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Research Article

Comparison between Automated and Manual methods of PT and APTT in Khartoum – Sudan

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Abstract

The present study was designed to compare between prothrombin time (PT) and activated partial thromboplastin time (APTT) using the manual and automated methods of analysis. Determine PT, APTT using automated coagulometer (clot2; SEAC) and manually. Then results was collected, compared, and analyzed using the statistical program (SPSS). The mean of PT in automated method was 19.36±11.4 SD, in manual method the mean was 20.99±11.3 SD. The mean of APTT in automated method was 34.2±5.2 SD, in manual method the mean was 37.3±5.3 SD.The study concluded that there was a significant variation between manual and automated methods of PT and APTT.

Keywords: Manual method; Automated method; Coagulometer; Prothrombin time; Activated partial thromboplastin time.

Introduction

Nowadays, the overwhelming majority of laboratory results in clinical laboratories are being generated by automated analyzers. Modern automated analyzers are highly sophicated instruments which can produce a large number of laboratory results in a very short time. Today laboratory personnel's duties have been shifted from manual work, maintenance of the equipment's, instruments calibration, quality control, and data management [1,5,6].

The manual methods have little value in large clinical laboratories; automated and semi-automated coagulation analyzers have replaced the manual methods to meet the increasing test load. Most of coagulation analyzers have been generated are based on the principles of photo-optical or mechanical clot detection. The most commonly used tests in coagulation profile are Prothrombin time (PT), Activated partial thromboplastin time (APTT), and fibrinogen concentration. PT is a test used to detect disorders involving the activity of the factors I. II, V, VII, and factor X of the extrinsic and common pathways [2]. While APTT is a test used to detect the disorders involving the activity of the factors I, II, V, VIII, IX, XI, and factor XII [3,4,7]. The present study was designed to compare between prothrombin time (PT) and activated partial thromboplastin time (APTT) using the manual and automated methods of analysis.

Materials and methods

The study was conducted at Khartoum state in 2015 among 100 healthy Sudanese volunteers.

Ethical consideration

All of the study participants had given an informed consent and they agreed to participate in the study.

Samples collection and processing

Blood samples were collected from them in 3.8% trisodium citrate containing tubes and EDTA containing tubes immediately. A complete blood count was performed in the samples that collected in EDTA tubes using automated haematology analyzer (sysmex xp300), and the citrated blood samples were centrifuged at 3000g x 15 min, then plasma was used to determine PT, APTT using automated coagulometer (clot2; SEAC) and manually. Then

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results was collected, compared, and analyzed using the statistical program (SPSS) [8,9].

Quality control

Quality control elements throughout the pre-analytical, analytical, and post-analytical phases of the study was applied and assured.

Results and discussion

Cost comparison

The mean of PT in automated method was 19.36±11.4 SD, for the control sample was 11.7±3.0 SD. In manual method the mean was 20.99±11.3 SD, for the control sample was 14.0±3.7 SD (Table 1). The mean of APTT in automated method was 34.2±5.2 SD, for the control sample was 38.1±2.7 SD.In manual method the mean was 37.3±5.3 SD, for the control sample was 41.5±3.1 SD (Table 2).

Table 1. The means of PT and p-value in automated and manual methods

Method	Mean±SD	p-value
Automated method	19.36±11.4	p<0.05
Manual method	20.99±11.3	
Control sample (automated)	11.7±3.0	p<0.05
Control sample (manual)	14.0±3.7	

Table 2. The means of APTT and p-value in automated and manual methods

Method	Mean±SD	p-value
Automated method	34.3±5.2	p<0.05
Manual method	37.3±5.3	
Control sample (automated)	38.1±2.7	p<0.05
Control sample (manual)	41.5±3.1	

In the laboratory the measurement of PT, APTT was the most commonly used laboratory tests in patients with a suspected coagulopathy.there are different methods used for the determination of PT, APTT automated and manual methods [4,10].

The results obtained in this study show that there is mild different between the mean of manual and automated methods for PT (p-value<0.05), and increase in the mean of APTT for the manual methods compared to automated method (p-value<0.05). So there was a significant variation between the manual and automated methods for PT, APTT. The study has certain limitations such as low number of populations, change of temperature during storage, and between subjects variation in carry out the tests.

Conclusions

The results obtained in this study show that there is mild different between the mean of manual and automated methods for PT (p-value<0.05), and increase in the mean of APTT for the manual methods compared to automated method (p-value<0.05). So there was a significant variation between the manual and automated methods for PT, APTT. The study concluded that there was a significant variation between manual and automated methods of PT and APTT.

Conflicts of interest

The author declares no conflict of interest.

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