

◆ Original Article ◆

The Study of Opportunistic Infection in the Medical Radiation Environment

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Abstract

With the development of medical technologies and the growth of household incomes, most of the people have become to be interested in health as it leads to significant early detection and cure of diseases. However the pattern of disease becomes diverse and it makes the imaging diagnosis department crowded with many patients. Therefore the opportunistic infection could be serious there. The hospital becomes the place which provides high risks of infection danger but it is true that the opportunistic infection of the hospital employees is not still recognized well. The imaging diagnosis department has developed a lot but it becomes the medium of secondary infection of patients and employees. So this study analyzes the status of bacteria infection of the examination table, the handle of diagnostic equipment and the hands of radiation staffs in imaging diagnosis department of the general hospitals and individual ones. And the result shows that some bacteria were found even though it's little. We are trying to make the hospitals to be free of secondary infection securing safety measure to prevent the secondary infection from occurring to patients and hospital employees.

Key Words : Hospital employees, Diagnosis department, Secondary infection, Infection danger

I. Introduction

With the progress of medical technology and high household income, people have been more interested in their health. However the pattern of disease gets diverse and the imaging diagnosis department is crowded with lots of patients.^{1~3} As

many patients visit it, it could be a place with high risks of hospital infection. As the result, hospitals become the dangerous environment as much as industrial work places but the infection of hospital employees is not recognized well. The hospital infection which is significant danger to patients and hospital employees means the one which occurs during hospitalization period or in 30 days after leaving hospital. Patients come to hospital to get free of diseases and visit imaging diagnosis department to take examination. In order to improve the accuracy of examination, imaging diagnosis has developed a lot however now it becomes the media of secondary infection

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of patients and employee.^{4~7} As the medical insurance system started in the year 1977 and national medical care insurance was inaugurated, many patients come to hospitals and the hospital infections are getting increased. So the guide for infection control has been arranged with the proposed standards of hospital infection from the year 1981.^{8~9} We tried to identify the status of pathogens rampancy on the patients examination tables and handles along with in the hand of radiation staffs infection of the two sample general hospitals each in Seoul and Kyungki-Do and 8 sample individual hospitals in Seongnam city so that we could identify the status of pathogens existence in the rooms of imaging diagnosis departments in order to make hospitals to get free of pathogens therefore we can prevent the secondary infection from occurring to patients and hospital employees.

II. Material & Method

1. The object of study

- 1) Imaging diagnosis department of one general hospital in Seoul.
- 2) Imaging diagnosis department of one general hospital in Kyungki-Do.
- 3) Imaging diagnosis departments of 7 individual hospitals in Sung-Nam
- 4) Radiation practice room of the imaging diagnosis department of Shingu College.
- 5) Questionnaire survey about sanitation recognition in imaging diagnosis department.

2. Sampling method

1) Sampling from examination table

We got samples from wiping both edges, center, up and down side of examination table with cotton stick and fixed them to special culture medium.

2) Sampling from examination handles

We got samples in the same way and fix them to special culture medium.

3) Sampling from hands of radiation staffs

We got samples from hands of radiation staffs using cotton stick and fixed them to special culture medium.

3. Culturing and analysis of samples

1) Culturing of samples

We sent samples collected to micro organism examination room of the clinical laboratory and cultured bacterias.

2) Analysis

We analyzed bacterias collected and proposed the result of collection and analysis of bacterias which were supposed to be pathogenic.

4. Distribution of survey questionnaire about radiology department

We distributed questionnaire about radiology department and analyzed the recognition of bacteria infection.

III. Result

We requested the bacteria fixed to special absorption culture medium to microorganism examination room. We could find that so many kinds of bacteria were detected(Fig. 1).



Fig. 1. Inspection of bacteria in the hands using absorption culture medium

1. Infection status in the imaging diagnosis department

Table 1. Vacteria detection quantity of examination table

Hospital	Examination table
C, E, G, H, J	<ul style="list-style-type: none"> • Pseudomonas putida. Gram negative • Gramnegative bacilli(Unidentification)
D, F	<ul style="list-style-type: none"> • Pseudomonas oryzihabitans, Gram negative
A, I, J	<ul style="list-style-type: none"> • Enterobactor cloacae. Gram negative.
B	<ul style="list-style-type: none"> • Nothing

Table 2. Vacteria detection quantity of examination handle

Hospital	Examination handle
F, G	<ul style="list-style-type: none"> • Acinetobacter baumannii. Gram negative • Acinetobacter baumannii, Gram negative
I, J	<ul style="list-style-type: none"> • Pseudomonas oryzihabitans, Gram negative • Bacillus specios Gram positive
C, B	<ul style="list-style-type: none"> • Bacillus specios Gram positive
H	<ul style="list-style-type: none"> • Pseudomonas oryzihabitans, Gram negative
A, D	<ul style="list-style-type: none"> • Nothing

2. Infection status in the hands of radiation staffs

Table 3. Vacteria detection quantity of radiorogist hand

Hospital	Hand
B, C, I	<ul style="list-style-type: none"> • Micrococcus species. Gram positive • Coagulase Negative Staphylococcus. Gram positive
E, F	<ul style="list-style-type: none"> • Coagulase Negative Staphylococcus. Gram positive
A, D	<ul style="list-style-type: none"> • Coagulase Negative Staphylococcus. Gram positive
H, G	<ul style="list-style-type: none"> • Nothing(Not examination in J hospital)

3. Result of examination for bacterias cultivated separate.

Table 4. Vacteria interpretation result

Classification	Hospital	bacterias
Examination Handle	B, C, E, F, G, H, I, J	<ul style="list-style-type: none"> • Acinetobacter aumannii. Gram negative • Pseudomonas oryzihabitans, Gram negative • Bacillus specios Gram positive
	A, C, D, E, F, G, H, I, J	<ul style="list-style-type: none"> • Pseudomonas putida. Gram negative. • Gramnegative bacilli (Unidentification) • Enterobactor cloacae. Gram negative.
Hand	A, B, C, D, E, F, I	<ul style="list-style-type: none"> • Micrococcus species. Gram positive • Coagulase Negative Staphylococcus. Gram positive

4. Questionnaire survey result

- A. Do you keep the sanitation rule of tools when you examine the patient who has risks of infection?
- B. Do you think the secondary infection is possible when the infection of tools is confirmed?
- C. Do you wash your hands before starting the examination of another patient?
- D. Are you satisfied with the environment for sanitation of hands in your hospital?

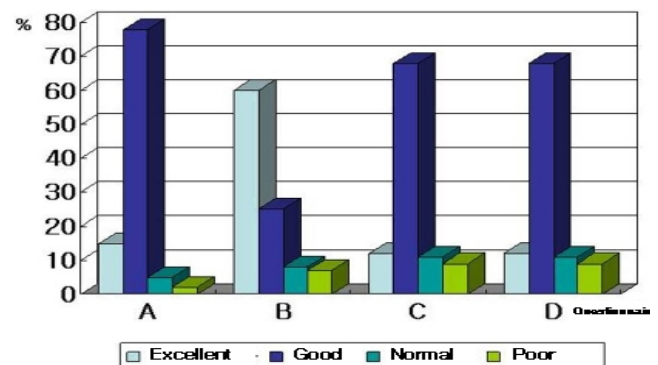


Fig. 2. The survey result for 3rd medical organizations

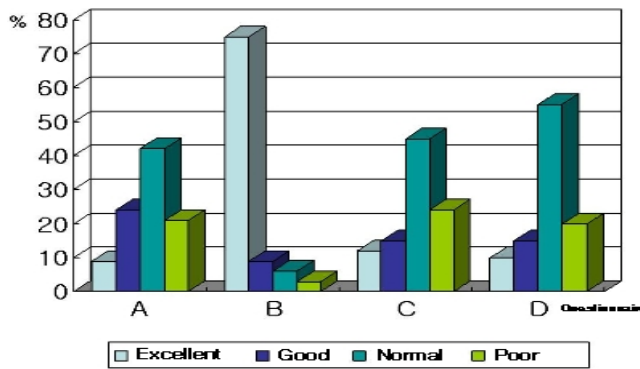


Fig. 3. The survey result for 1st medical organizations

IV. Discussion

Recently here was an occasion in which hospital infection became an issue due to the rampant child enteritis in several hospitals. The infection in the hospitals usually occurs to patients who have weak immunity but the guardians who visit hospitals and related hospitals staffs could be infected. However what is more important is that they are playing the conveyer of bacterias.^{10~11} The people who work in the imaging diagnosis department that patient of diverse diseases visit could have the higher risk of infection. As imaging diagnosis departments should recognize it, they have to be aggressively interested in personal sanitation along with the through disinfection of tools in contact of patients after medical examination.

The first step for it is washing hands, as the Figure 4 shows, the way of washing hands is first rub both hands, second rub one hand against the back of other hand, third rub space between fingers face to face, fourth rub palms of other hand with ends of fingers, fifth rub other thumb with wrapping and revolving it in other hand and finally rub nails to the palm of other hand strongly. You should make sure to do it before contact with patients, before and after wearing globes and before contact with contaminants (blood, body fluid, mucous membrane, impaired

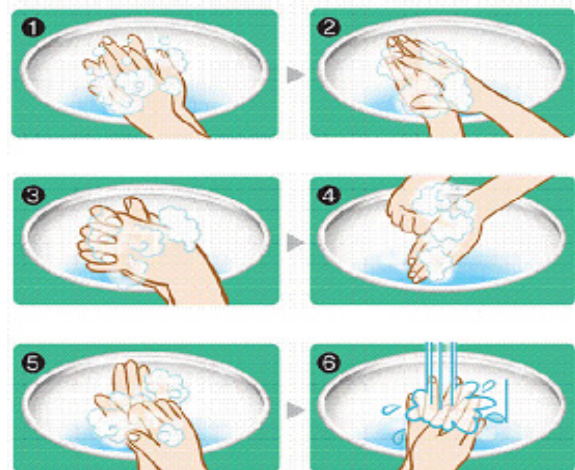


Fig. 4. The right way of washing hands

skin and contaminated tools). The rubbing time should be 10~15 seconds. You have to remove water from the hands by drying them with paper towel or hand dryer after washing your hands.

For the second you have to make sure to get rid of the infectious bacterias with disinfection material after visiting the patients who keep some strong infectious diseases. You should make the imaging diagnosis safe from hospital infection as providing more comfortable environment and medical service by practicing disinfection activities more aggressively than related employees to prevent invisible bacteria infection.

V. Conclusion

As the result of measuring bacteria contamination status, we found that small amount of Gram (-) Acine to bacter baumannii, Gram (-) Pseudomonas oryzihabitans and Gram (+) Bacillus specios Gram were detected on the handle of photographing tools and some of Gram (-) Pseudomonas putida, Gramnegative bacilli(Unidentification), Pseudomonas oryzihabitans, Gram (-) Enterobactor cloacae were found on the photogra- phing tables. And bacterias such as ram (+) Micrococcus species, Gram (+) Coagulase Negative Staphylococcus were found in the hands of staffs

who work in imaging diagnosis department. On the whole the result shows small amount of bacteria was detected in the first medical organization. This survey result supports the fact the people who work in imaging diagnosis department of 1st medical organization keep high level of recognition for the risk of opportunistic infection but the environment around them is poor. And it shows the sanitation of equipments in the third medical organization is relatively in good condition but some bacteria were found in the hands of people. What is surprising in this study is that some bacteria was found even though it's little in the third medical organization appraised to be in positive condition from the questionnaire of disinfection of equipment and hand. In the event we found the possibility of opportunistic infection is related with disinterest of employees due to increasing number of inpatients in 3rd medical organization and recognition level of employees in first medical organization.

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