



A STUDY ON DISINFECTION PROCESS IN DIALYSIS UNIT OF MULTISPECIALTY HOSPITAL

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ABSTRACT

The number of patients on maintenance haemodialysis is increasing. Chronic haemodialysis patients have an increased infection risk. HD facility is very conducive for transmission of infection. A study to understand the present disinfection process in the dialysis unit of a hospital was carried out with the help of check list. The study shows that disinfection at the site of HD catheter is not appropriate. In case of AV-fistula the patient was not made aware to wash hands before the prick at the site, also there is a gross negligence towards the handling of sterile equipment's, and non-use of PPE. The touch surface disinfection was also lacking. In case of disinfectant levels of machine, expired disinfectant solutions were found. The study concluded that the disinfection process had certain shortfalls. Attention is needed towards the process and frequency of surface disinfection, reprocessing techniques and formulation and strict implementation of standard operating procedures.

KEYWORDS: *Haemodialysis, dialysis unit, disinfection, hospital.*



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INTRODUCTION

The haemodialysis(HD) patient is particularly susceptible to several infections both bacterial occasioned by the decreased immunity and blood borne viral infections¹. Studies have shown that bacterial infections in addition to carrying higher short term mortality also increases the risk of long term cardiovascular complications². Viral infections like Hepatitis B and C progress to liver cirrhosis and increase the morbidity and mortality on haemodialysis³. In addition, the staff of a dialysis unit is uniquely at risk of contracting these viral infections from contaminated blood and dialysate. Preventing the transmission of infections involves several links in the chain involving the patients, the dialysis procedure and ancillary care, the staff of the unit and various administrative and waste disposal protocols. A comprehensive infection preventive protocol includes hygiene measures, vaccination, dialyzer reprocessing and disposal of bio hazardous materials⁴. The number of patients on maintenance haemodialysis is increasing rapidly in India. Chronic haemodialysis patients have an increased infection risk. HD facility is very conducive for transmission of infection since multiple patients receive dialysis concurrently. Transmission can occur directly or indirectly via contaminated devices, equipment and supplies, environmental surfaces, or hands of personnel. Even in the developed world, there are substantial deficiencies in infection control practices. These suggested reasons include lack of awareness of the practices and their importance, and lack of clarity of difference between universal precautions (recommended for all health-care settings) and the additional precautions necessary in the haemodialysis setting⁵. Infection control guidelines and surveillance system for infections in haemodialysis centres has been implemented in most advanced countries to cut down infection risk and to determine the frequency and risk factors for these complications⁴. Some of the major aspects that can be applied for the Infection control in the dialysis unit are as follows: hand hygiene, use of gloves, personal protection, environmental issues including equipment and consumables, cleaning of dialysis machines and chairs/beds, disinfection of haemodialysis machines, proper handling of needle and sharps, blood spills management, proper preparation of access for cannulation⁶. Training of manpower, provision

of proper resources and equipment's and timely supervision and indulgence from seniors can save great amount of such incidences. There should be documentation of entire process flow which can be used to highlight any deviation small or big. Many studies highlight on technical and clinical aspect of disinfection in dialysis unit. Assessing the incidence will provide a suitable background to assess the quality of patient services, remedial actions and impact on other operational aspect of a healthcare facility. With this as a background, the present study was carried at a dialysis unit of a multispecialty hospital with an aim to ascertain the incidence of infection along with an objective of identifying the shortfalls in present set up and to recommend remedial action.

MATERIALS & METHODS

The research approach adopted in the study is cross-sectional descriptive as well as analytical method. For the purpose of the study, the dialysis department was divided in to four parts. This was also done for convenience of assessment. To collect data, total 180 cases were observed in the period of two months. Checklist was used as a tool for process observation. This was prepared by reference of guidelines issued by the Government and review of literature on similar subject. The checklist included the processes with 'yes' and 'no' to check for compliance related to haemodialysis unit access care. which include- 30 cases of AV Fistula, 40 cases of HD catheter, 40 cases of Dialyser wash and 40 tubing wash. Disinfectant assessment was done for- access point disinfection assessment, dialysis machine disinfectant assessment, dialyser set disinfection assessment, surface disinfection assessment. The final data collected was verified and codified. The data was entered in MS-Excel, frequency distribution and valid percentages were thus computed. Since, the present study is an observational and was conducted for understanding the managerial control mechanisms, to reduce the Hospital Acquired Infections in the Dialysis centre set-up, and as there was no intervention in management of the patients, no permission of the ethical committee of the hospital was taken. However, permission by the hospital authorities was obtained to conduct the observational study.

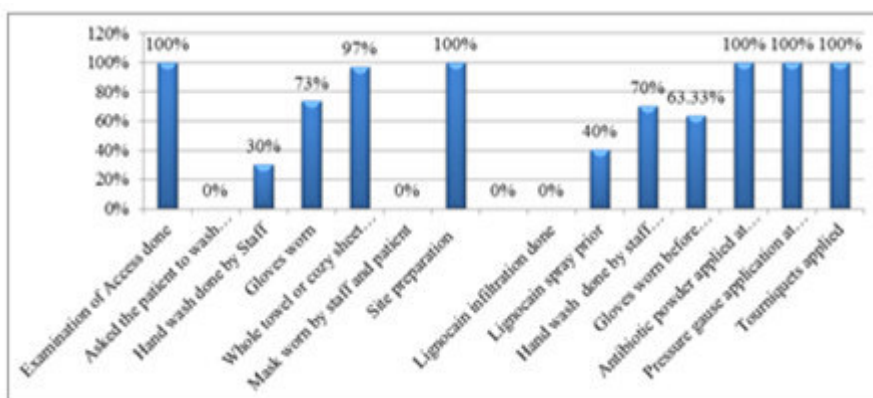


Figure 1
Cases of disinfectant assessment of AV Fistula

Fig.1 indicates, that the patient was not asked to wash hands and was directly taken for procedure (0%) which would have proved as a first level of disinfection at least against dust and dirt. The staff was quite negligent towards Hand wash and Hand Hygiene, compliance seen only (30%). Gloves were not worn for some procedure and also if worn not autoclaved or the gloves reverted and worn this is a serious concern as it is primary barrier both for attendant and patient compliance accounted to (73%). Although whole towel or cosy sheet was used for the procedure some instance it was observed that it was used again without autoclaving. Use of face mask, preparation of site in circular motion and lignocaine infiltration are the processes which were not done at all. Gloves in some instance were not worn during the removal of AV

cannula which would prove harmful for the staff as this increases the risk of prick injury and blood spills. It was also observed that the unit was running 24*7 with not enough manpower. There was no sufficient patient-free interval at each station. Also access to proper supplies most of the time posed problem and therefore the compliance gap was identified. Infection is the most common cause of hospitalization and the second most common cause of mortality among haemodialysis (HD) patients, after cardiovascular disease. HD patients as well as the dialysis staff are vulnerable to contracting health-care- associated infections (HAIs) due to frequent and prolonged exposure to many possible contaminants in the dialysis environment⁷. Thus utmost care is the responsibility of dialysis unit staff and should not be ignored at any cost.

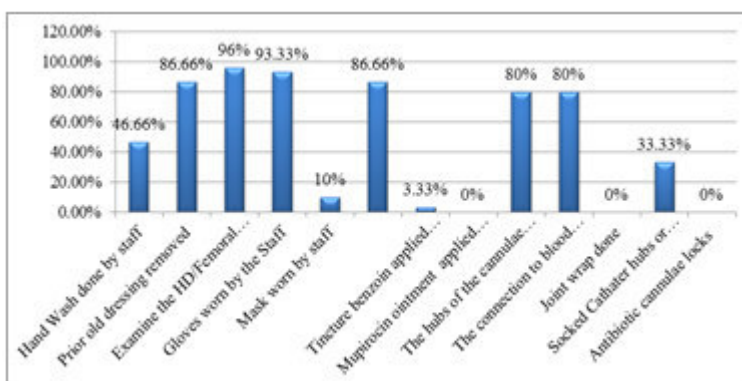


Figure 2
Cases of disinfectant assessment of HD Catheter

As per fig.2 it is seen in some cases that the staff showed negligence towards Hand Hygiene compliance (46.66%). Prior old dressing removal of HD catheters (86.66%), examination (96%) and Wearing of glove (93%) are at acceptable levels but need further improvement. Personal protective equipment (PPE) not used by staff for routine with compliance rate of only (10%) which is a critical area of concern and it should be looked into. Some of the standard applications as Mupirocin ointment (0%), tincture benzoin (0%) were not used at all which could have been a strong barrier to infections. No touch technique for hub or connectors not used in some instances. During the study it was also found that joint wrap of connector and antibiotic cannula lock was not done at all (0%). There should be proper

guidelines which should be adhered to. Periodic assessment of current infection control practices and environmental cleaning and disinfection practices within the facility should be done. Staff training in this situation is a must as most of the gaps identified can be avoided. Cleaning and disinfection are important components of infection control in a haemodialysis centre⁸. Robust reporting system is also desired in case infection incidences arise. Results of the incidences should be shared with the staff for better awareness and overcoming of such situations in future. There should also be a system to incentivize the staff showing adherence and contributing to the maximum patient safety

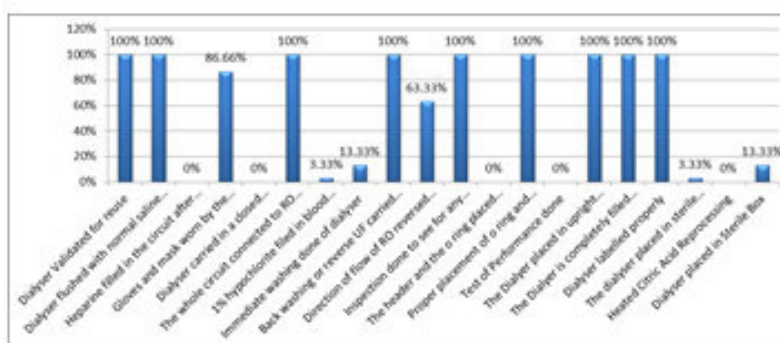


Figure 3
Cases of disinfectant assessment of Dialyser Wash

Water suitable for drinking is unsuited for use in the preparation of haemodialysis fluid and undergoes additional treatment⁹. The primary component of the additional treatment being reverse osmosis, which does not remove low-molecular-weight contaminants, the water treatment system must contain carbon beds or filters to ensure effective removal of such contaminants. Results in fig.3 shows that, heparin was not flushed from the machine before disconnecting (0%) as this could lead to formation of clots in the Dialyser fibres and hinder its performance and lead to harbouring of organisms. There was no separate storage for HBsAg patient dialyser before processing or separate reprocessing area for high risk patients. Hands were washed by the staff above the dialysers in the wash basin. PPE were not used. It was observed during the study that Dialyser was not carried in closed container from station to reprocessing area (0%) which results in spillage of blood on the floor, also a primary 1%

hypochlorite wash not given after disconnecting in the reprocessing area (3.33%) which is in protocols as it proves very effective in first phase of disinfection. It was also observed during the study that washing under pressure with water is at satisfactory level only the concern was the reversal of flow of water which showed compliance up to (63.33%) was not done satisfactorily. One of the major aspect was Dialyser is not placed in sterile bag; also the box or container for keeping the dialyser was not cleaned with sterillium before placement of Dialyser in the box. It is generally recommended that the reprocessing of the Dialyser should be done immediately after the procedure is over of dialysis but this was observed only in (13.33%) of cases, other dialysers were placed in the basin for about 12 to 18 hrs. before reprocessing which shows negligence towards the disinfection of prime component, also this might lead to formation of clots and multiplication of bacilli in the dialyser.

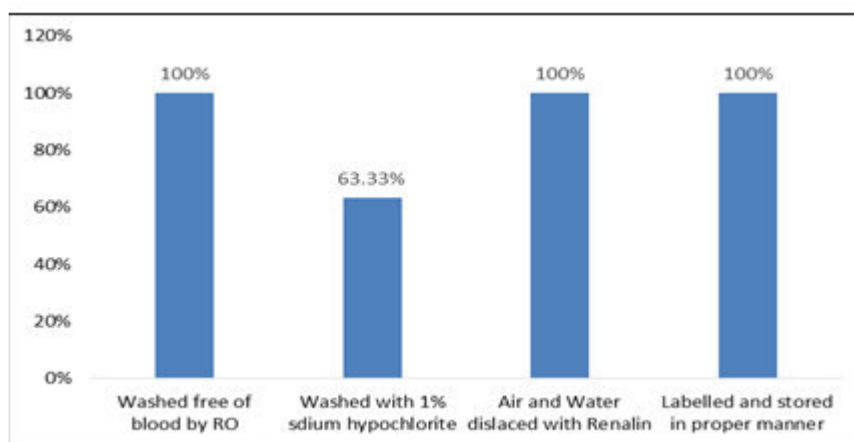


Figure 4
Cases of disinfectant assessment of Tubing Wash

From the results as shown in Fig.4 it is observed that the washing of the tubing was done satisfactorily, but the storage before washing was in the common area with the high risk patients also the tubing's were left unprocessed for about 12 – 18 hrs. It is observed during the study that only (63.33%) were washed or processed with 1% sodium hypochlorite solution. Harms in which the deviation of a parameter strictly coincides with the clinically measured effect on the patient are defined as "direct." Otherwise, when another clinical parameter, for hospital acquired infection must be involved to quantify severity, the related harm is considered "indirect." Two complete examples of multidisciplinary evaluation for severity of hazards which may be a direct harm (air embolism) or an indirect harm (hypothermia)¹⁰. The overall results points towards facility to have established procedures and most importantly routine disinfection of dialysis station should be taken up seriously by staff members. A closed supervision is required to ensure the compliance and reduction of identified gaps. It is vital to have an established hospital infection management system along with strengthening the continuing education of hospital infection knowledge, and consciousness. There is need to standardize the operation flow, and firmly carrying out the disinfection isolation system, in order to enhance the organization management on hospital infection in dialysis unit. This

will result in better care and patient satisfaction which is ultimately the aim of any healthcare facility. Disinfection of Hemodialysis Machines & Peripheral Equipment & Accessories should be followed as per the provisional standards and guidelines which describes in detail the methodology. If adopted it can bridge the gap and up the compliance level¹¹.

CONCLUSION

The study reveals the shortfalls in the disinfection process in the haemodialysis centre in the tertiary care hospital. It also brought in light that there is immediate need of attention for the management to look in to reprocessing area relocation and proper means of training of personnel towards disinfection of Dialyser and tubing's used in the process, as it could lead to major source of nosocomial infection in the Dialysis compromising the quality of care. The study also observed that proper attention is needed to be paid towards the process and frequency of surface disinfection in the dialysis unit, which is one of the important zones of contact infection especially in immune compromised patients with low immunity as in the dialysis patient. Creating importance of awareness regarding susceptibility for infection by the patients on dialysis, sustained training of health care workers,

monitoring of their patient care activities in the dialysis centres, sustainability by adhering to standard operating procedures (SOPs), are few important points and way forward for safety of patients.

CONFLICT OF INTEREST

Conflict of interest declared none.

REFERENCES

1. Handbook of dialysis for technicians [Internet]. Handbook of dialysis for technicians | Read Online | Foboko. [cited 2016Dec16]. Available from: <https://www.foboko.com/ebook/7413/health-and-fitness/handbook-of-dialysis-for-technicians/preview/2>.
2. Eleftheriadis T, Liakopoulos V, Leivaditis K, Antoniadi G, Stefanidis I. Infections in hemodialysis: a concise review. Part II: blood transmitted viral infections [Internet]. Hippokratia. LITHOGRAPHIA Antoniadis I.-Psarras Th. G.P.; 2011 [cited 2016Nov07]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3209673/>.
3. Azmi AN, Tan S-S, Mohamed R. Hepatitis C and kidney disease: An overview and approach to management [Internet]. World Journal of Hepatology. Baishideng Publishing Group Inc; 2015 [cited 2016Dec 03]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4295197/>.
4. Guidelines for maintenance of haemodialysis in India [Internet]. [cited 2016Dec18]. Available from: <http://clinicalestablishments.nic.in/WriteReadData/358.pdf>.
5. Recommendations for preventing transmission of infections among chronic Haemodialysis patients [Internet]. Available from: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5005a1.html>
6. Dix K. Infection Control in the Dialysis Setting [Internet]. [cited 2016Nov19]. Available from: <http://www.infectioncontrolday.com/articles/2007/04/infection-control-in-the-dialysis-setting.aspx>.
7. Karkar A, Bouhaha BM, Dammang ML. Infection control in hemodialysis units: A quick access to essential elements. <http://www.sjkdt.org/article.asp?isn=13192442;year=2014;volume=25;issue=3;spage=496;epage=519;aulast=Karkar>. Saudi Journal of Kidney Diseases and Transplantation; 2014.
8. Centers for Disease Control and Prevention [Internet]. Centers for Disease Control and Prevention. Centers for Disease Control and Prevention; 2009 [cited 2017Jan9]. Available from: https://www.cdc.gov/hicpac/disinfection_sterilization/3_2contaminateddevices.html
9. Nicholas A Hoenich Institute for Cell 1 December 2009; Critical Care 2009;13:1007 (doi:10.1186/cc8158); Critical Care Vol 13 No; 6 Page 2 of 2.
10. Lodi CA, Vasta A, Hegbrant MA, Bosch JP, Paolini F, Garzotto F, Ronco C. *Clinical Journal of the American Society of Nephrology : CJASN*. 2010 Nov; 5(11): 2004-2017.
11. Cleaning & Disinfecting Hemodialysis Machines & Stations [Internet]. www.bcrenalagency.ca. CPRA; 2016 [Cited 2017Jan7]. Available from: <http://www.bcrenalagency.ca/resourcegallery/Documents/Cleaning%20and%20Disinfecting%20Hemodialysis%20Machines%20and%20Stations.pdf>

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