



RESEARCH ARTICLE

EFFECT OF STORAGE TIME ON SOME SERUM ANALYTES

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ABSTRACT

Results obtained from stored samples of serum or whole blood are often contradictory. The present study was done with the aim to determine the effects of storage time on the laboratory results of 5 analytes in sera. We determined the concentration of Glucose, Creatinine, Bilirubin, SGOT and SGPT at 0, 6, 12, 24, 48 and 72 hours and observed its stability. All samples were stored at 4-8° C. It was observed that all five serum analytes examined are sufficiently stable for 72 hours in serum.

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INTRODUCTION

A number of factors, primarily preanalytical and analytical as well as normal biological variations affect the accuracy of laboratory test results. For most routine assays in a clinical laboratory, serum is the preferred sample. The laboratory receives the specimen as whole blood, and then separates the serum from the clot by centrifugation. For clinically useful and reliable test results, the time between blood collection and serum separation must be controlled. Many investigators have studied related changes in some analytes, but the results are controversial. We have selected 5 analytes for this study, which have not been previously studied in this area. For this reason, the present study was designed to determine the effect of storage time on the laboratory results of these 5 analytes in sera. In this study, we have also tried to find out the quantitative alterations and determine the useful length of storage time for these analytes for optimum accuracy of laboratory results. To detect real pathological changes in patients, the preanalytical and analytical variations must be reduced to acceptable levels at which they cause no adverse effect on the results. Observational clinical studies can often be greatly enhanced by the inclusion of biochemical analyses in stored serum samples collected.

MATERIALS AND METHODS

The present study was conducted at the Department of Clinical Biochemistry, GCS Medical College, Hospital and Research Center, Ahmedabad. The study was approved by the institutional Ethics Committee and conducted between February and April 2016. All estimations were done in Autoanalyser Erba XL640 in the Clinical Biochemistry division of the Central Laboratory, GCSMC Hospital, Ahmedabad. All serum samples were included for the study. Only samples showing visible hemolysis were excluded from the study. 100 random venous blood samples that have been collected in vacutainers without any anticoagulant are selected for the study. Sera for Glucose estimation were collected in Fluoride vacutainers. Samples are allowed to clot at room temperature for 20 minutes and then centrifuged. The separated sera are assayed for the selected analytes without delay. In addition, samples from each participant were stored 4 ± 1°C in the refrigerator in separate tubes for estimations at 24, 48 and 72 hours respectively. The concentration of the following selected analytes - Glucose, Creatinine, Bilirubin, SGOT and SGPT were determined.

The methods used for assay are as follows:-

- **Glucose** – Glucose Oxidase Peroxidase (GOD- POD) method
- **Creatinine** – Jaffe's method
- **Bilirubin** – Diazo method
- **SGOT and SGPT** – IFCC method

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All data were analysed using the standard statistical software.

RESULTS AND DISCUSSION

The samples were assayed and stored at $4 \pm 1^\circ\text{C}$ in the refrigerator and repeat assays were done at 24, 48 and 72 hours and results were observed for variations. It was found that in the metabolites viz., Glucose, Creatinine, SGOT and SGPT, results were stable and effect of storage time upto 72 hours was not significant. Only in case of Bilirubin stability was observed till 48 hours of storage.

GLUCOSE

SUMMARY

Groups	Count	Sum	Average	Variance	P-value
0HR	105	11613	110.6	1704.165	0.983963
24HR	105	11431	108.8667	1938.328	
48HR	105	11381	108.3905	1761.067	
72HR	105	11501	109.5333	1882.444	

BILIRUBIN

SUMMARY

Groups	Count	Sum	Average	Variance	P-value
0HR	39	33.23	0.852051	0.705675	0.863755
6HR	39	32.35	0.829487	0.708173	
12HR	39	36.7	0.941026	1.360673	

SGPT

SUMMARY

Groups	Count	Sum	Average	Variance	P-value
0HR	14	276.2	19.72857	107.5591	0.331173
24HR	14	278.6	19.9	123.0046	
48HR	14	195.66	13.97571	112.2993	
72HR	14	202.7	14.47857	158.6295	

SGOT

SUMMARY

Groups	Count	Sum	Average	Variance	P-value
0HR	106	2406.4	22.70189	136.3549	0.986628
24HR	106	2368.6	22.34528	140.1419	
48HR	106	2431.3	22.93679	146.0216	
72HR	106	2414	22.77358	143.6587	

CREATININE

SUMMARY

Groups	Count	Sum	Average	Variance	P-value
0HR	97	93.15	0.960309	0.15613	0.921981
24HR	97	92.78	0.956495	0.080067	
48HR	97	93	0.958763	0.055765	
72HR	97	95.26	0.982062	0.046	

Data was tabulated in Microsoft Excel and analyzed using IBM SPSS 20.0 and Microsoft Excel 2007. Anova was used to test the significance between the groups of parameters i.e. SGPT, SGOT, CREATININE, GLUCOSE, BILIRUBIN. P value less than 0.05 was considered significant. Differences in SGPT, SGOT, CREATININE, GLUCOSE, BILIRUBIN at different intervals of time were not statistically significant ($p > 0.05$).

Conclusion

From the study, it can be concluded that blood samples should be centrifuged as early as possible and definitely by 20 minutes of collection. The parameters Glucose, Creatinine, SGOT and SGPT can be assayed within 72 hours if stored at $4 \pm 1^\circ\text{C}$. Whereas Bilirubin should be assayed within 48 hours. However, it is recommended that all assays should be done within 24 hours of sample collection for high accuracy and validity.

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