



HEMODIALYSIS CATHETER RELATED BLOOD STREAM INFECTION: A SINGLE CENTRE EXPERIENCE

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ABSTRACT **BACKGROUND:** Chronic kidney disease (CKD) is a leading global health issue. Most of the patients undergo hemodialysis via catheters. They are prone for infections. Infection is a common cause of death in CKD patients. We designed this study to evaluate prevalence of catheter related infection at our centre. **MATERIALS AND METHODS:** This is a prospective observational study done at tertiary level medical centre. It included patients on hemodialysis with catheters as an access. The aim of the study is to study frequency of infection and causative organisms. **RESULTS:** 137 patients completed the study. 18.24% patients developed infections during study period. Commonest organism responsible for infection was staphylococcus aureus (28%). **CONCLUSION:** Catheter related blood stream infection is present in significant number of patients. Gram positive and gram negative organisms both were responsible for the infection.

KEYWORDS : Blood Stream, Catheter, Ckd, Hemodialysis, Infection

INTRODUCTION

World is witnessing increased incidence and prevalence of non communicable diseases. Chronic kidney disease (CKD) is a major health related problem all over the world¹. India and China account for one third of the global CKD population². CKD has impact on physical health, mental health and economical condition of the patient. Kidney transplant is the treatment of choice for CKD. But for various reasons very few patients undergo transplant. Majority patients prefer dialysis as a method of renal replacement therapy. Hemodialysis (HD) is commonly chosen over peritoneal dialysis in India. Various accesses available for HD include AV fistula, AV graft, non tunneled catheter and tunneled catheter^{3,4}. Many patients present very late in the course of the disease and hence require catheter placement for HD. Catheters are prone for infection due to frequent handling, non compliance with the precautions and source of thrombosis. We designed this study to evaluate frequency of infection in patients with catheter and etiology of the infections.

MATERIALS AND METHODS

This is a prospective, observational study done at tertiary care centre. Permission was taken from institutional review board and ethics committee prior to patient enrollment. It included patients on hemodialysis.

Inclusion criteria

1. Patient with CKD on HD
2. Age more than 18 years
3. Patient with HD catheter as a access for HD

Exclusion Criteria

1. Patients with AKI requiring HD
2. Patient already on treatment for CRBSI
3. Patient diagnosed with infection at any site
4. Patient on antibiotics or who received antibiotic in previous seven days.

OBJECTIVES OF THE STUDY

1. To study prevalence of CRBSI in HD unit
2. To study etiology of CRBSI in HD unit

After enrollment, detailed history was taken. Each patient underwent relevant clinical examination. Patient was followed up for one month after catheter placement or till catheter removal whichever is longer. CRBSI was suspected in patients having fever and/or chills without any other obvious cause, unexplained hypotension during HD, chills during HD, discharge from catheter site and tenderness over catheter site. Blood culture samples were collected (both peripheral and central from catheter). Patients were diagnosed to have CRBSI as per standard criteria guidelines.

Statistical Analysis

- Data was entered on EXCEL worksheets. Quantitative variables were expressed as mean, and standard deviation. Qualitative variables were expressed as percentage and frequencies..

- SPSS Statistical software was used for all statistical work.

RESULTS

Total 137 patients completed the study. Mean age of patients was 42.6± 17.19 years. Of the total patients 61.32% were males and 38.68% were females. Causes of chronic kidney disease in study population are shown in table 1. Important causes include diabetes mellitus and hypertension.

Table 1: Etiology of chronic kidney disease

Cause	Patients(n=137)
Diabetes Mellitus	40.14%
Hypertensive nephrosclerosis	20.43%
Congenital anomalies	10.94%
Cystic diseases	2.91%
Connective tissue disorders	1.45%
Renal calculus diseases	1.45%
Others**	22.68%

** Others include patients presenting late in the course of the disease with shrunken kidneys so cause could not be established. It probably includes some patients with chronic glomerulonephritis and chronic tubulointerstitial disease.

112 patients were initiated after putting non tunneled catheter while remaining were dialysed via tunneled catheters. Of the total patients, 25 had CRBSI. 12 had gram positive infection, 11 had gram negative infection and two had fungal infection.

Table 2: Etiology of CRBSI

Organism	Patients(n=25)
Staphylococcus aureus	7(28%)
Coagulase negative staphylococci	4(16%)
Enterococci	1(4%)
Pseudomonas	4(16%)
Acinetobacter	3(12%)
Klebsiella	2(8%)
Serratia	2(8%)
Candida	2(8%)

DISCUSSION

Our study comprised of male patients more than female patients, similar observations were made by Rajapurkar et al⁵ and Chandrashekhar et al⁶. Diabetes mellitus is the commonest cause of CKD in study population. This is in acceptance with the available literature^{7,8}. % patients were diagnosed to have CRBSI in our study. In studies done by Tokras et al and Taylor et al^{9,10} similar results were seen. Both gram negative and gram positive organisms were responsible for CRBSI. Shah et al¹¹ reported gram positive organisms in 60% and gram negative in 38 %. Most common organism at our centre was staphylococcus aureus. Similar findings were noted by Blakestijn PJ et al¹².

CONCLUSION

We conclude that CRBSI is still an important complication seen in HD patients. AV fistula creation should be advised early in the course of the disease.

REFERENCES

1. Bikbov B, Purcell CA, Levey AS, Smith M, Abdoli A, Abebe M et al. Global, regional, and national burden of chronic kidney disease, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *The Lancet*. 2020;395:709-33.
2. Modi GK, Jha V. The incidence of end-stage renal disease in India: a population-based study. *Kidney Int*. 2006;70:2131-3.
3. Kher V. End-stage renal disease in developing countries. *Kidney Int*. 2002;62:350-62.
4. Jha V, Ur-Rashid H, Agarwal SK, Akhtar SF, Kaffle RK, Sheriff R. The state of nephrology in South Asia. *Kidney Int*. 2019;95:31-37.
5. Rajapurkar M., John GT, Kirpalani AL, Abraham G, Agarwal SK, Almeida AF et al. What do we know about chronic kidney disease in India: first report of the Indian CKD registry. *BMC Nephrol* 2012;13:1-8
6. Chandrashekar A, Ramakrishnan S, Rangarajan D. Survival analysis of patients on maintenance hemodialysis. *Indian J Nephrol*. 2014;24:206-13
7. Radica Z, Alicic, Michele T, Rooney and Katherine R. Tuttle. Diabetic kidney disease: Challenges, progress and possibilities. *CJASN* 2017; 12: 2032-2045.
8. Rahimi Z, Mansouri Zaveleh O, Rahimi Z, Abbasi A. AT2R -1332 G:A polymorphism and diabetic nephropathy in type 2 diabetes mellitus patients. *J Renal Inj Prev*. 2013; 1:97-101.
9. Tokars JI, Miller ER, Stein G. New national surveillance system for hemodialysis-associated infections: initial results. *Am J Infect Control*. 2002;30:288-95.
10. Taylor G, Gravel D, Johnston L, Embil J, Holton D, Paton S. Prospective surveillance for primary blood stream infections occurring in Canadian hemodialysis units. *Infect control Hosp Epidemiol* 2002;23:716-22.
11. Shah S, Singhal T, Naik R, Thakkar P. Incidence and Etiology of Hemodialysis Catheter Related Blood Stream Infections at a Tertiary Care Hospital in Mumbai: A 5 Year Review. *Indian J Nephrol*. 2020;30:132-133.
12. Blakestijn PJ. Treatment and prevention of catheter related infections in hemodialysis patients. *Nephrol Dial Transplant* 2001;16:1975-8.