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INFECTION RISK CONTROL IN “COMPUTER RADIOGRAPHY IMAGING PLATE” IN DIAGNOSTIC RADIOLOGY DEPARTMENT

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ABSTRACT

This study was carried out in order to establish whether infection control measures we're being undertaken sufficiently on Computer Radiography Imaging plate (CRIP) used in Radio Diagnosis and Imaging Department of our medical college. CRIP is used to obtain the take computerised radiographic image.

This study involved the swabbing of a sample of CRIP used within different

Areas of the department. Swabs were taken from the area on the corners and the centre of the plate. Each plate was firstly swabbed to determine the current level

Of microorganism contamination (determination of baseline data) and then again after recommended cleaning. Comparisons were then made between the number of microorganisms' present (colony forming units/cm²) pre and post-cleaning at each location. All CRIP were found to be contaminated with microorganisms. Methylated spirit used in the practice of medicine, with water and soap is used to clean the CRIP was found to be significantly reduce the amount of microorganisms present.

The results suggest that the All CRIP were not being cleaned sufficiently which has infection control implications for the department. In order for cross contamination to be kept to a minimum an effective infection control policy needs to be employed and this Should be to carry out regular cleaning

Key word: - Infection control; computer Radiography Imaging Plate; Hospital acquired infections; Radiology Department;

Introduction

Infection within healthcare has been in the news and has become a high priority recently, particularly as some infections are becoming harder to treat. The resistance of antibiotics and other antimicrobial agents have been reported on along with concerns regarding the rise of methicillin resistant *Staphylococcus aureus* (MRSA) (1). *Staphylococcus aureus* is one of the most common of all bacteria and can cause superficial infections of the skin and serious infections (2). Epidemic strains exist, which spread easily from person to person and can cause ward closure and disrupt hospital services (3). Infection control in hospitals is concerned with decontamination; this prevents microorganisms reaching a susceptible site in sufficient quantities

to cause infection or potential harm to patients (4). Hospitals can become contaminated with organic matter and potentially infectious organisms and a safe environment can only be achieved by decontamination in the form of cleaning, disinfection and sterilization, breaking the chain of infection (5). A major reason for the importance of infection control is to prevent the occurrence of Nosocomial or Hospital Acquired Infections. These are infections that occur during a patient's stay in hospital which were not present or incubating at the time of admission (2). In contrast to community acquired infections these infections usually occur as a result of pathogens taking advantage of patients whose normal defences against infection are contravened (2).

Aim

To establish whether CRIP plate can become contaminated with microorganisms and become a potential reservoir for cross infection and if simple, regular cleaning can significantly reduce this cross infection risk

Objectives

- (1) To determine whether there is currently a detectable Presence of microorganisms on a sample of CRIP
- (2) To determine any presence of microorganisms after recommended cleaning (methylated spirit used in the practice of medicine with water and soap is used to clean the CRIP).
- (3) To evaluate the findings and make suggestions for future practice, including recommendations for re-audit.

Method

20 CRIP were swabbed, from Different areas within the Radiology department. These included general X-ray rooms for inpatients (room number 1, room number 2, and room number 3) and outpatient's room. Randomisation of the sample was not practical, as it was necessary to ascertain data from each area. It was possible to swab all of CRIP from general X-ray rooms for in-patients (room number 1, room number 2, and room number 3) and outpatients. Swabbing was carried out with Tryptic Soy Agar contact plates which are used to sample flat surfaces of equipment. They consist of a domed surface which is placed gently upon the

area causing any microorganisms to be transferred onto the agar (10) (13). The plates were taken to the microbiology laboratory for culturing. The current level of microorganism contamination on the sample CRIP is known as baseline data. Following the collection of baseline data, each CRIP in the sample was cleaned according to recommended guidelines and swabbing was repeated. Data collected from this part of the audit was to identify a standard to compare to future practice and any future infection control carried out on CRIP

After the data is collected the presence and absence of infection is mentioned as presence in CRIP and absence in CRIP.

Result

From this work all CRIP pre cleaning were contaminated with microorganisms. Table shows pre and post-cleaning results for location general X-ray rooms for in-patients (room number 1, room number 2, room number 3) and out-patients x ray room. Post-cleaning data demonstrates that on most of the CRIP the number of colony forming units was reduced after cleaning. All plates were inspected by microbiology staff to identify the range of microorganisms present. Species of microorganisms found across the samples included most significantly Gram positive cocci in the form of Staphylococci

Both coagulases positive and negative.

Table 1:- The situation of all the CRIP used in the study.

Room number	Number of cassette	Before cleaning – presence of infection	After cleaning – presence of infection
Room number – 1 (inpatients)	4	Increase number of microorganisms (colony forming units/cm2) (CRIP - 1 to 4)	Absent of microorganisms (colony forming units/cm2) in 1 CRIP and decrease in number of microorganisms' present (colony forming units/cm2) in 3 CRIP Absent – CRIP -4 Decrease – CRIP – 1 st , 2 nd and 3 rd
Room number – 2 (inpatients)	4	Increase number of microorganisms (colony forming units/cm2) (CRIP - 5 to 8)	decrease in number of microorganisms' (colony forming units/cm2) in 4 CRIP Decrease – CRIP – 5 th , 6 th , 7 th and 8 th
Room number – 3 (inpatients)	5	Increase number of microorganisms (colony forming units/cm2) (CRIP - 9 to 13)	Absent of microorganisms (colony forming units/cm2) in 2 CRIP and decrease in number of microorganisms (colony forming units/cm2) in 3 CRIP Absent – CRIP -10 th and 11 th Decrease – CRIP – 9 th , 12 th and 13 th
Out patients	7	Increase number of microorganisms (colony forming units/cm2) (CRIP - 14 to 20)	Absent of microorganisms (colony forming units/cm2) in 5 CRIP and decrease in number of microorganisms (colony forming units/cm2) in 2 CRIP Absent – CRIP -15 th , 16 th , 18 th , 19 th and 20 th Decrease – CRIP – 14 th and 17 th

Table 2:- The situation of all the CRIP used in the study

Room number	CRIP
Room number 1 (inpatients)	CRIP - 1 st to 4 th
Room number 2 (inpatients)	CRIP - 5 th to 8 th
Room number 3(inpatients)	CPIP – 9 th to 13 th
Out patients room	CRIP – 14 th to 20 th

Discussion

Despite the fact that no Methicillin resistant strains exist was present upon the CRIP sampled, microorganism growth was found on all CRIP. This compares with other studies (6-9) Coagulase-negative staphylococci are found as normal skin flora and include for example *Staphylococci epidermis*. These bacteria rarely cause infection (2, 4, 13). It has however recently been recognised that *Staphylococci epidermis* can be an important cause of HAIs as it produces an extracellular polysaccharide, a type of slime that enables it to adhere to plastics and metals(2,11). *Staphylococcus aureus* was also identified and is a coagulase Positive staphylococci. One-third of the population carry it on their skin or in their nose and throat asymptotically (3). However, it is an important pyogenic pathogen, causing pus to form, which can cause a range of superficial infections of the skin if it penetrates the dermis such as septic spots, boils and abscesses and other more serious problems such as

osteomyelitis, septicaemia and pneumonia (2,3,11, 13) It is also an important cause of HAIs, being responsible for around 40 to 50% of surgical wound infections and approximately 25% of blood stream infections(2,13), and is particularly capable of developing resistance to antibiotics. Methicillin resistant strains exist (MRSA), which are found in greatest abundance In the hospital setting as many patients receive antimicrobial therapy and are vulnerable to serious infection (2), it is also becoming recognised as an important pathogen due to its ability to colonise and cause infection of biomedical devices.1 *Staphylococci* released in skin scales will collect in dust and survive for long periods of time in the environment (2, 13). Swain and Flint on (7) compared the use of soap and water with alcohol wipes and phenolic disinfectant for the infection control of X-ray cassettes and concluded that all cleaning methods had a significant reduction in bacterial numbers. However, the alcohol wipes were found by the authors to be 100%

effective, because of this and ease of use they were recommended as the cleaning method of choice. Another study shed doubt on

The use of alcohol wipes, forensic tools were used to look for the presence of blood on seemingly clean cassettes and results suggested that if alcohol wipes were used universally to clean cassettes they are ineffective in cleaning any that are blood soiled (12). In our study use of methylated spirit used in the practice of medicine (especially for cleansing the skin before injections or before surgery) with water and soap is more effective method of cleaning the CRIP.

Conclusion

The results of the audit suggest that the CRIP were not cleaned effectively. Although the microorganisms identified are quite harmless in the majority of cases, all have the potential to be pathogenic when coming into contact with the variety of patients that present for examination in the Radiology department. This possibility is increased in cases where for example, there are damaged sites of skin such as wounds or cannula insertion sites (2). An effective infection control policy for the cleaning of CRIP should be established as an essential method to reduce cross contamination. It can be concluded that cleaning with methylated spirit used in the practice of medicine (especially for cleansing the skin before injections or before surgery) with water and soap is more effective method of cleaning CRIP can significantly reduce the number of microorganisms present and it should be carried out routinely.

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