9	40.8	25.8	4.7	78.3	60.3	73.5	55.3

Deg. = degree

The results of this study in table 1 shows that the patients with moderate and severe thyrotoxicosis some what increased the time of maximum accumulation of isotope in the liver.
The degree of blood flow and accumulation of isotope in our results was increased in 25% of patients, and in 45-50% of patients were normal.
Excretion of isotope showed sever suppression of liver function in 2 cases.
In euthyroid forms the result of liver function was increased.

Discussion:
Toxic goiter appears to affect liver cells in about 70% of cases that depend on severity and duration of the illness.
The pathology in the liver have complicated processes heamodynamic dysfunction which is related to toxic myocardiopathy in severe cases of thyrotoxicosis[(2)].
The liver gives a picture of chronic portal hepatitis due to blood stasis in venous circulation in side the liver[(2)].
It appeared that the long accumulation time and the slow decline of curve of isotope depend on the severity of toxic goiter, while in euthyroid cases are sharper and at a shorter time.
There is no previous study on the relation ship between

thyrotoxicosis and liver function tests by isotopes ^{131}I. The previous research from 1959 Taplin et al who had used Rose Bengal test
and other radio active materials for diagnosis and assessment of different diseases. The comparative study of individuals with normal liver function and no jaundice patient having problem liver disease and other patient with confirmed liver disease. The study also includes assessment of liver blood flow and cell function with patients (congestive heart failure, hepatitis, jaundice and cirrhosis).
The study involve also radio active ^{131}I labeled human serum
albumin to estimate phagocytic and proteolytic digestive functions
of the reticuloendothelial system [(9)].
We can calculate that this technique which may provide a safe and sensitive method for assessing the severity of liver dysfunction and also for monitoring clinical progress, especially liver biopsy may be unreliable or hazardous [(7)].

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