The Effect of Test Tube Sterilization from Serum Lipemic Against Level of Triglyceride GPO-PAP Method

Fitri Fadhilah[1], Ana Bina Sari[1], Astika Apriliani[1]

[1]Department of Medical Laboratory Technology, Sekolah Tinggi Analis Bakti Asih, Bandung, Indonesia

Correspondence:

Fitri Fadhilah, Jl. Padasuka Atas No.233, Padasuka, Cimenyan, City of Bandung, West Java, Indonesia Zip Code : 40192

Email:
fitrifadhilahssimkes@gmail.com

Abstract

In terms of analytic factors, it is important to define acceptable levels of common interferences, such as lipemia or hemolysis. For triglyceride, the laboratory technician must define whether samples with excess lipemia will be included in the study; this depends, in part, on whether the interferences affect the methods. In most laboratories, glass or plastic that is in direct contact associated with bio hazardous material is usually disposable. If not, it must be decontaminated according to appropriate protocols. Immediately rinsing glass or plastic supplies after use, followed by washing with a powder or liquid detergent designed for cleaning laboratory supplies and several distilled water rinses, may be insufficient. To ensure that all remaining fat from lipemic serum that attached to the tube wall has been removed, then the sterilization process is carried out so that a sterile tube is obtained. The purpose of this study is to determine the effect of test tube sterilization from serum lipemic against levels of triglyceride GPO-PAP (Glycerol-3-phosphate oxidase-p-aminophenazone) examination. This research method was a laboratory experiment. We used 8 times repetition with tubes used first are given liquid fat and cleaned by sterilization, washed with surfactant and washed with water only. By using statistical tests ANOVA obtained of this study showed results $p>0.05$ which is mean the treatment that used did not show a significant difference in the treatment of ordinary water-washed tubes with sterilized tubes and surfactant washed tubes. The conclusion of this study is cleaning of the test tube with the sterilization method is recommended because to avoiding the fear of remaining pollutants that can affect the results, It can also minimize the life of bacteria and viruses from the sample to be examined. However, if the sterilization method is difficult to do because of limited equipment and so on, the use of surfactants and the correct method of cleaning the tube is enough to remove impurities such as fat.

Keywords
Tube sterilization, serum lipemics, triglyceride

INTRODUCTION

Pre-analytic refers to all steps that must be taken before the sample is analyzed. Over the years, a series of studies have shown that 61% of all testing errors occur in the pre-analytic phase. Meanwhile, along with technological advances and procedures for quality assurance, it has significantly reduced the number of analytical errors (1,2).

Potential sources of errors or failures in the pre-analytic process in the laboratory include the type of test requested, identification of samples, improper time, improper fasting, incorrect type and comparison of anticoagulation with blood, improper mixing, appropriate equipment, and hemolysis or lipemic specimens (2).

Lipemic serums provide additional challenges in laboratory analysis. The lipemic serum is a cloudy or milky serum (cloudy white). This condition is mainly due to increased levels of fat in the blood. Some chemical tests can be carried out on lipemic specimens due to turbidity and disrupting testing procedures (3).

Other pre-analytic that must be considered is the cleanliness of the tools used. The cleanliness of the tool can affect the results of the examination. If the tool to be used is not clean, things will not be desired. For example, if there are chemicals, fats, or impurities remaining on

these devices, then the substance can react with the substances we use afterwards and can result in failures in the examination (3).

Equipment in laboratory examinations in general must be clean, dry conditions do not contain ingredients that change substances in the sample, and easily washed from former specimens. In some clinical laboratories glass test tubes was used for clinical examination, which will be read on a spectrophotometer, which is a component that will be passed by light. In laboratory test tubes glass is used repeatedly, but sometimes the procedure for treating glass test tubes is not done properly and correctly (4,5).

Sterilization is a process in which this activity aims to free tools or materials from various types of microorganisms. A material should be steriled if it is free from living microorganisms that are pathogenic or not, both in vegetative form and non-vegetative forms (spores) (6).

MATERIALS AND METHODS

Experimental research methods have various types of designs, the experimental method in this study uses the design type One Group Pretest-Post test Design. We used as 8 times repetition with tubes used first are given liquid fat and cleaned by sterilization, washed with surfactant and washed with water only, which is a

39

laboratory tests to determine the effect of sterilization of reaction tubes from lipemic serums on Triglyceride levels in the GPO-PAP method.

The sample in this study were the serum of the officers of the Citama Bojong Gede Hospital Laboratory, Bogor. The research was conducted at the Laboratory of Citama Bojong Gede Hospital, Bogor. The time of the study conducted in August until September 2018.

RESULTS

The results of triglyceride levels were examined in serum and worked using a test tube that had been cleaned by sterilization, washed with surfactant, and washed with water only were shown at Figure 1.

Triglyceride examination was carried out with 3 treatments. Each uses 8 different samples, namely using a sterile tube obtained an average yield of 127, a minimum result of 95 and a maximum yield of 183, a tube washed with surfactant obtained an average yield of 149.75, a minimum yield of 109 and a maximum yield of 202, the tube is washed with water just got an average yield of 198.13, a minimum yield of 153 and a maximum yield of 254.

In Shapiro-Wilk test, it was obtained significant results of 0.359 on examination with sterile tubes, 0.813 on inspection with surfactant washing tubes, and 0.811 on inspection with ordinary water wash tubes.
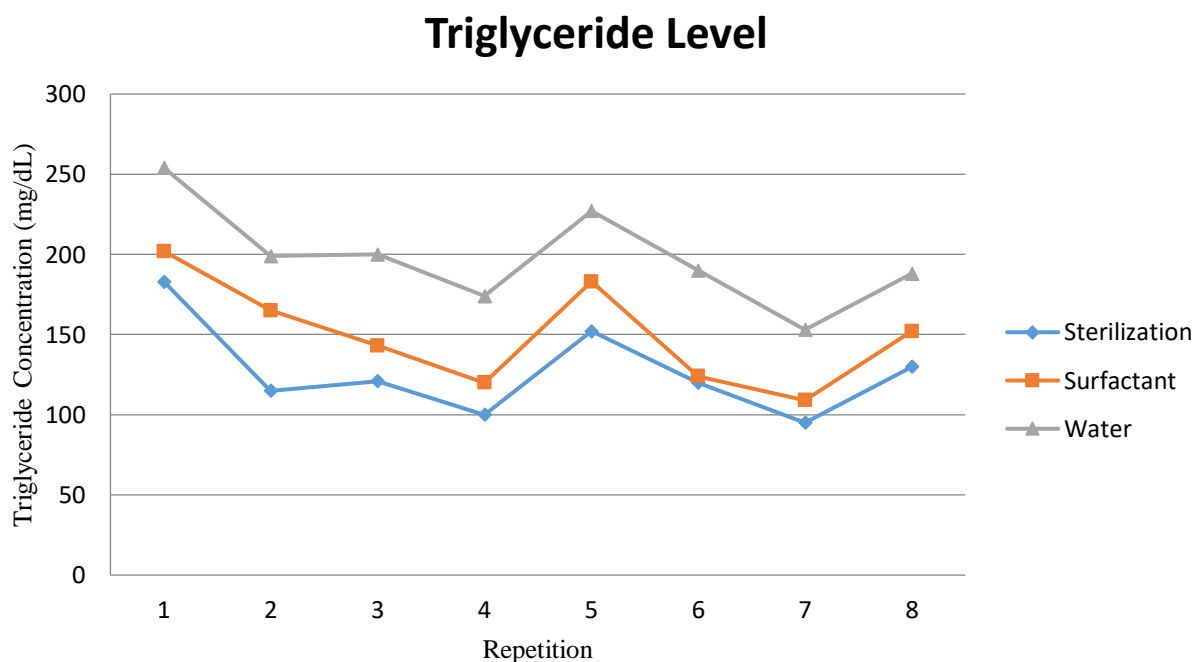

Fig 1. Graph of Triglyceride Level Results

40

Because of the three significance results were >0.05 (95% confidence level where 5% or 0.05 is the error limit that is still accepted) then the data was declaring to be normally distributed. In this homogeneity test, it was obtained the results of 0.150 with a significance of 0.862, so that the data can be declared homogeneous because the significance results of 0.862>0.05. Because of the results of the data were normal and homogeneous followed by further statistical tests.

In ANOVA test, it was obtained significant results of 0.000. In addition, a confidence level of 95% the results of the significance of 0.000<0.05, so that the conclusions obtained there were significant differences. Because the results show that there was a significant difference, further testing followed it, namely the Post Hoc Test.

The results of the post hoc test on the treatment of sterile tubes with washing tubes plus surfactants were obtained at an average difference of -22.750, and a significant result of 0.461. From these data the significance of 0.461>0.05, the results did not show a significant difference. The results of the post hoc test on the treatment of sterile tubes with normal water wash tubes obtained results of an average difference of -71.125 and a significance result of 0.000. From these data the significance of 0.000<0.05, the results show there were a significant differences. The results of the post hoc tests on the

treatment of washing tubes plus surfactants with sterile tubes obtained results of an average difference of 22.750 and a significant result of 0.461. From these data the significance of 0.461> 0.05, the results showed no significant differences. The post hoc test results on the treatment of washing tubes plus surfactants with ordinary water wash tubes obtained results of an average difference of -48.375 and a significant result of 0.015. From these data the significance of 0.015 <0.05, the results showed a significant difference.

The results of the post hoc test on the treatment of ordinary water wash tubes with sterile tubes obtained the results of an average difference of 71.125 and a significance result of 0.000. From these data the significance of 0.000<0.05, the results showed a significant difference. The results of the post hoc test on the treatment of ordinary water wash tubes with washing tubes plus surfactants obtained results of an average difference of 48.375 and a significant result of 0.015. From these data the significance of 0.015<0.05, the results showed a significant difference.

DISCUSSION

After the study examined triglycerides using a tube that had been given liquid fat and then washed and handling with three methods the first sterilized tube, washed with surfactants, and the last washed using water

41

only. Triglyceride examination was performed on a spectrophotometer using 8 samples. In this study on sterilized tubes and tubes equipped with surfactants the results were not much different, whereas in tubes equipped with air the results were far different from those of the sterilized tubes.

This shows the cleanliness of the tool that can produce the results of the inspection. If the tool to be used is not clean, things might not be desired. For example, if there are chemicals, fats, or impurities remaining on these tools, then these substances can be considered with substances that we can use and can be returned to the lab (7,8).

By performing statistical data, the test results should the average number using sterile tubes obtained an average yield of 127.00, the tubes connecting with surfactants obtain an average yield of 149.75, the tubes carry with air only obtained an average yield of 198.13. Then proceed with the normality test, using the Shapiro-Wilk test because the sample that passes is less than 50. The data obtained from the Shapiro Wilk test results in a significance of 0.359 on examination with a sterile tube, 0.813 on examination with a surfactant washing tube, and 0.811 when receiving a washing tube ordinary water. Because the results of the three significance >0.05 (95% confidence degree while 5% or 0.05 is the error limit that is still accepted) then the approved data is normally distributed. Furthermore, the homogeneity

test could be declared homogeneous because the significance results are 0.862>0.05 (9).

Since the results of normal and homogeneous data are carried out by the next statistical test which is using ANOVA test. In this ANOVA test obtained significant results of 0,000. So with a confidence level of 95% the results of the significance of 0.000<0.05, so that the conclusions obtained are significant differences (9).

Because the results showed a significant difference then continued with the further test namely the Post Hoc Test. In the post hoc test the results obtained did not show a significant difference in the sterilized tubes with tubes equipped with surfactants, then the packaging tubes were added with a sterile surfactant. While for the results that show a significant difference from the results of a sterile tube with an air wash tube, then on the treatment tube plus surfactant with a normal air wash tube, and on a normal tube air wash tube with a sterile tube, also a normal air washing tube with a washing tube plus surfactant (10).

This shows that the release of the test tube with the sterilization method is highly recommended because it could be avoided that the remaining impurities that are feared to affect the results can also minimize viruses and bacteria from the samples to be discussed. However, if the sterilization method is difficult because of the limitations of the tools and so on, the use of surfactants

42

and how to store the tubes is really enough to remove impurities such as fat (11).

CONCLUSIONS

The cleaning of the test tube with the sterilization method is recommended to avoiding the fear of remaining pollutants that can affect the resultan. It can also minimize the life of bacteria and viruses from the sample to be examined. However, if the sterilization method is difficult to do because of limited equipment and so on, the use of surfactants and the correct method of cleaning the tube is enough to remove impurities such as fat.

CONFLICT OF INTEREST

There are no conflicts of interest.

REFERENCES

1. Plebani M. Diagnostic errors and laboratory medicine – causes and strategies. J Int Int Fed Clin Fed Chem Clin Lab Med Chem Lab Med. 2015;26(1):7–14.
2. Conte R. Management of Errors in a Clinical Laboratory. Off J Inst Sci Technol [Internet]. 2018;spring 201:22–3. Available from: https://istonline.org.uk
3. Sampath S, Bhatia K, Batra HS. Analysis of various errors in receipt of samples in the Biochemistry laboratory of a Tertiary Care Hospital. 2016;(September):280–4.
4. Guder WG. History of the preanalytical phase: A personal view. Biochemia Medica. 2014.
5. Cornes MP, Atherton J, Pourmahram G, Borthwick H, Kyle B, West J, et al. Monitoring and reporting of preanalytical errors in laboratory medicine: the UK situation. Ann Clin Biochem. 2016;53(2):279–84.
6. Bearss JJ, Honnold SP, Picado ES, Davis NM, Lackemeyer JR. Validation and verification of steam sterilization procedures for the decontamination of biological waste in a biocontainment laboratory. Appl Biosaf. 2017;22(1):33–7.
7. Farrell CJL, Carter AC. Serum indices: managing assay interference. Ann Clin Biochem. 2016;53(5):527–38.
8. Arifuddin N, Saad MA, Lakshmi VU. Jermb . com Jermb . com Case Report. :21–2.
9. Kim TK. Understanding one-way anova using conceptual figures. Korean J Anesthesiol. 201.
10. Shingala MC, Rajyaguru A. Comparison of Post Hoc Tests for Unequal Variance. Int J New Technol Sci Eng. 2015.
11. Rutala WA, Weber DJ. Disinfection and Sterilization in Healthcare Facilities. In: Practical Healthcare Epidemiology. 2018.

43