



# Efficacy study of Captopril on some liver function tests in hypertensive patients

Estudio de eficacia de Captopril en algunas pruebas de función hepática en pacientes hipertensos

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## Abstract

**Background:** Drug-related liver injury has emerged as a significant public health issue, accounting for more than 50% of instances of acute liver failure.

**Objective:** to assess, in relation to patient age, dosage, and duration of captopril usage, the impact of captopril monotherapy on a few liver function tests in hypertensive patients.

**Subject & Methods:** From June 15, 2022, to December 15, 2022, this case control study was conducted in the Internal Medicine Consultation Clinic at the AL-Nasseriya Teaching Hospital in the city of AL-Nasseriya. "Eighty individuals (40 men and 40 women) with mild to moderate primary hypertension who were free of diabetes, liver disease, and other chronic illnesses were divided into two groups: The first group was made up of 45 patients, aged 37 to 60, who had been taking captopril for more than three months. 45 newly discovered, untreated hypertension patients made up the second group, which was matched with the first group in terms of age, sex, and BM". All blood samples from study participants were used to extract serum, which was subsequently used to evaluate different liver function tests using readily available commercial test kits. A sphygmomanometer was used to measure blood pressure (BP) while the subject was seated, and a BMI was generated by dividing the

subject's weight in kilograms by their height in meters».

**Results:** The captopril group had considerably lower systolic and diastolic blood pressure than the control group. The captopril group considerably outperformed the control group in terms of serum alkaline phosphatase activity (ALP), but differences in the outcomes of the other liver function tests were not statistically significant. The findings of the liver function tests did not significantly differ according to the age of captopril users. There was no observable effect of captopril dose and captopril treatment duration on the liver function tests other from a significant increase in blood ALP with increasing captopril dosage.

**Conclusion:** The use of captopril medication causes a smooth decrease of blood pressure with no effects on liver function tests, with the exception of a considerably higher level of serum ALP in comparison to the control group and an increase in captopril dose that results in a rise in the serum ALP level. The findings of the liver function tests were unaffected by the age of the patients or the duration of captopril use.

**Key words:** Captopril, hypertensive patients, liver enzymes.

## Resumen

**Antecedentes:** la lesión hepática relacionada con fármacos se ha convertido en un importante problema de salud pública y representa más del 50 % de los casos de insuficiencia hepática aguda.

**Objetivo:** evaluar, en relación con la edad del paciente, la dosis y la duración del uso de captopril, el impacto de la monoterapia con captopril en algunas pruebas de función hepática en pacientes hipertensos.

**Sujeto y métodos:** Del 15 de junio de 2022 al 15 de diciembre de 2022, este estudio de casos y controles se llevó a cabo en la Clínica de Consulta de Medicina Interna del Hospital Universitario AL-Nasseriya en la ciudad de AL-Nasseriya. "Ochenta personas (40 hombres y

40 mujeres) con hipertensión primaria leve a moderada que no padecían diabetes, enfermedad hepática y otras enfermedades crónicas se dividieron en dos grupos: el primer grupo estaba formado por 45 pacientes, de 37 a 60 años, que habían estado tomando captopril durante más de tres meses. 45 pacientes con hipertensión recién descubiertos y no tratados conformaron el segundo grupo, que fue emparejado con el primer grupo en términos de edad, sexo y BM". Todas las muestras de sangre de los participantes del estudio se usaron para extraer suero, que posteriormente se usó para evaluar diferentes pruebas de función hepática utilizando kits de prueba comerciales fácilmente disponibles. Se utilizó un esfigmomanómetro para medir la presión arterial (PA)

mientras el sujeto estaba sentado, y se generó un IMC dividiendo el peso del sujeto en kilogramos por su altura en metros”.

**Resultados:** El grupo de captopril tuvo una presión arterial sistólica y diastólica considerablemente más baja que el grupo de control. El grupo de captopril superó considerablemente al grupo de control en términos de actividad de la fosfatasa alcalina sérica (ALP), pero las diferencias en los resultados de las otras pruebas de función hepática no fueron estadísticamente significativas. Los resultados de las pruebas de función hepática no difirieron significativamente según la edad de los usuarios de captopril. No hubo un efecto observable de la dosis de captopril y la duración del tratamiento con captopril en las pruebas de función hepática, aparte de un aumento significativo en la ALP en sangre con el aumento de la dosis de captopril.

**Conclusión:** El uso de la medicación con captopril provoca una suave disminución de la presión arterial sin efectos sobre las pruebas de función hepática, con la excepción de un nivel de ALP sérico considerablemente más alto en comparación con el grupo control y un aumento en la dosis de captopril que resulta en un aumento en el nivel sérico de ALP. Los resultados de las pruebas de función hepática no se vieron afectados por la edad de los pacientes o la duración del uso de captopril.

**Palabras clave:** Captopril, pacientes hipertensos, enzimas hepáticas.

diuretic medicines) have been shown to be beneficial in both short- and long-term treatment, with a markedly decreased incidence of adverse effects. With this background knowledge, the benefit-risk ratio is much better, and captopril's usage as a main medication in the treatment of hypertension may be taken into consideration.

Despite the fact that captopril is effective for the majority of hypertension types, its usage has mostly been restricted due to safety concerns for individuals with severe, «treatment-resistant hypertension. However, despite the fact that antihypertensive effectiveness is maintained, recent reports of trials employing lower dosages, often in conjunction with a diuretic, indicate that captopril's safety profile may need to be reviewed. In light of the recent discoveries» the goal of this paper is to evaluate the information that is currently accessible and published studies on the safety and effectiveness of captopril treatment<sup>4</sup>.

The purpose of this research is to compare captopril usage with a control group and examine the effects of captopril on a few liver function tests (total serum bilirubin, ALP, ALT, AST, serum protein, and serum albumin) in relation to patient age, dosage, and duration of captopril use.

#### Subjects and Methods:

The AL-Nasseriya Teaching Hospital's Consolatory Clinic for Internal Medicine in AL-Nasseriya City served as the study's location. 80 individuals (40 men and 40 women) with mild to moderate primary hypertension who were not diabetic, did not have renal disease, and did not have any other chronic conditions were separated into two groups: The first group consisted of 40 patients who had been using captopril (captopril group) for more than three months, ranging in age from 37 to 6040» . newly identified, untreated hypertension patients made up the second group, which was matched with the firstgroup by age, sex, and (BMI (weight in kilograms over height in square meters». A disposable syringe was used to draw five milliliters of venous blood from the captopril group and the control group<sup>5</sup>.

«The serum was extracted from the blood after it had clotted in a simple tube at room temperature by centrifugation at 3000 rpm for 10 minutes, and it was then stored at -20°C for further analysis». All research participants provided blood samples, which were used to make the serum that was used to measure: bilirubin concentration in serum, glutamic oxaloacetic transaminase (GOT) Serum ALT, and Glutamate pyruvate transaminase (GPT) AST activities<sup>6-10</sup>.

**L**iver damage caused by drug ingestion has become an important public health problem, contributing to more than 50% of acute liver failure cases. Since it has been generally acknowledged for many years that hypertension is a serious condition that threatens the health of middle-aged and older people, more and more effort is being put into clinical research on its treatment<sup>1</sup>. ((Despite the enormous efforts, hypertension is still clinically classified as a chronic condition that has no effective treatment))<sup>2</sup>. Additionally, hypertension often co-occurs with heart, brain, or organic vascular abnormalities as well as diseases of lipid and glycometabolism<sup>3</sup>.

«The angiotensin-converting enzyme inhibitor captopril's pharmacologic characteristics is discussed. A small subset of clinically complicated patients who are particularly at risk for side effects and in whom the medication must be administered with care is defined after a study of the captopril clinical experience in its entirety from the international literature and manufacturer's files». Lower dosages (150 mg/day or fewer, with moderate doses of

**E**ighty hypertensive patients (40 men and 40 women) were enrolled in the study; 40 of them were taking a single antihypertensive medication (captopril), and the remaining 40 were newly diagnosed, untreated hypertensives used as a control group. Table 1 shows that captopril significantly reduced both systolic and diastolic blood pressure compared to the control group.

**Table 1: Comparison between values of SBP and DBP of captopril groups and controlling groups**

Mean $\pm$ SD			
Parameters	Captopril groups (n= 40)	Controlling groups (n= 40)	P-Value
SBP (mmHg)	164.53 $\pm$ 6. 87	145.13 $\pm$ 7.41	0.000
DBP (mmHg)	81.93 $\pm$ 8.83	76.21 $\pm$ 4.22	0.001

**Table 2 glutamic oxaloacetic transaminase (GOT) Serum ALT, and Glutamate pyruvate transaminase (GPT) AST activities Value.**

Patients No 1	GOT	GPT	Sex	age
1	53	32	Male	22
2	55	39	Male	27
3	70	44	Male	26
4	76	36	Male	39
5	53	40	Male	28
6	48	40	Male	32
7	48	40	Male	42
8	49	32	Male	39
9	74	40	Male	43
10	71	44	Male	45
11	48	38	Female	57
12	52	40	Female	25
13	50	39	Female	42
14	60	35	Female	32
15	42	37	Female	29
16	54	30	Female	43
17	50	37	Female	39
18	52	38	Female	59
19	48	35	Female	41
20	50	30	Female	37

Normal of GPT: 35 and Normal GOT: 45

**Table 3: Comparison of liver function tests between Captopril groups and controlling groups.**

Table 3 shows a statistically significant increase in serum ALP in the captopril group as compared to the control group, but no changes in the other liver function tests.

Mean $\pm$ SD			
Parameters	Captopril group (n= 40)	Control group (n= 40)	P-Value
Mean $\pm$ SD			
Parameters	Captopril group (n= 40)	Control group (n= 40)	P-Value
GOT	65.45 $\pm$ 10.55	65.92 $\pm$ 9.78	(NS)
GPT	37.3 $\pm$ 6.7	37.8 $\pm$ 6.1	(NS)

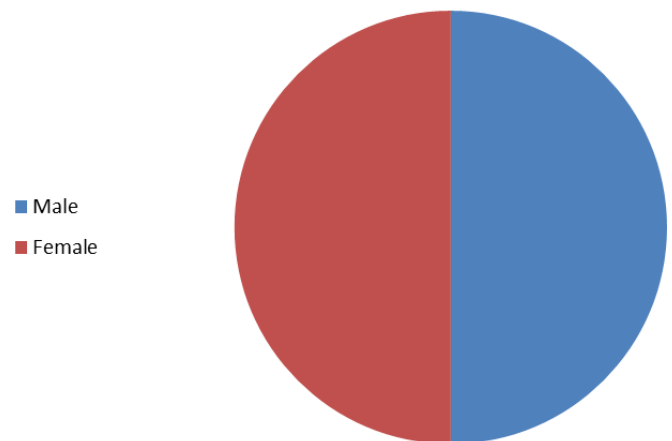


Diagram No 1: Sex of Patients in glutamic oxaloacetic transaminase (GOT) Serum ALT, and Glutamate pyruvate transaminase (GPT) AST activities Value.

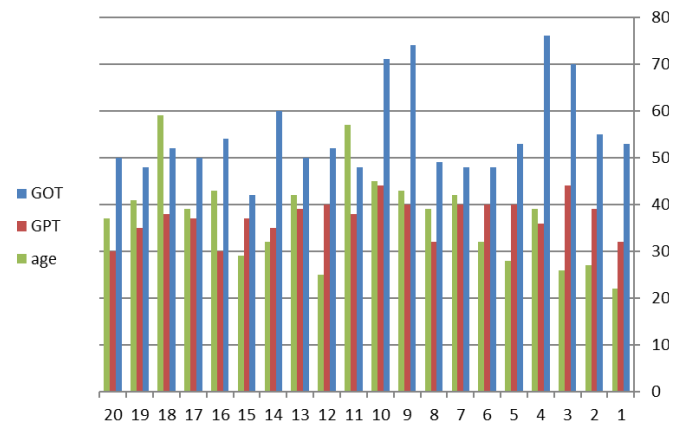


Diagram No 2: relation between the age of Patients and in glutamic oxaloacetic transaminase (GOT) Serum ALT, and Glutamate pyruvate transaminase (GPT) AST activities Value.

### Statistical methods

The chi-square test is used to compare enumeration data across groups, including sex, treatment efficacy rate, or incidence rate of adverse responses. Enumeration data are provided as rates (%). Measurement information, such as DBP is presented as a mean standard

## Discussion

deviation. Analysis of variance of repeated measurements was used to compare groups, whereas the paired t-test was used to compare within-group differences. It was decided that a statistically significant difference was present at a level of  $P 0.05^{11,12}$ .

**D**rug-related liver injury has emerged as a significant public health issue, accounting for more than 50% of instances of acute liver failure.

Due to its effectiveness, accessibility, and affordable price, captopril is the antihypertensive medication that is used the most often in our community in Al-Nasseriya and Iraq.

These results were in keeping with the findings of earlier studies, which revealed that captopril considerably dropped BP by blocking the RAAS. This research discovered that the use of captopril in hypertensive patients has resulted in a considerable reduction of mean SBP and DBP.

The current investigation showed that patients using captopril had significantly higher serum ALP activity than patients in the control group.

However, compared to the control group, the captopril-using patient group's mean blood ALT and AST activities were non-significantly slightly higher.

## Conclusions

**T**o assess, in relation to "patient age, dosage, and duration of captopril usage, the impact of captopril monotherapy on a few liver function tests in hypertensive patients.

With the exception of a significantly higher level of serum ALP when compared to the control group and a rise in serum ALP level with an increase in captopril dosage, the use of captopril treatment results in a smooth lowering of blood pressure with no impact on liver function tests. The length of captopril usage and the patients' ages had no appreciable impact on the results of the liver function tests".

With the exception of a significantly higher level of serum ALP compared to the control group and an increase in

the captopril dosage resulting in a rise in the serum ALP level, the use of captopril treatment results in a smooth lowering of blood pressure with no effects on liver function tests. The length of captopril usage and the patients' ages had no appreciable impact on the results of the liver function tests.

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