Jurnal Saintika Medika
Jurnal Ilmu Kesehatan dan Kedokteran Keluarga
Faculty of Medicine UMM

Vol. 19 No. 2 December 2023
p-ISSN : 0216-759X e-ISSN : 2614-X476X
http://ejournal.umm.ac.id/index.php/sainmed

Comparative of Fixation Time in Control of Breast FNAB with Diff-Quick staining

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Received : August 1th2023. Revised : September 1th2023. Published: December 30th2023

DOI : https://doi.org/10.22219/sm.Vol19.SMUMM2.30684

ABSTRACT

The breast is a body part consisting of fatty tissue, fibrous glands, and connective tissue that is connected to the muscles of the chest wall. In the physiological processes of the body, there are several factors in breast cells that experience abnormal development which causes breast lumps. The prevalence of breast cancer in Indonesia is 65,858 (Globocan, 2020). At the Nganjuk Regional Hospital in 2022, 71 patients were examined for FNAB breasts from June to November. The cytological diagnosis performed was FNAB examination using the diff quick staining method with dry fixation. This research aims to determine the comparative analysis of fixation time on the quality control of breast FNAB preparations with diff quick staining at Nganjuk Regional Hospital. The research design uses an experimental method that tests between two variables and a comparative research, which compares the factors that influence research from different experimental designs. The population of this research were outpatients and inpatients of breast FNAB at the Nganjuk Regional Hospital by Quota Sampling method. Based on the Friedman statistical test, it can be concluded that there are differences in color quality control of breast FNAB preparations using diff quick staining with fixation time.

Keywords : Breast, FNAB, Fixation Time.

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INTRODUCTION

Breasts or mammae are a part of the body which include fatty tissue, fibrous glands and connective tissue related to the muscle groups of the chest wall. however, within the body's physiological procedures, there are several factors that purpose cells in the breast to revel in atypical improvement. those physiological modifications purpose lumps in the breast inside the form of benign tumors, malignant tumors and breast hyperplasia. Lumps within the breast are the most not unusual complaint in girls with breast sickness. statistics acquired from a surgical clinic in London states that 30% of the ailment is benign, 40% is fibrocystic trade and 10% is breast most cancers.

Malignant breast tumors in developing international locations are at a complicated level when compared with malignant breast tumors in advanced nations. It turned into defined that in 2020 new

cases of breast most cancers reached 298,445 out of two,252,981 instances of malignant tumors in Southeast Asia. Globocan recorded 65,858 new cases of breast most cancers in Indonesia in 2020 (Globocan, 2020 at (Lamhot Gultom et al., 2021)). Benign tumors in Indonesia reached seventy four.8%. in line with the cancer Registration company of the affiliation of Indonesian Pathology specialists and the Indonesian most cancers basis (YKI) in 2010, there had been 12/one hundred,000 cases in women and 1% in guys (Lamhot Gultom et al., 2021). in the Nganjuk Regency place, specifically on the Nganjuk local health center, statistics received from the anatomical pathology installation in 2022, breast FNAB biopsy strategies from June to November reached a complete of seventy one patients.

scientific diagnosis of breast tumors is decided from anamnesis, bodily exam, helping examinations and cytological examination. The cytological diagnosis that may be made for breast tumors is the FNAB (first-class Needle Aspiration Biopsy) exam (El-Desoky et al., 2024; Lamhot Gultom et al., 2021; Musyarifah and Agus, n.d.). FNAB is an act of analyzing a part of the frame by using injecting a nice needle (smaller than a regular syringe) into the part in which there may be a lump, then aspiration (suction) to remove the contents of the lump. next, the aspiration cloth is made right into a smear and stained then examined by using a pathologist (Suyatno, 2015).

The Diff-quick staining approach is Romanowsky staining, that is commonly utilized in speedy histological staining to differentiate various formations, commonly blood and non-gynecological consisting of FNAB. the primary function of Romanowsky staining is to view cytoplasmic details (Xing et al., 2023). The fixation approach used is dry fixation which can be executed by means of drying the training inside the outdoors or heating it with a hair dryer (Nurgroho, 2020; Xing et al., 2023).

Fixation of cytology preparations is one of the elements which could have an effect on the staining of the arrangements. one of them is Diff-quick coloring. previous studies with the aid of Fitri Nuroini, 2021 on evaluating the consequences of Diff-brief staining on cytology arrangements from FNAB with the wet fixation method and the dry technique changed into carried out to decide which fixation approach is better to use. comparable studies has never been performed earlier than, namely regarding a assessment of fixation times for good and efficient cytology arrangements from FNAB samples, each in phrases of time and value (Ratna Dewi, 2020; El-Desoky et al., 2024).

METHODS

This research has been tested ethically with ethical no: 11/FTMK/EP/III/2023 .The research design used in this research is experimental research which tests two variables and a comparative study, which compares the influencing factors in this research from different experimental designs. The samples in this study were patients with lumps in the breast who underwent FNAB examinations at the Anatomical Pathology Laboratory at Nganjuk Regional Hospital during December 2022 –

January 2023. Samples were then made by combining dry and wet fixation in Diff Quick staining. The results were then analyzed descriptively.

RESULTS AND DISCUSSION

Table 1. Friedman Test.

Test Statistics			
Monte Carlo Sig.	Sig.		.000
	95% Confidence Interval	Lower Bound	.000
		Upper Bound	.000
a. Friedman Test			

Based on table 1, the results of the Friedman test show a significant value = 0.000 or a sig value of 0.000 < 0.05 which shows that the value is very significantly different. So it can be concluded that H1 is accepted and shows that there is a comparison in the results of color quality control of breast FNAB preparations using diff quick staining with different fixation times at the Nganjuk Regional Hospital. In addition, it is known that controlling the color quality of breast FNAB preparations with diff quick staining using different fixation times, the best color quality was obtained in treatment 2 with the results of the nucleus and cytoplasm obtaining a rank value of 4.60, treatment 3 and treatment 4 with The core results obtained a rank value of 4.60, where the smaller the rank value, the better the color quality. The worst color quality was found in treatment 1 with a nuclear result obtained with a rank value of 7.00 and cytoplasm 8.20, and treatment 4 with a cytoplasm result obtained with a rank value of 10.60, where the greater the rank value, the worse the color quality (table 2).

The best fixation time was in treatment 2 with the results of the nucleus and cytoplasm obtaining a rank value of 4.60. The worst fixation time was in treatment 1 with a nuclear and cytoplasm result obtained with a rank value of 7.00 and cytoplasm 8.20 and treatment 4 with a cytoplasm result obtained with a rank value of 10.60, where the smaller the rank value, the better the color quality. Conversely, the greater the rank value, the worse the color quality.

Table 2. Spearman rank

Ranks	
Treatment	Mean Rank
P2 Nucleus	4.60
P2 Cytoplasm	4.60

Ranks	
Treatment	Mean Rank
P3 Nucleus	4.60
P4 Nucleus	4.60
KP Nucleus	4.60
P3 Cytoplasm	5.80
KP Cytoplasm	5.80
P1 Nucleus	7.00
P1 Cytoplasm	8.20
KN Nucleus	8.20
KN Cytoplasm	9.40
P4 Cytoplasm	10.60

Cytology comes from two words, namely cytos which means cell and logos which means science. So the definition of cytology is the study of human body cells, whether they are released by themselves or taken in a certain way. Cytological examination is an examination of human body fluids which are then processed, that is, they are fixed and processed until they are ready to become slides or smear preparations which are then colored with a special stain and read using a microscope (Yeti, 2019) .

Staining is the process of giving color to cells so that the cell shape becomes contrasting and can be observed with a microscope (Lukas, 2016; Zheng et al., 2023). Generally, staining of cytology preparations can be done using Diff-Quick staining (Sidhu et al., 2018).

The coloring of cytology preparations is greatly influenced by the fixation method, where dry fixation is fixation carried out by drying the preparations in open air or dry air (Indah, 2022).

In the research entitled "Comparative Analysis of Fixation Time in Quality Control of Breast FNAB Preparations with Diff Quick Staining at the Nganjuk Regional Hospital" a sample of 5 respondents was obtained and the data obtained as a whole was female with age range in table 2. Staining used in the research This is a quick diff coloring using dry fixation. The fixation time treatment design used was 3 minutes, 10 minutes, 15 minutes, 20 minutes, positive control (fixed with hairdyer) and negative control (not dried).

Based on the results of reading FNAB breast preparations, it was found that the percentage of color quality that was close to the positive control was shown in Figure 2, namely treatment 2 with a fixation time of 10 minutes showing results for 5 respondents with good nuclear and cytoplasmic color quality results (100%). This is because the fixation time greatly influences the color absorption of cytological preparations, where the longer the fixation time is used, the more clearly visible the color absorption in the nucleus and cytoplasm will be, resulting in good color quality. This treatment is in accordance with the 2019 Cytohistotechnology Book, Faculty of Health Sciences,

Muhammadiyah University of Surabaya, where dry fixation carried out in open air takes a minimum of 5 – 10 minutes. However, too long a fixation time causes very concentrated color absorption so that the quality of the cytoplasmic color is damaged (Astuti, 2020). This is shown in the diagram in Figure 4, namely a fixation time of 20 minutes which shows bad cytoplasm results for 5 respondents (100%).

Based on the percentage of color quality in the diagram in Figure 6, namely the negative control with preparations that were not fixed, the results for 5 respondents were shown, with 3 respondents (60%) having poor core color quality results and 4 respondents (80%) have poor cytoplasm. There is a less clear cell shape, less clear cytoplasmic color intensity and lots of bubbles. The color intensity in the core is less clear because the core color has faded. This is because the preparation is too wet and fixation is not carried out, resulting in damage to the cell membrane which leads to damage to the cell nucleus and cytoplasm (Suryono, 2017; Zheng et al., 2023).

Other factors that result in poor preparation quality include the preparation process, coloring technique, inappropriate or too long fixation time and dilution of dye concentration. According to Dewi (2017), the quality of the preparation can be shown in the form of color contrast, completeness of cell components and clarity of the preparation. A preparation is said to be in the good category if the level of clarity is good, the color quality is good and the preparation is not too thick or thin(El-Desoky et al., 2024; Wang et al., 2023; Zheng et al., 2023; Zhou et al., 2024).

Based on table 3, the results of the Friedman Test comparison test show that the values are very significantly different with a value of sig = 0.000. So H1 is accepted and shows that there is a significant comparison of results at fixation time with color quality control of breast FNAB preparations using diff quick staining at the Nganjuk Regional Hospital. Based on the research results which showed that the best fixation time was treatment 2 with a fixation time of 10 minutes compared to treatments 1, 3 and 4, where the color quality results were the same as the positive control. This test can be proven by table 4, namely the ranking table which shows a rank value of 4.60 in the nucleus and cytoplasm. This method is very effective because the appropriate fixation time will allow good penetration of the cells by the fixative material, namely methanol solution. Then the painting is carried out using a solution of eosin and methylene blue, where this painting is used specifically for liquids in the form of smears. Apart from that, this smear preparation takes a fast time or does not take a long time and is easier to do, so that a diagnosis can be carried out immediately by a specialist pathologist.

CONCLUSION

There was a significant comparison of results at fixation time with color quality control of breast FNAB preparations using diff quick staining at the Nganjuk Regional Hospital. Sig value = 0.000 in the Friedman Test statistical test.. The limitation of this research is that the dye used must be new and if the dye used is not in good condition it can result in errors in reading the research results. This research also still has great potential

for development by making more detailed comparisons such as staining time, type of fixation solution used which can be applied in further research.

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