



HAEMODIALYSIS; HAEMODIALYSIS CATHETER RELATED INFECTIONS

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ABSTRACT... Introduction: Vascular access is lifeline for haemodialysis (HD) patients. Catheter related infections limit the duration of such devices and are important cause of morbidity in this population the main complication of catheter in hemodialysis is infection. **Objectives:** To determine frequency of haemodialysis Catheter Related Infections in haemodialysis patients. **Study Design:** Prospective study. **Place and Duration:** This study was conducted at Department of Nephrology, King Abdul Aziz Specialists Hospital, Taif, Saudi Arabia in 1 year from Jan to Dec 2017. **Methodology:** This study included one hundred sixteen adults who underwent catheterization for Haemodialysis. These patients were evaluated to determine the incidence of catheter related infections. At each dialysis session patients were clinically examined and cultures taken from exit site and blood. Ten malfunctioning catheters were changed over guide wire. At the time of catheter removal or change catheter tips were sent for culture. **Results:** Total of 116 catheters (50 femoral, 52 jugular, 14 subclavian) were evaluated. Duration of catheterization varied from 2-70 days (average 21 days) for jugular and subclavian whereas for femoral catheters it was 1-30 days (mean 8.4 days). Exit site cultures were positive in 76 (66%) patients and common organism were Staphylococcus epidermis 32, Staphylococcus aureus 24, Gram negative rods in 12 and mix growth in 08 patients. Clinical sepsis was observed in 27(23%) patients (fever with /without chills, purulent discharge around catheter. One patient had endocarditis with big mass in right atrium). Organism isolated from these patients were (Staphylococcus aureus 11, Staphylococcus epidermis 8, gram negative 5). Bacteremia alone was observed in 13 (11%) patients. Of 10 patients with soaked dressing 7 (70%) patients subsequently became febrile. In all these patients catheters were removed and antibiotics instituted. Although clinical sepsis was more with jugular than femoral catheters but could be related to longer duration of jugular catheters. Catheters removed from febrile patients had much higher rate of colonization and bacteremia. Catheter exchange over guide wire was not associated with higher infection rates. **Conclusions:** Catheter related infection still remain high in dialysis population. Staphylococcus epidermis and Staphylococcus aureus were commonly isolated organisms. Cather sepsis was an important cause of morbidity in these patients. Long duration of catheterization, soaked dressing and colonization were important risk factors.

Key words: Haemodialysis, Catheter-Related Infection, Sepsis, ESRD.

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INTRODUCTION

The prevalence of end-stage renal disease (ESRD) patients requiring renal replacement therapy (RRT) has increased in the last decade and it is expected that this increase will continue over the next 10 years. Hemodialysis (HD), the main modality of RRT^{1,2}, depends on long-term and effective vascular access. Vascular access is lifeline for haemodialysis (HD) patients. Catheter related infections limit the duration of such devices and are important cause of morbidity in

this population. Several international associations including European Best practice Guidelines (EBPG) and Kidney Disease Outcomes Quality Initiative (KDOQI) recommend keeping temporary vascular catheter for as short time as possible to prevent catheter-related blood-stream infections (CRBSI) and its complications.^{3,4}

This is particularly true in patients with end stage renal disease; sepsis is the second most common cause of death in this population after

cardiovascular disease.⁵⁻⁷

Identifying Catheter related infection risk factors is important for setting prevention policies. These risk factors vary from study to another. They include duration of Catheter, diabetes mellitus, old age, and low hemoglobin and serum albumin levels.⁸⁻¹¹

In this prospective study, we aim to determine the incidence of catheter related infections, microbiological spectrum, clinical effects and any salvage methods.

MATERIALS AND METHODS

This prospective study was conducted in Chronic Kidney Disease (CKD) stage V patients presenting for dialysis without permanent vascular access at King Abdul Aziz Specialists Hospital, Taif, Saudi Arabia. One hundred sixteen adults who underwent catheterization for Haemodialysis were evaluated.

Inclusion Criteria

CKD-V patients requiring haemodialysis, age more than 18 years without permanent vascular access (arterio-venous fistula (AVF), arterio-venous graft (AVG) or cuffed hemodialysis catheters) or with recently created AVF or AVG but without possibility of cannulation for 30 days.

Exclusion Criteria

Sepsis at presentation, antibiotic use within 7 days prior to the catheter insertion, pregnancy.

DEFINITIONS

Catheter colonization: It was defined by positive catheter tip culture.

Catheter related blood stream infection: It was defined as Catheter colonization and blood culture positive for same organism

Exit site infection: Presence of pus at insertion site or erythema 2 cms around exit site

Clinical Sepsis: Fever 38 C /hypotension.

RESULTS

A total of 116 catheters (50 femoral, 52 jugular, 14 subclavian) were evaluated (Table-I). At each dialysis session patients were clinically examined

and cultures taken from exit site and blood. Ten malfunctioning catheters were changed over guide wire. At the time of catheter removal or change catheter tips were sent for culture.

Duration of catheterization varied from 2-70 days (average 21 days) for jugular and subclavian whereas for femoral catheters it was 1-30 days (mean 8.4 days). Exit site cultures were positive in 76 (65.5%) patients and common organism were Staphylococcus epidermis 32, Staphylococcus aureus 24, Gram negative rods in 12 and mix growth in 08 patients (Figure-1). Clinical sepsis was observed in 27(23%) patients (fever with /without chills, purulent discharge around catheter. One patient had endocarditis with big mass in right atrium). Organisms isolated from these patients were (Staphylococcus aureus 11, Staphylococcus epidermis 8, Gram negative rods 05 and mix growth in 03 patients (Figure-2).

Bacteremia alone was observed in 13(11%) patients. Out of 10 patients with soaked dressing, 7 (70%) patients subsequently became febrile. In all these patients catheters were removed and antibiotics instituted. Although clinical sepsis was more with jugular than femoral catheters but could be related to longer duration of jugular catheters. Catheters removed from febrile patients had much higher rate of colonization and bacteremia. Catheter exchange over guide wire was not associated with higher infection rates.

Catheter Name	Number
Jugular Catheter	52
Femoral Catheter	50
Subclavian Catheter	14
Total	116

Table-I. List of catheters

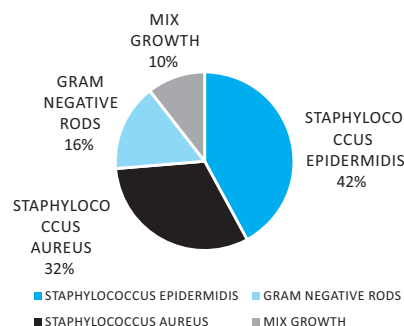


Figure-1. Positive exit site culture (n=76 (66%))

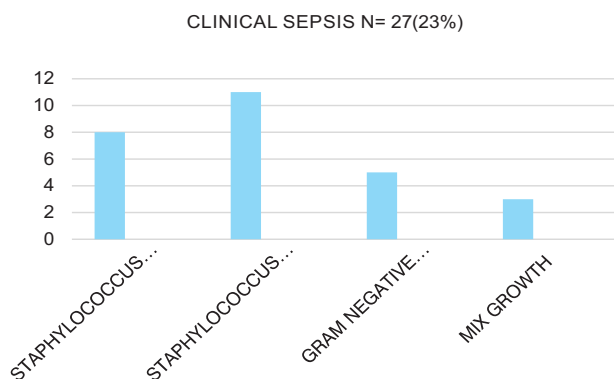


Figure-2. Clinical sepsis n= 27(23%)

DISCUSSION

It is evident from this study that unfortunately, still large number of patients initiate haemodialysis using temporary vascular access and may keep the catheter for more than 3 weeks (median 21 days, in our study). The microorganisms most frequently isolated during catheter-related bacteremia episodes in HD are Staphylococcus cocci and other Gram-positive cocci. According to US data, coagulase-negative Staphylococcus cocci (CoNS) are found in 32% to 45% of cases^{12,13}, Staphylococcus aureus in 22 to 29%^{12,14,15} and Gram-negative bacteria have been isolated in 21% to 30% of cases.^{12,14}

Our results documented that exit site cultures were positive in 76 (66%) patients and common organism were Staphylococcus epidermis 32 (42%), Staphylococcus aureus 24 (31.5%), Gram negative rods in 12(16%) and mix growth in 08 (10.5%) patients. Clinical sepsis was observed in 27(23%) patients (fever with /without chills, purulent discharge around catheter. One patient had endocarditis with big mass in right atrium). Organisms isolated from these patients were (Staphylococcus aureus 11 (41%), Staphylococcus epidermis 08 (30%), gram negative 05 (18.5%). Our results documented incidences were similar to the above mentioned international studies.

Bacteremia alone was observed in 13 (11%) patients. Out of 10 patients with soaked dressing 7 (70%) patients subsequently became febrile. In all these patients catheters were removed and

antibiotics instituted. Although clinical sepsis was more with jugular than femoral catheters but could be related to longer duration of jugular catheters. Catheters removed from febrile patients had much higher rate of colonization and bacteremia. Catheter exchange over guide wire was not associated with higher infection rates.

Promotion of clear clinical guidelines and continuing staff education for improvements of practice are needed. Improving hand hygiene is needed. Applying aseptic techniques during the insertion, care and manipulation of intravascular catheters are known to be effective precautions. Our study confirmed that longer duration of Catheter use (≥ 10 days) were significantly associated with risk of sepsis as mentioned by Lemaire et al.¹⁶ and other studies.^{17,18} Prolonged duration of catheter usage was due to difficulty of performing an arterio-venous fistula which was a problem encountered in both diabetic and non-diabetic patients.

Staphylococcus epidermis and Staphylococcus Aureus were the most common causative organisms in our study and this was also found in most reports.^{12,13,16,19-21} Considering all Gram-negative micro-organisms, they were responsible for a significant proportion of cases. This should be taken into account for the empirical treatment of catheter sepsis.

A lot must be done to reduce the duration of temporary vascular accesses by creation of fistulas. Both Staphylococcus aureus and Gramnegative micro-organisms must be taken into account for empirical therapy. Compliance to hygiene measure and rational use of antibiotics are recommended for decreasing MDR rate.

CONCLUSIONS

Catheter related infection still remain high in dialysis population. Staphylococcus epidermis and Staphylococcus aureus were commonly isolated organisms. Catheter sepsis was an important cause of morbidity in these patients. Long duration of catheterization, soaked dressing and colonization were important risk factors.

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

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*No response is a response.
And it's a powerful one.
Remember that.*

– Unknown –

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Muhammad Ajmal Farid	Designing, collection of data, drafting, reviewing.	
2	Hammad Tufail Chaudhary	Drafting, corrections, Reviewing, rewriting.	
3	Imran Nazir	Reviewing.	
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