

Abnormal Liver Enzymes in Patients Seeking Physical Check-up in the Preventive Clinic, Chulalongkorn Hospital

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Sriratanaban J. Abnormal Liver Enzymes in Patients Seeking Physical Check-up in the Preventive Clinic, Chulalongkorn Hospital. Chula Med J 1994 Oct; 38(10): 565-570

The serum levels of liver enzymes have been used in screening for liver disorders. Investigations of Aspartate Aminotransferase (AST) and Alanine Aminotransferase (ALT) were often prescribed. This retrospective study aimed to study the detection of abnormal serum AST and ALT in patients receiving a physical check-up at the preventive clinic of Chulalongkorn Hospital. The 857 out-patient records between January and June 1993 were reviewed for the results of the investigations. The enzyme levels either of AST or ALT over 40 units/litre were considered abnormal. It was found that the detection rate of abnormal liver enzymes was 18.67%. The rate was higher in males than in females. There was a significant association between the level of AST and ALT ($p < 0.01$). There were more cases with abnormal ALT than with abnormal AST. Generally, when AST was abnormal ALT was also abnormal. Thus, screening only ALT, without examining AST, is suggested in patients seeking a physical check-up.

Key words: Liver enzymes, AST, ALT, SGOT, SGPT, Physical Check-up.

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Received for publication. July 20, 1993.

จิรุตม์ ศรีรัตนบัลล์. ความผิดปกติของเอนไซม์ของตับในผู้มารับบริการตรวจสุขภาพ ณ คลินิกเวชศาสตร์ป้องกัน โรงพยาบาลจุฬาลงกรณ์. จุฬาลงกรณ์เวชสาร 2537 ตุลาคม; 38(10): 565-570

ระดับของเอนไซม์ของตับในซีรัมได้ถูกนำมาใช้ในการตรวจกรองหาความผิดปกติของตับ ซึ่งมักเป็นการตรวจหาเอนไซม์แอสปาเตท อะมิโนทรานเฟอเรส (AST) และอะลานีนอะมิโนทรานเฟอเรส (ALT) ร่วมกัน การศึกษาชนิดย้อนหลังนี้จึงมีวัตถุประสงค์เพื่อศึกษาการตรวจพบความผิดปกติของ AST กับ ALT ในผู้มารับบริการตรวจสุขภาพ (Physical check-up) ที่คลินิกเวชศาสตร์ป้องกันโรงพยาบาลจุฬาลงกรณ์ โดยศึกษาจากประวัติผู้ป่วยนอก ที่มาตรวจในช่วงมกราคมถึงมิถุนายน 2536 จำนวน 857 ราย ทั้งนี้ระดับเอนไซม์ที่มากกว่า 40 ยูนิตต่อลิตร ถือว่าผิดปกติ ผลการศึกษาพบว่าอัตราการตรวจพบความผิดปกติของเอนไซม์ของตับ เท่ากับ 18.67% อัตราดังกล่าวในผู้ชายสูงกว่าในผู้หญิง นอกจากนี้พบว่า ระดับของเอนไซม์ AST และ ALT ที่ปกติหรือไม่ปกตินั้น มีความสัมพันธ์กันอย่างมีนัยสำคัญทางสถิติ ($p < 0.01$) จำนวนการตรวจพบความผิดปกติของเอนไซม์ ALT มีมากกว่าเอนไซม์ AST และเกือบทุกรายที่เอนไซม์ AST ผิดปกติ จะพบเอนไซม์ ALT ผิดปกติเสมอ ดังนั้นการตรวจเพียงเอนไซม์ ALT ตัวเดียวโดยไม่ตรวจเอนไซม์ AST ในการตรวจกรองในผู้มารับบริการตรวจสุขภาพนั้นน่าจะเป็นการเพียงพอ

In Thailand, people have become more health-conscious due to improved economic status, changing social norms and mass media influences. There has been an increase in requests for physical check-ups which usually comprises a physical examination and, mainly, laboratory screening investigations such as complete blood count, blood chemistry, chest X-ray, urine analysis and electrocardiogram. Nevertheless, there is no universally accepted approach to screening asymptomatic adults, given uncertainties about benefits and cost effectiveness of each screening.⁽¹⁾ In hospitals many routine investigations may be a waste of time and money.⁽²⁾ Moreover, physicians sometimes do not pay enough attention on cost containment and the redundancy of some screening tests.

Liver function tests (LFT), especially the examination of liver enzymes serum Aspartate Aminotransferase (AST) or serum Glutamic-oxaloacetic Transaminase [SGOT]) and serum Alanine Aminotransferase (ALT) or serum Glutamic-pyruvic Transaminase [SGPT]) are among the common screening tests used during physical check-ups, as well as during hospital admission. AST and ALT are sensitive indicators of liver cell injury and are helpful in recognizing acute, as well as chronic, liver disorders and most hepatobiliary disorders.⁽³⁾ In general, AST and ALT levels parallel each other with the exception of alcoholic hepatitis. Elevations of enzyme activity above 40 units/litre are suggestive of hepatitis.⁽³⁻⁵⁾ Investigations of these enzymes are often prescribed together in screening tests, but routing measurement of the two enzymes in general medicine outpatient clinics seemed to have a low yield.⁽⁶⁾

The purpose of this study was to study the detection rate of abnormal levels of the liver enzymes AST and ALT in the serum of patients

seeking physical check-ups at the preventive clinic of Chulalongkorn Hospital, as well as to determine their association to each other.

Materials and Methods

This study was a retrospective chart review of outpatient department medical records. the study population comprised outpatients of the preventive clinic of Chulalongkorn Hospital, Bangkok, Thailand who requested physical check-ups for whatever reason during the period January to June 1993, totaling 857 cases. In the usual practice of the clinic, each patient was sent to the hospital laboratory to receive laboratory screening tests and to get the results prior to seeing physicians. In general, the physical condition of patients was unknown to the medical staff at the time of the laboratory testing.

The levels of serum AST and ALT were measured by the hospital laboratory. the results of the tests were recorded in the outpatient (OPD) records. The normal range of both serum AST and ALT set by the clinical laboratory was 0-38 units/litre. However, in this study levels of enzymes over 40 units/litre were considered abnormal.^(3,5)

In the data analysis, descriptive and inferential statistics were applied. the difference in the outcome of the serum examination-normal or abnormal results-was tested by the marginal Chi-square.

Study Results

The detection rate of abnormal liver enzymes in serum, either AST or ALT, in all patients was 18.67%. The rate in the males was higher than in the females (29.19% and 13.06%, respectively). An abnormal ALT serum level was more frequently found than that of AST in both sexes (Table 1).

Table 1. Numbers and percentages of abnormal liver enzymes detected in patients by sex

SEX	TOTAL NUMBER TESTED	ABNORMAL		AST		ABNORMAL ALT		TEST*	
		NO.	%	NO.	%	NO.	%	NO.	%
MALE	298	39	13.09	85	28.52	87	29.19		
FEMALE	559	36	6.44	71	12.70	73	13.06		
TOTAL	857	75	8.75	156	18.20	160	18.67		

Note *Abnormal in either AST or ALT

The patterns of detection of abnormal serum AST and ALT levels across the age groups were

rather similar (Table 2).

Table 2. Numbers and percentages of abnormal liver enzymes detected in patients by age group

AGE GROUP	TOTAL NUMBER TESTED	ABNORMAL AST		ABNORMAL ALT		ABNORMAL TEST*	
		NO.	%	NO.	%	NO.	%
less than 30	76	5	6.58	13	17.11	13	17.11
30-44	301	23	7.64	61	20.27	63	20.93
45-59	329	38	11.55	72	21.88	73	22.19
60 or more	151	9	5.96	10	6.62	11	7.28
TOTAL	857	75	8.75	156	18.20	160	18.67

Note *Abnormal in either AST or ALT

There was a significant association between the levels of AST and ALT ($p < 0.01$). The detection rate of abnormal serum levels of ALT (18.20%) was higher than that of AST (8.75%), whereas the result of examining only ALT was not very different from that of examining both enzymes (18.67%). The study also showed that the AST

level was almost always in the normal range when the ALT level was normal. there was a very small chance of 0.47% (4 out of 857) that ALT level was normal while AST was abnormal. the AST levels in those cases were below 70 units/litre. Generally, serum AST levels were abnormal, serum ALT levels would also be abnormal (Table 3).

Table 3. The differences between the AST and ALT levels in patients

The Level of Liver Enzymes in Serum		ALT		TOTAL	
		Normal	Abnormal	cases	(%)
AST	Normal	697	85	782	(91.25)
(cases)	Abnormal	4	71	75	(8.75)
TOTAL	cases (%)	701 (81.80)	156 (18.20)	857 (100.00)	

Note Marginal Chi-square = 73.7 ($p < 0.01$)

Discussion

The detection rates of abnormal levels of the liver enzymes in serum, both AST or ALT, were surprisingly higher than expected. Although there were more detected cases of abnormal levels of liver enzymes in this study than in some previous studies,^(5,7) the findings of elevated enzyme levels

being more frequently found in males than in females corresponded with the study of Sriratanaban et al on the prevalence of liver disease in a rural community in 1981.⁽⁵⁾ The patients, especially males, might more readily come for a physical check-up when they believed they had some physical problems. There were, thus, more chances that the abnormal-

lities would be detected in the hospital than among the general population. The unexpected rise of serum aminotransferases in routine screening might be due to obesity, diabetes mellitus, alcohol abuse, chronic hepatitis, hepatic drug reaction or heart failure.⁽⁸⁾

Since there was a statistically significant association between the level of AST and ALT, and more cases with abnormal ALT were detected, the findings indirectly indicated the higher sensitivity of serum ALT in screening for hepatocellular abnormalities in the patients. In addition, AST was known to be less specific for hepatobiliary disorder than ALT as AST was found in many organs including the liver, cardiac muscle, skeletal muscle, kidneys, brain, pancreas, lung, and blood cells.

However ALT was present primarily in liver.^(3,4) Thus, there might be very little need to examine both AST and ALT.

As testing AST and ALT levels at Chulalongkorn Hospital cost 30 baht for each test, (60 bath per case) the total cost per one detection of abnormality of liver enzymes was 321.38 baht. Consequently, there is no good reason to support prescribing investigations of AST and ALT together for screening purposes in patients with no specific clinical indication, like a physical check-up. By measuring only the serum ALT level, the same conclusion could be reached while the cost of the investigations was cut by half. This is much more cost-effective. In cases of suspecting alcoholic hepatitis, history taking should indicate whether examining both enzymes might be beneficial for a patient.

Regarding our study, it could not be concluded whether the use of liver enzymes in screening tests should be done or not. More over, the study population could not be considered representative of the general population as it was performed in the tertiary health care institution, causing "referral filter bias". Nevertheless, it suggested that physicians should consider the cost-benefit of the tests, and avoid prescribing the unnecessary one. In addition, further studies concerning the clinical significance of the investigations should be conducted, probably on a longitudinal basis, to determine their usefulness for screening purposes.

Conclusion

There were high detection rates of abnormal levels of liver enzymes in the patients seeking physical check-ups. therefore, more routine screening tests for liver disorders might be useful. Nevertheless, it was highly suggestive that investigating only the serum ALT level was adequate since it would be more cost-effective than examining both AST and ALT. Moreover, physicians should, before prescribing investigations, plan for patient management in case of detected abnormalities. Furthermore, physicians awareness should be raised concerning other redundant screening investigations.

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