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Analysis of Microorganism in Radiotherapy Patient Masks before and after Cleaning with Disinfectant Liquid

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Abstract

Background: Radiotherapy masks patient are a fixation tool in radiotherapy radiation services. The function of the radiotherapy mask is to fix the irradiation area so that it is always fixed every time you perform radiotherapy so that the radiation is carried out accurately. The radiotherapy mask after printing will be used by the patient until the radiation is complete. Usually in a period of approximately 1 month. Masks are used with the inner surface always in contact with the patient's skin, so far the masks have never been cleaned so that it is possible to develop fungi or microorganisms that will cause infection in the skin. The research objective was to determine the difference in the number of microorganisms before and after cleaning using a 70% alcohol disinfectant

Methods: The research method used was experimental, namely measuring microorganisms pre and post cleaned using 70% alcohol disinfectant in radiotherapy masks with the Swap method. The number of samples was 16 masks for radiotherapy patients. Furthermore, the results of the research will be processed using the Wilcoxon test to determine the differences in the content of microorganisms before and after cleaning and the percentage reduction will also be made in each of the results of the content of microorganisms using alcohol disinfectants.

Result: The results showed that the number of microorganisms in the masks of radiotherapy patients showed that the mean total plate count (ALT), mold / yeast and staphylococcus before cleaning were 9,450, 9,528, 0.490, while after cleaning the ALT value was 2.089, 8228,0,194. The amount of percentage reduction in the number of microorganisms in radiotherapy patient masks before and after cleaning alcohol was the highest microorganism at ALT 63.792%, staphylococcus 43.275% and the smallest decrease in mold / yeast 38.529%. Based on the Wilcoxon test on ALT and Staphylococcus, p 0.0001 and 0.0003 <0.05 Ha were obtained. Ho was rejected, meaning that there was a difference in the ALT and staphylococcus values on the radiotherapy patient's mask before and after cleaning using 70% alcohol.

Keywords: *Microorganisms, radiotherapy patient masks, disinfectants*

INTRODUCTION

At present, the equipment for making photo radiographs (radiographs) consists of an imaging plate, imaging plate, grid, fixation devices, protective devices and markers. Meanwhile, in radiotherapy services, one of the stages of service is the manufacture of a fixation device, namely a radiotherapy mask. Radiotherapy masks are a fixation tool in radiotherapy radiation services whose function is a radiotherapy mask made before radiotherapy is performed. The form of a radiotherapy mask with small holes. The function of the radiotherapy mask to fix the root irradiation area is always fixed every time radiotherapy is carried out so that the radiation is carried out accurately. Various kinds of radiotherapy masks for the head, neck, arms and legs while for the breast is rare. After the mask is made, the

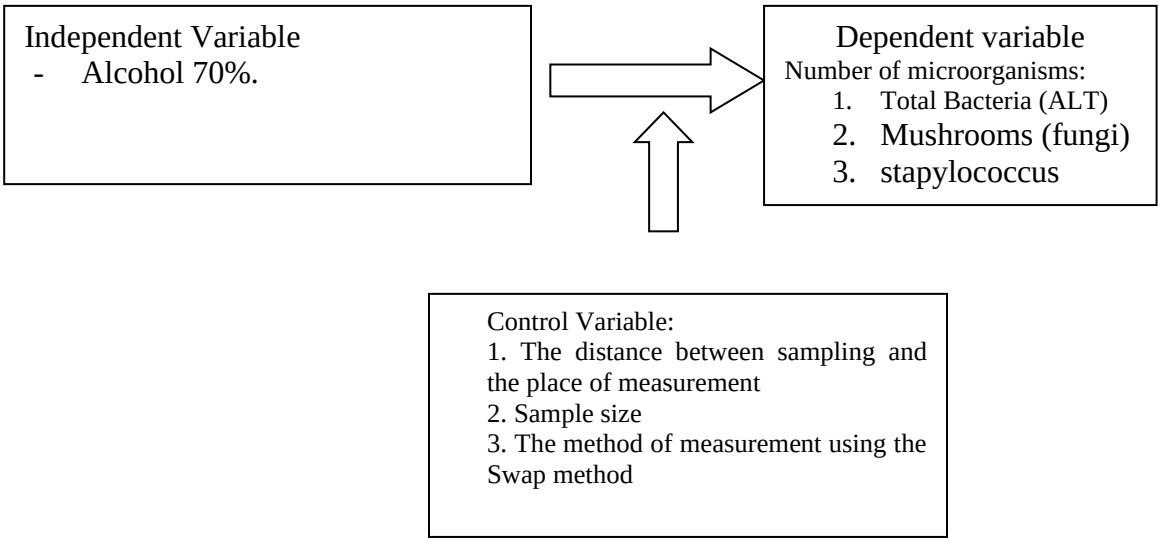
radiographer makes a mark in accordance with the illumination point so that the position of the object being lighted will remain the same every time it is illuminated.

According to the Kepmenkes RI No. 375 / Menkes / SK / III / 2007 regarding the professional standards of radiographers stated that one of the duties of a radiographer in the field of radiology services is the management of facilities and infrastructure for radiology and radiotherapy equipment. In particular, maintaining radiological facilities, infrastructure and equipment within the limits of its jurisdiction will greatly determine the quality of the results of the services provided. This maintenance includes cleanliness and maintenance as an effort and action of Quality Assurance (QA) radiology. Radiotherapy mask after printing will be used by the patient until the radiation is complete. Usually in a period of approximately 1 month. The mask is used with the inner surface always in contact with the patient's skin. Meanwhile, if it has been irradiated several times, the patient usually experiences irritation and sometimes even cuts. In connection with this, so far the mask has never been cleaned so that it is possible to develop fungi or microorganisms which when attached to the skin of an irritated patient will cause infection in the wound.

This can be proven by previous research from Meddison, 2010, about "RADIOGRAPHIC MARKERS A RESERVOIR FOR BACTERIA" that markers as a means of radiographic accessories can be a source of bacteria. Another study states that on the cassette there are microorganisms and fungi (Laili, 2013). In addition, research conducted by Dartini (2017) states that there is a decrease in the content of microorganisms and fungi on the cassette after cleaning with 70% alcohol. Dartini in 2014, stated that the decrease in the bacterial content on the cassette using clroine had the highest reduction in chlorine 65.67%, alcohol 63.67%, lysol 60.33% and the lowest was anti-bacterial soap 54.33%. In connection with this, radiotherapy patients who have undergone irradiation several times the skin will experience irritation, while chlorine is also more sensitive to irritating the skin, especially injured skin so it will be safer to use alcohol. Based on the above background, the researchers are interested in studying the microorganism content contained in mask before and after cleaning with an alcohol disinfectant solution.The benefits of this study are: it can provide an overview of the number of microorganisms present in radiotherapy masks before and after cleaning with 70% alcohol in the practice area for students so that they can gain experience that can be applied when they work and provide input to radiographers in the hospital. where they work on efforts for patient safety / patient safety in order to make improvements and improve the quality of service

METHOD

This type of research is experimental research with pre and post treatment approaches.



The population of this study were all facial radiotherapy masks in patients at Ken Saras Hospital. The sample consisted of 6 facial radiotherapy masks, 6 breast masks and 1 radiotherapy mask that were not used as controls. The data obtained were data with a ratio scale, before the data normality test was processed first, it turned out that the data was not normal. and dependent so using the Wilcoxon test. At the level of significance ρ = 5%. Ha is accepted if ρ ≤ 0.05 and Ha is rejected if ρ> 0.05

RESULT AND DISCUSSION

The results of calculating the amount and percentage of reduction in the amount of ALT, Staphylococus, and Fungi on radiotherapy patient masks before and after cleaning with 70% alcohol are as follows:

1. Number of Microorganisms

The results of research on microorganisms can be seen in table 1

Table 1. Descriptive of Microorganisms Before and After Cleaning with Alcohol

No	Bacteria	Treat	**Mean**	**Median**	**Max**	**Min**	**SD**
1	ALT	Before	9,450	4,200	64,5	0,7	15.6469
		After	2.089	.700	9.2	.0	2.6940
2	Mushroom	Before	9.528	5.600	92.0	.0	20.7433
		After	4.228	3.050	13.3	.0	4.1205
3	Staphylococcus	Before	.490	.145	2.1	.0	.6077
		After	.194	.050	1.1	.0	.3421

Reduction of Microorganisms in Radiotherapy Patient Masks before and after the microorganisms were cleaned with Alakohorl 70%. The reduction of microorganisms in radiotherapy patient masks before and after cleaning using 70% alcohol can be shown in Table 2 below

Table 2.Reduction of Microorganisms in Radiotherapy Patient Masks before and after the microorganisms are cleaned with Alakohorl 70%

No	**Microorganisme**	**Before**	**After**	**% Reduction**
1	ALT	9,450	2,089	63,792
2	Mushroom	9,528	4,228	38,529
3	Stapylococcus	0,490	0,194	43,275

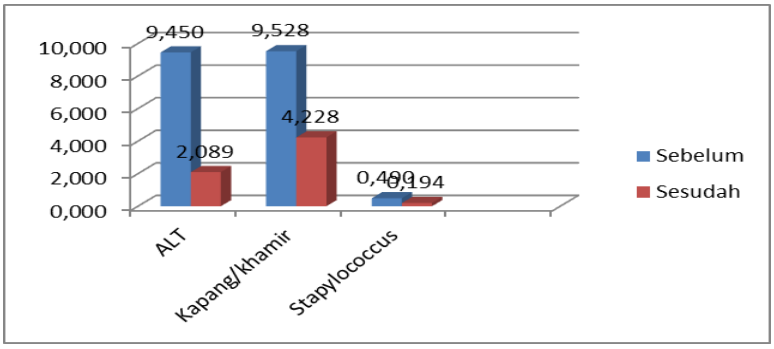


Figure 3 Reduction of Microorganisms in Radiotherapy Patient Masks before and after cleaning the microorganisms with 70% alcohol

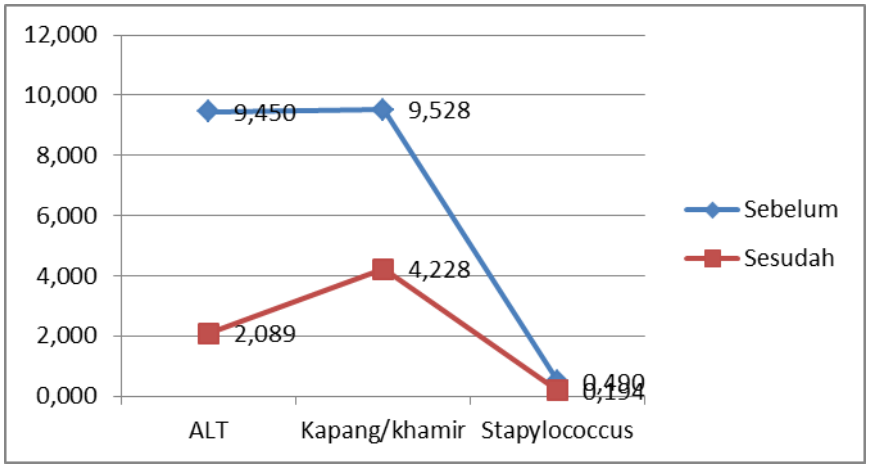


Figure 4 Reduction of Microorganisms in Radiotherapy Patient Masks before and after cleaning the microorganisms with 70% alcohol

The difference in the number of microorganisms in the mask of radiotherapy patients before and after cleaning using 70% alcohol

The results of microorganisms in radiotherapy patient masks before and after cleaning were then tested using Wilcoxon to determine differences in the content of microorganisms in radiotherapy patient masks before and after cleaning with a confidence level of 5% with the following results:

Table. 3 Wilcoxon test results to determine differences in the content of microorganisms in radiotherapy patient masks before and after cleaning using 70% alcohol

	Value (post<pre)	Value (post=pre)	Value (post>pre)	Z	pValue
	f	f	f		
ALT	17	0	1	-3,625	< 0,0001
Kapang Khamir	11	3	4	-1,226	0,220

S. aureus	11	0	7	-2,940	0,003

Discussion

The number of microorganisms in the radiotherapy patient mask.

Based on the results of the study showed that the number of microorganisms in radiotherapy patient masks on the total plate count examination (ALT) showed that the mean ALT before cleaning was 9.450 while after cleaning the ALT value was 2.089, for fungi / mold it was known that the mean of mold / mold before cleaning was 9.528 while after cleaning the value 8,228 and for staphylococcus it is known that the mean staphylococcus before cleaning is 0.490 while after cleaning the value is 0.194. Descriptively there was a decrease in ALT, mold / yeast, staphylcoccus on the imaging plate after the cassette was cleaned with 70% alcohol. In addition, the decrease in microorganisms in radiotherapy patient masks decreased before and after cleaning alcohol. The highest order of reduction of the 3 types of microorganisms was ALT 63.792%, staphylococcus 43.275% and the smallest decrease was in mold / yeast 38.529%.

According to the Kepmenkes RI No. 375 / Menkes / SK / III / 2007 regarding the professional standards of radiographers stated that one of the duties of a radiographer in the field of radiology services, including in radiotherapy, is the management of facilities and infrastructure for radiology and radiotherapy equipment. In particular, maintaining radiological facilities, infrastructure and equipment within the limits of its jurisdiction will greatly determine the quality of the results of the services provided. One of the maintenance in radiotherapy is the maintenance of radiotherapy patient masks, which includes cleanliness and maintenance as an effort and radiological Quality Assurance (QA) action.

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Based on the above, it is proven that by cleaning the cassette using 70% alcohol it can reduce the content of microorganisms contained in the radiotherapy patient's mask, in the order of the percentage decrease in ALT and staphylococus, then mold / yeast, so it is better if when cleaning the mask, radiotherapy patients must use disinfectants so that the radiotherapy mask not as a medium for nosocomial infection between patients or cause additional effects for patients who have the mask because the infected data is caused by the microororganisms contained in the mask. Meanwhile, Darmadi, 2008 stated that alcohol disinfectants can reduce the number of microorganisms on the surface of the imaging plate, namely by working to denaturate proteins by dehydrating and dissolving fat so that cell membranes are damaged and enzymes are activated by alcohol.

According to Darmadi, 2008, to control nosocomial infections, namely by sterilizing the tools used. The disinfectant used to clean the masks of alcohol radiotherapy patients, soap has a function to remove or reduce microorganisms on the surface of the cassette so that it will reduce the possibility of nosocomial infections between patients and patients and also between patients and radiology workers. The difference in the number of microorganisms in the mask of radiotherapy patients before and after cleaning them with 70% alcohol.Based on the results of different test studies using the Wilcoxon test to determine differences in the content of microorganisms in the radiotherapy patient masks before and after cleaning with a confidence level of 5%, it can be shown as follows:

a. There is a difference in the total number of plates (ALT) on radiotherapy patient masks before and after cleaning using 70% alcohol with p 0.0001 <0.05 Ha accepted Ho is rejected, meaning there is a difference in the ALT value on the radiotherapy patient's mask before and after cleaning use 70% alcohol
b. There is no difference in the number of molds / yeasts in the masks of radiotherapy patients before and after cleaning using 70% alcohol with p 0.220> 0.05 Ha rejected Ho is accepted, meaning that there is a difference in the value of mold / yeast in radiotherapy patient masks before and after cleaning using alcohol 70%.
c. There is a difference in the number of staphylococcus in radiotherapy patient masks before and after cleaning using 70% alcohol with p 0.0001 <0.03 Ha accepted Ho is rejected, meaning that there is a difference in the value of stapgylococcus on radiotherapy patient masks before and after cleaning using 70% alcohol

Based on the above results, it is proven that by cleaning radiotherapy patient masks using 70% alcohol there is a difference in the content of microorganisms before and after cleaning with 70% alcohol. The content of microorganisms in radiotherapy patient masks reduces the content of microorganisms contained in radiotherapy patient masks before and after cleaning using alcohol in the order of the percentage decrease in ALT and staphylococus, then mold / yeast, so it is better if when cleaning the mask, radiotherapy patients must use a disinfectant so that radiotherapy masks are not used as a medium. nosocomial infections between patients or cause additional effects for patients who have the mask because the data on the infection is caused by the microororganisms contained in the mask.

According to Darmadi, 2008, alcohol disinfectants can reduce the number of microorganisms on the surface of the imaging plate by working to denaturate proteins by dehydrating and dissolving fat so that cell membranes are damaged and enzymes are activated by alcohol. In addition, according to Darmadi, 2008 also, for control nosocomial infection, namely by means of sterilizing the equipment used. The disinfectant used to clean the masks of alcohol radiotherapy patients, soap has a function to remove or reduce microorganisms on the surface of the cassette so that it will reduce the possibility of nosocomial infections between patients and patients and also between patients and radiology workers.

Based on the foregoing, it is better if the radiotherapy patient's mask is cleaned using a disinfectant every morning before using the patient. And storage methods in special places should not be stacked and the storage area is also cleaned with disinfectants, thereby reducing the possibility of nosocomial infections between patients and patients and also between patients and workers in radiology.

In this study, it still has research weaknesses, namely:

1) Radiotherapy patient masks are in the shape of holes and for disinfection by spraying so that disinfectants cannot be ascertained on the entire surface of the mask, especially between the walls of the radiotherapy mask holes.
2) Some of the mask storage are lined up in a certain place, but there are also those that are piled up where the storage is not cleaned.

3) In the study there was no control.

CONCLUSION

The results showed that the number of microorganisms in the mask of radiotherapy patients showed that the mean total plate count (ALT), mold / yeast and staphylococcus before cleaning were 9,450, 9,528, 0.490, while after cleaning the ALT value was 2,089, 8228,0,194. The percentage decrease in the number of microorganisms on the mask radiotherapy patients before and after cleaning alcohol. The highest order of reduction of the 3 types of microorganisms was ALT 63.792%, staphylococcus 43.275% and the smallest decrease was in mold / yeast 38.529%. Based on the Wilcoxon test on ALT and Staphylococcus, it was found that p 0.0001 and 0.0003 <0.05 Ha were accepted. Ho was rejected, meaning that there was a difference in the ALT and staphylococcus values on the radiotherapy patient's mask before and after cleaning using 70% alcohol. Whereas for mold / khmair p: 0.220> 0.05 Ha, Ho is rejected, meaning that there is no difference in the amount of mold / yeast before and after cleaning using 70% alcohol. It is better if radiotherapy patient masks are prepared every day before using the patient. storage is arranged in rows, not in piles. We recommend that you clean the disinfectant as well.

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