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OUTCOME OF BACTERIAL CULTURE IN SAMPLES FROM AV FISTULA AND CENTRAL VENOUS CATHETER: A STUDY IN BANGABANDHU SHEIKH MUJIB MEDICAL UNIVERSITY, DHAKA, BANGLADESH

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ABSTRACT

Introduction: Bloodstream infections are the second most common cause of death among patients on hemodialysis. Since data on vascular access complications are scarce, this study was designed to focus on vascular access complications in hemodialysis patientsInfection is the second leading cause of death in hemodialysis patients in many countries and is the leading cause of death. Furthermore, infection is a major cause of hospitalization in hemodialysis patients. **Objective:** The purpose of the present study was to estimate the Outcome of Bacterial Culture in Samples from AV Fistula and Central Venous Catheter. **Methods:** This cross sectional study was conducted from January 2014 to December 2015 for a period of 2(two) years in the Department of Nephrology at Bangabandhu Sheikh Mujib Medical University, Dhaka. All adult patients underwent hemodialysis of both sexes fulfilling the inclusion and exclusion criteria were included in the study. Then each patient was evaluated during each hemodialysis session for the two samples were sent for cultures one from peripheral veins and another from vascular access either from fistula or from central venous catheter. **Result:** The mean age of the patients were 38.26 (15.26) years. In this present study male (71.7%) are predominant than female (28.3%). Maximum (51.7%) patients were under weight. In this study 50 (83.3%) patients had anemia. Mean (SD) WBC, Hb, S. uric acid, FPG, Plasma glucose 2h ABF, HbA1C, S. total protein and S. albumin were 14415 (4000) count/cmm, 9.61 (1.62) g/dl, 417.67 (100.87) µmol/l, 5.37 (1.18) mmol/l, 7.27 (2.18) mmol/l, 6.42 % (0.68), 62.71 (5.82) g/l and 28.97 (4.99) g/l respectively. Out of 46 AV fistula cases, culture was positive in vein 8 (13.3%) cases and in fistula 5 (10.8%) cases. Out of 11 permanent CV catheter cases, culture was positive in vein 6 (54.5%) cases and in catheter 7 (63.3%) cases. Out of 3 catheter tip cases, culture was positive in catheter tip 2 (66.7%) cases. Comparison of growth between AV fistula and central venous catheter site. Positive growth was significantly higher in central venous catheter 9 (64.3%) than that of AV fistula 5 (10.9%) cases. **Conclusion:** We identified a high incidence of catheter-related infections caused by resistant microorganisms in patients undergoing hemodialysis via central venous catheters. The risk of BSI in patients undergoing hemodialysis is related to the vascular access (tunneled central venous catheter), low haemoglobin, underweight, low serum total protein and low serum albumin.

KEYWORDS: Bacteremia, Hemodialysis, Blood stream infection, Epidemiology, Infection control.

I. INTRODUCTION

Infection is the second leading cause of death in hemodialysis patients in many countries and is the leading cause of death in the first year of hemodialysis in Japan.[1-3] Furthermore, infection is a major cause of hospitalization in hemodialysis patients. In the United States, infection was observed in approximately 30% of all hospitalizations of hemodialysis patients.[4,5] These data indicate that infection is a serious threat to these patients. Hemodialysis patients have higher rates of bacteremia, whereas peritoneal dialysis patients have higher rates of peritonitis.[4,6] In a study in the United States, the rates (per 100 person-years) of specific infection-related hospitalizations of hemodialysis patients were 17.6 for septicemia, 15.3 for pulmonary infections, 3.7 for gastrointestinal infections, 12.3 for genitourinary infections, and 10.2 for soft-tissue infections.[4] In a cohort study in Denmark, the incidence

of blood stream infection was 13.7 per 100 person-years in hemodialysis patients and 0.53 per 100 person-years in a population control.[7] These data indicate higher risks of bacteremia and a significant need to reduce bacteremia in hemodialysis patients. In this review, we describe the features of bacteremia, including its prevalence, microbiological features, and risk factors in hemodialysis patients. And we describe details of catheter related bacteremia, a characteristic bacteremia in hemodialysis patients. Furthermore we discuss how to reduce the risk of bacteremia in hemodialysis patients. The incidence of bacteremia in hemodialysis patients is very high compared with its incidence in the general population. A population-based cohort study in Denmark showed that the incidence of bacteremia was 13.7 per 100 person years in hemodialysis patients, whereas that in the general population was 0.53 per 100 person years.[7] The incidence of *Staphylococcus aureus* (*S. aureus*) bacteremia in hemodialysis patients was 46.9-fold that of the general population in Denmark.[8] In studies in Canada, the relative risks of *Pseudomonas aeruginosa* and anaerobe infection were 123.3 and 72.7, respectively, in hemodialysis patients.[9,10] Almost all studies on bacteremia in Japan were case reports.[11-13] Sepsis was the second leading cause of death in infectious diseases in a study in Japan.[14] However, microbiological studies have not been conducted. On the other hand, the greater use of arteriovenous fistula and low catheter use are unique characteristics in Japan.[15] Eighty nine point seven percent of vascular accesses of Japanese hemodialysis patients was native arteriovenous fistula, 7.1% was arteriovenous grafts, 1.8% was superficialization of artery, and only 0.5% was long-term catheters in 2008.[16] It might be a reason why few studies have conducted on catheter related bacteremia in Japan. Further studies are required to clarify about the bacteremia in Japan.But hemodialysis is associated with bloodstream infections, morbidity and even mortality. In medicine, hemodialysis is a method that is used to achieve the extracorporeal removal of waste products such as creatinine and urea and free water from the blood when the kidneys are in a state of renal failure. Hemodialysis is one of three renal replacement therapies (the other two being renal transplantation and peritoneal dialysis). Hemodialysis can be an outpatient or inpatient therapy. However, concentrations of sodium and chloride are similar to those of normal plasma to prevent loss. Sodium bicarbonate is added in a higher concentration than plasma to correct blood acidity. A small amount of glucose is also commonly used. Note that this is a different process to the related technique of hemofiltration.[17] Hemodialysis often involves fluid removal, because most patients with renal failure pass little or no urine. Side effects caused by removing too much fluid and/or removing fluid too rapidly include low blood pressure, fatigue, chest pains, leg-cramps, nausea and headaches. Since hemodialysis requires access to the circulatory system, patients undergoing hemodialysis may expose their circulatory system to microbes, which can lead to sepsis, endocarditis or osteomyelitis. The risk of infection varies depending on the type of access used. Bleeding may also occur; again the risk varies depending on the type of access used. Infections can be minimized by strictly adhering to infection control best practices.[18] In Bangladesh, vascular access for maintenance hemodialysis patients are AV fistula and untunneled CVC. Some hemodialysis centers in Bangladesh are using tunneled CVC, but the rates are still not high. AV grafts rarely used in our country. Data from the Dialysis Outcomes and Practices Patterns Study (DOPPS) shows that in the United States 25% of dialysis patients are dialyzed with catheters; in other countries the use of catheters is even more common (Belgium, 41%; UK, 28%). Over 70% of patients with initiating chronic hemodialysis in the United States have a tunneled CVC as their first blood access device.[19]

II OBJECTIVE

The purpose of the present study was to estimate the Outcome of Bacterial Culture in Samples from AV Fistula and Central Venous Catheter.

III MATERIALS AND METHODS

This cross sectional study was conducted from January 2014 to December 2015 for a period of 2(two) years in the Department of Nephrology at Bangabandhu Sheikh Mujib Medical University, Dhaka. All adult patients underwent hemodialysis of both sexes fulfilling the inclusion and exclusion criteria were included in the study. Then each patient was evaluated during each hemodialysis session for the two samples were sent for cultures one from peripheral veins and another from vascular access either from fistula or from central venous catheter. Sampling technique: Purposive sampling was done. Sample size: Due to time constrain finally 60 samples were taken.

Inclusion criteria

1. Subjects on maintenance hemodialysis more than 3 months.
2. A patient with vascular access who developed the following clinical or lab criteria.
3. Temperature: >100°F.
4. Heart rate: >90/minute.
5. Respiratory rate: >20/minute.
6. Peripheral white blood cell count: >12000/cmm.
7. Age: More than 18 years.
8. Sex: patients of both sexes.
9. Patients willing to participate in the study.

Exclusion criteria

1. Subjects with prophylactic antibiotic therapy
2. Subjects with known infection within one month
3. Acute renal failure
4. Temporary venous catheter

Data collection: The study subjects were selected on the basis of selection criteria from the patients of the Department of Nephrology, BSMMU Hospital. The demographic information, relevant history, examination

findings and investigation reports of all the study subjects were recorded in the data collection sheet. Any complication during the procedure and hospital admission if required was also recorded.

Data analysis: Data were recorded systematically in predesigned data collection form. Quantitative data were expressed as mean and standard deviation and qualitative data were expressed as frequency distribution and percentage. Statistical analyses were performed by using window based computer software device with Statistical Packages for Social Sciences (SPSS-21) (SPSS Inc, Chicago, IL, USA). Association between categorical variables were analyzed by chi-squared test and continuous variable by unpaired student t-test used. For all statistical tests, p value <0.05 as was considered as statistically significant.

Risk factors: The most important risk factor for bacteremia in hemodialysis patients is the use of central venous catheters. Hemodialysis catheter uses were at higher risk of bacteremia compared with arteriovenous fistula or graft uses. A single center study in the United States indicated that the rate of positive blood cultures in patients with central venous catheters was 1.86/1000 d and 0.08/1000 d in patients with an arteriovenous fistula and 0.31/1000 d in patients with an arteriovenousgraft.[22] Rate of infection related hospitalization was higher in the patients with catheters or arteriovenous grafts compared with arteriovenous fistula, the rate ratios were 1.59 and 1.37, respectively.[5] Analysis of the United States Renal Data System showed that hemodialysis patients with a temporary catheter had a 50% higher risk of septicemia than patients with a native fistula. Patients with a GOR-TEX or bovine graft had a 33% higher risk of septicemia than patients with a native fistula during throughout seven years of follow-up.[21] In a retrospective study of a hospital in Brazil, a multiple regression analysis showed that the use of a central venous catheter was associated with an 11.2-fold increased risk of bloodstream infections compared with arteriovenous fistula for vascular access.[20] In addition, a second leading risk factor was previous hospitalizations, which had an odds ratio of 6.63 in a multiple logistic regression analysis.[20] In patient characteristics, the adjusted risk ratios of age > 65 years, diabetes mellitus, and serum albumin < 3.5 were 1.61, 1.26 and 1.66, respectively.[21] The patients who reused dialyzers had a 28% higher risk of septicemia than patients who did not reuse membranes.[21]

Antibiotic lock for hemodialysis catheter: There are many reports and a meta-analysis of antibiotic lock for hemodialysis catheters.[23-28] The antibiotics include gentamycin, minocycline, cefotaxime, cefazolin, and vancomycin. Moreover, antiseptics including taurolidine and trisodium citrate have also been tested. Antibiotic lock therapy significantly reduced CRBSI in all studies. In a subgroup analysis of each antibiotic, the reductions in bacteremia rates remained significant for locks containing gentamicin, minocycline, cefotaxime, and vancomycin and gentamicin, but not for those containing taurolidine, or cefazolin and gentamicin, or citrate.[23,28] Although they are associated with a significant reduction of CRBSI, the guidelines of the Centers for Disease Control and Prevention (CDC) do not recommend the routine use of antibiotic lock, and limit this treatment to patients with long-term catheters who have a history of multiple CRBSIs despite optimal maximal adherence to aseptic techniques because of the potential for side effects, toxicity, allergic reactions, or the emergence of resistance to the antimicrobial agent.[31]

Topical antibiotics: The prophylactic effects of the application of topical antibiotics, including mupirocin and polysporin triple antibiotic ointments, to the exit sites of the catheter were also investigated. These topical antibiotics significantly reduced CRBSI in hemodialysis patients. A randomized trial indicated that the topical use of polysporin triple antibiotic ointment to catheter exit sites reduced the relative risk of bacteremia by 60%, as well as the relative risk of mortality by 78%.[32] Mupirocin ointment is also effective to reduce CRBSI. In a randomized controlled trial, application of mupirocin ointment to the catheter exit sites reduced CRBSI by 85%.[32] However, the rapid emergence of resistant *S. aureus* and CNS has been reported.[33-35] Based on this evidence, the CDC guidelines recommend the antibiotic ointment for only hemodialysis patients.

Antibiotics/antiseptics coated catheters: Antibiotics or antiseptics impregnated or coated catheters can reduce the catheter related bacteremia.[46,47] The duration of catheter use in these studies were within a month, and the efficacy in long term use of these catheter has not been established.[36]

IV RESULTS AND OBSERVATION

The present cross sectional study was conducted to estimate the rates of infections and clinical and microbiological evaluation of bloodstream infections in patients undergoing maintenance hemodialysis in the Department of Nephrology of Bangabandhu Sheikh Mujib Medical University, Dhaka. A total number of 60 patients were included in the present study. The results of the present study are as follows.

Table 1: Distribution of patients according to age group (N=60).

Age group	Frequency	Percentage
≤20	6	10.0
21 – 30	17	28.3
31 – 40	12	20.0
41 – 50	7	11.7
51 – 60	15	25.0
>60	3	5.0
Total	60	100.0

[Table-1] shows the text merits the description which refer to the percent distribution of patients/subjects in different age group.

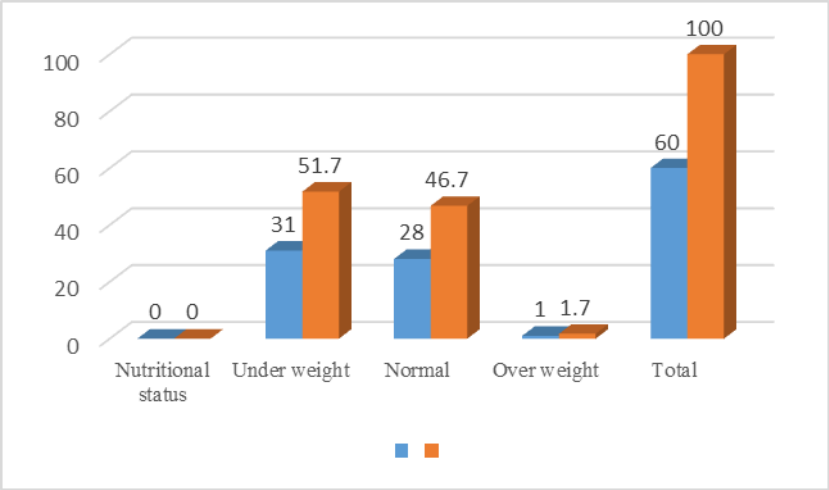

Figure 1: Distribution of patients according to body mass index (BMI) (N=60)

[Figure-1] shows distribution of patients by body mass index. Most of the patients were either underweight (51.7%) or normal (46.7%). Body mass index (kg/m2) : <18.5=underweight, 18.5-24.9= normal, 25-29.9= over weight and > 30= obese.

Table 2: Baseline clinical characteristics of the study sample (N=60).

Characteristic	Bacteremia		p value
	Negative (n=46)	Positive (n=14)	
Radial pulse rate /min	99.04 ± 8.54	98.07 ± 7.50	0.703#
Systolic blood pressure (mm of Hg)	154±22	143 ± 8	0.134#
Diastolic blood pressure(mm of Hg)	92 ± 9	86 ± 7	0.064#
Temperature (ºF)	101 ± 1	102 ± 1	0.055#
Respiratory rate (b/min)	22. 6 ± 1.6	22.7 ± 0.9	0.065#
Anemia			0.338##
Absent	9 (19.6)	1 (7.1)	
Mild	17 (37.0)	4 (28.6)	
Moderate	20 (43.5)	9 (64.3)	
Pneumonia	0 (0.0)	0 (0.0)	
Skin infection	0 (0.0)	0 (0.0)	
Urinary tract infection	0 (0.0)	0 (0.0)	
Infective endocarditis	0 (0.0)	0 (0.0)	
Septic arthritis	0 (0.0)	0 (0.0)	
Intra-abdominal abscess(by USG)	0 (0.0)	0 (0.0)	

Unpaired t test was done to calculate statistical difference.
Chi square test was done to calculate statistical difference.
Numeric data was expressed as Mean±SD and categorical data as number (percent)

[Table-2] shows that baseline clinical characteristics of both bacteremic and nonbacteremic patients are not significantly different statistically.

Table 3: Clinico-biochemical; hematological; comorbid condition and other associated factors in subjects with or without BSI in patients receiving HD (N=60).

Characteristic	Bacteremia		p value
	Negative (n=46)	Positive (n=14)	
Age, yr Mean(SD)	38 ± 16	37 ± 12	0.756[#]
Gender			0.513[##]
Male	32 (69.6)	11 (78.6)	
Female	14 (30.4)	3 (21.4)	
Diabetes mellitus			0.361[##]
Yes	12 (26.1)	2 (14.3)	
No	34 (73.9)	12 (85.7)	
Cerebrovascular disease			0.427[##]
Yes	2 (4.3)	0 (0.0)	
No	44 (95.7)	14 (100.0)	
Vascular Access			<0.001[##]
AV fistula	41 (89.1)	5 (35.7)	
Permanent catheter	5 (10.9)	9 (64.3)	
Surgical procedure within 1 month	3 (6.5)	5 (35.7)	0.005[##]
Current iron therapy	36 (78.3)	11 (78.6)	0.980
History of blood transfusion within 1 month	20 (43.5)	8 (57.1)	0.370[##]
Presence of intravenous canula	2 (4.3)	0 (0.0)	0.427[##]
S. total protein (g/L)	63.6 ± 6.1	59.5 ± 3.0	0.020[#]
S. Albumin (g/L)	30.2 ± 4.8	24.6 ± 2.4	<0.001[#]
White cell count/ cmm	14954 ± 4407	12642 ± 988	0.058[#]
Hemoglobin (g/dl)	9.6 ± 1.7	9.4 ± 1.2	0.720[#]

[#] Unpaired t- test was done to calculate statistical difference
[##] Chi square test was done to calculate statistical association
Numeric data was expressed as Mean±SD and categorical data as number (percent).

[Table-3] shows that in the analysis of variables, Type of vascular access (Permanent catheter), surgical procedure within one month, low serum total protein and low serum albumin were significantly more frequently associated with bacteremia.

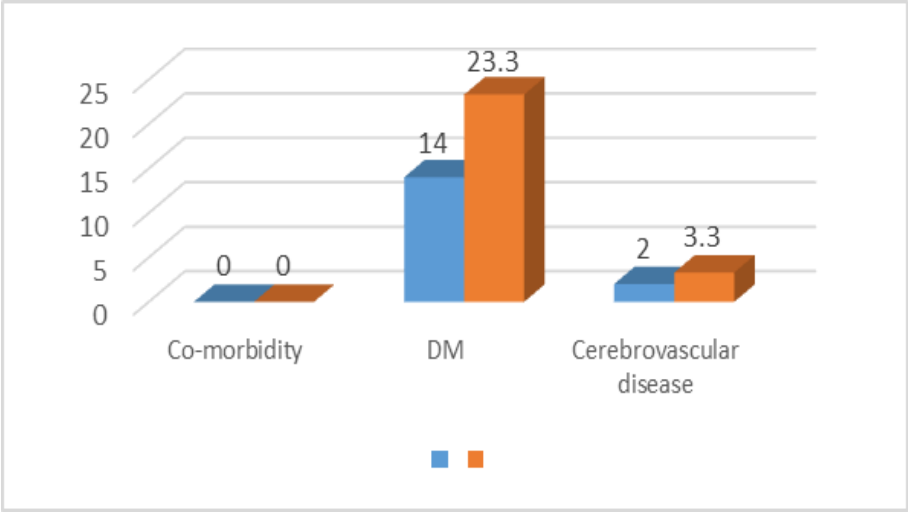

Figure 2: Distribution of patients according to co-morbidities (N=60).

[Figure-2] shows co-morbidities of the patients. DM was in 14 (23.3%) patients and cerebrovascular disease was in 2 (3.3%) patients. [DM=Diabetes mellitus]

Table 4: Distribution of patients according to anemia in two access types (N=60).

Anemia	Access type		Total n (%)	p value
	AV Fistula n (%)	Central venous catheter n (%)		
Absent	9 (19.5)	1 (7.1)	10 (16.7)	0.525
Mild	16 (34.8)	5 (35.7)	21 (35.0)	
Moderate	21 (45.7)	8 (57.2)	29 (48.3)	
Total	46 (100.0)	14 (100.0)	60 (100.0)	

Chi-square test was done to calculate statistical significance

[Table-4] shows distribution of patients according to anemia in two different access types. Anemia was moderate in 57.2% cases in central venous catheter and 45.7% cases in AV fistula. Mild anemia was presence in 35.7% cases in central venous catheter and 34.8% cases in AV fistula. Most of the patients of both groups are anemic, but there is no significant difference between two groups regarding anemia.

Table 5: Hematological and biochemical variables in two groups of access type for hemodialysis (N=60).

	Access type		Total	p value
	AV Fistula	Central venous catheter		
WBC (count/cmm)	14652±4209	13635±3229	14415 ± 4000	0.410
Hemoglobin (g/dl)	9.67 ± 1.75	9.41 ± 1.13	9.61 ± 1.62	0.599
S. Uric acid (µmol/l)	410.45± 108.65	440.35±69.56	417.67 ± 100.87	0.338
Plasma glucose				
Fasting (mmol/l)	5.31±1.29	5.55± 0.73	5.37 ± 1.18	0.508
2 hours ABF	7.29±2.27	7.20±1.94	7.27 ± 2.18	0.885
HbA1c (%)	6.41 ± 0.65	6.46 ± 0.78	6.42 ± 0.68	0.800
S. total protein (g/l)	63.79±5.87	59.14 ± 4.09	62.71 ± 5.82	0.008
S. albumin (g/l)	30.01 ± 5.01	25.52 ± 3.07	28.97 ± 4.99	0.003

Unpaired t test was done to calculate statistical difference.

[Table-5] shows laboratory findings in two different access types. Serum total protein and serum albumin were significantly higher in cases of AV fistula comparing central venous catheter type. WBC, Hemoglobin, Serum Uric acid, plasma glucose and HbA1c were almost similar in both cases.

Table 6: Bloodstream infection rate of the patients (N=60)

	Peripheral Vein	AV fistula	Catheter	Total
No of infection episodes	14	5	9	28
Total patient-days	23340	20390	2950	23340
Infection rate (per 1000 patient-days)	0.59	0.24	3.05	1.19

[Table-6] shows blood stream infection rate due to hemodialysis. Infection rate in fistula was 0.24/1000 patient-days, in catheter was 3.05/100 patient-days and total was 1.19/1000 patient-days.

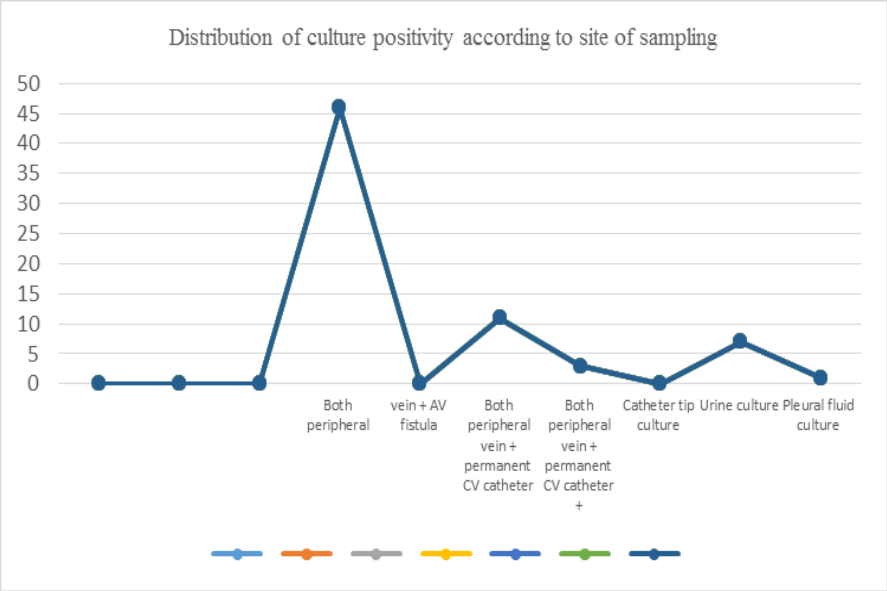

Figure 3: Distribution of culture positivity according to site of sampling (N=60)

[Figure-3] shows output of culture according to culture sites. Out of 46 AV fistula cases, culture was positive in peripheral vein 8 (13.3%) cases and in fistula 5 (10.8%) cases. Out of 11 permanent CV catheter cases, culture was positive in vein 6 (54.5%) cases and in catheter 7 (63.3%) cases. Out of 3 catheter tip cases, culture was positive in catheter tip 2 (66.7%) cases. Urine and pleural fluid culture revealed no growth of bacteria.

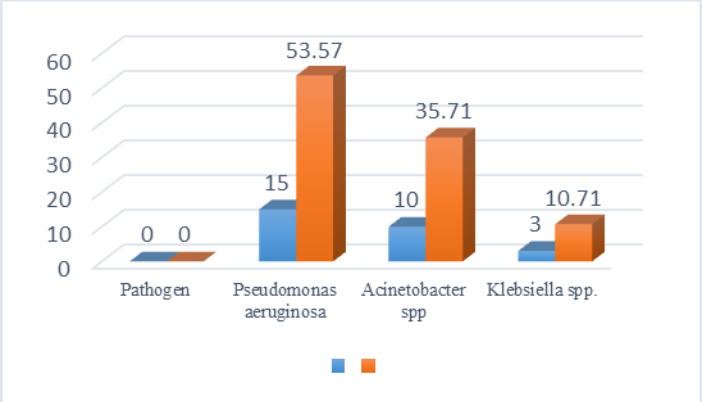

Figure 4: Names of organisms isolated from total bacterial episodes (N=60).

[Figure-4] shows among 28 bacterial episodes Pseudomonas aeruginosa were 53.57%, Acinetobacter spp. were 35.71% and Klebsiella spp. were 10.71%.

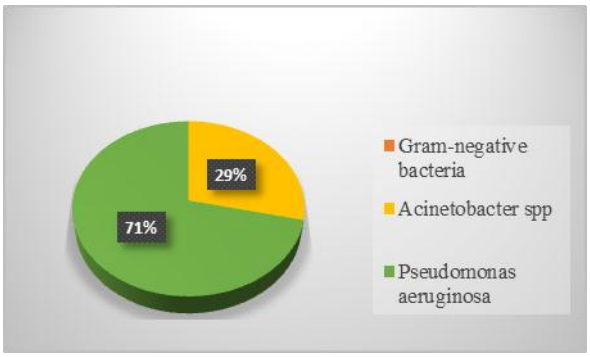

Figure 5: Organisms isolated from peripheral vein (N=60).

[Figure-5] shows organisms isolated from peripheral vein. Acinetobacterspp was present in 6.7% cases and Pseudomonas aeruginosa was present in 16.7% cases.

Table 7: Peripheral vein sensitivity pattern of Acinetobacterspp(N=60).

Antibiotics	Sensitive	Resistant
Piperacillin + Tazobactum	4 (100.0)	
Cefuroxime		2 (100.0)
Ceftazidime		3 (100.0)
Ceftriaxone		1 (100.0)
Imipenem	1 (33.3)	2 (66.7)
Amikacin	4 (100.0)	
Netilmicin	3 (75.0)	1 (25.0)
Amoxicillin		3 (100.0)
Ciprofloxacin	4 (100.0)	
Co-trimoxazole	3 (75.0)	1 (25.0)
Colistin	4 (100.0)	
Cefotaxime		2 (100.0)
Ticarcillin		2 (100.0)
Aztreonam		4 (100.0)

[Table-7] shows sensitivity pattern of Acinetobacter spp. Piperacillin + Tazobactum(4/4), Amikacin(4/4), Ciprofloxacin(4/4) and Colistin(4/4) antibiotics were sensitive in 100% cases. Imipenem(1/3) was sensitive in 33.3% cases. Netilmicin(3/4) and co-trimoxazole(3/4) was sensitive in 75% cases. Cefuroxime (2/2), Ceftazidime(3/3), Ceftriaxone(1/1), Amoxicillin(3/3), cefotaxime(2/2), Ticarcillin(2/2) and Aztreonam(4/4) were resistant 100% cases.

Table 8: Outcome of bacterial culture in samples from AV fistula and central venous catheter (N=60).

Culture	Access type		p value
	AV Fistula (n=46)	Central venous catheter (n=14)	
No growth	41 (89.1)	5 (35.7)	<0.001
Positive	5 (10.9)	9 (64.3)	

Chi-square test was done to calculate statistical association.

[Table-8] shows comparison of growth between AV fistula and central venous catheter site. Positive growth was significantly higher in central venous catheter 9 (64.3%) than that of AV fistula 5 (10.9%) cases.

V DISCUSSION

Bloodstream infection (BSI) is the leading cause of hospitalization and the second most common cause of death (after cardiovascular death) among patients receiving regular hemodialysis.[52] In the present cross sectional study the rates of infections was estimated and clinical and microbiological evaluation of bloodstream infections in patients undergoing hemodialysis was done. In this study mean (SD) age of the study population was 38.26 (15.26) within the range of 16-70 years. Maximum (28.3%) patients were in age group 21-30 years followed by (25.0%) were in age group 51-60 years. Mean age was comparatively higher in others studies.[54,55] Patient at any age may require hemodialysis. Males (71.7%) were predominant than females (28.3%). Male female ratio was 2.52:1. Any gender may require hemodialysis.[54,55] Females are associated with more bacteremia than the males.[46, 54] Most of the patients were either underweight (51.7%) or normal (46.7%). Evaluation of baseline clinical characteristics such as pulse, blood pressure, respiratory rate, temperature and anemia, body mass index of both bacteremic and nonbacteremic patients revealed no significant difference. During further evaluation no patient was found to have urinary tract infection, pneumonia, infective endocarditis, skin infection, septic arthritis.[56] Stated that hemodialysis patient may be suspected for bloodstream infection who present with fever or chills, unexplained hypotension, and no other localizing sign.[47] Found pneumonia 0.84/100 patient-month, urinary tract infection 0.29/ 100 patient-month, wound infection 1.29/100 patient-month for all access. In this study risk factors for bloodstream infections were searched and found that tunneled central venous catheter, surgical procedure within one month, low serum total protein and low serum albumin were significantly associated with bacteremia.[57] Showed the risk of bacteremia was highest in hemodialysis patients using central venous catheter as vascular access and the incidence rate of CRBSI was 2.5 to 5.5 cases/1000 catheter days. Risk factors described in other studies include: older age[56] higher total intravenous iron dose[38, 39] increased recombinant human erythropoietin dose[6], lower hemoglobin level[53,54] low serum albumin level[56,38]; Diabetes mellitus[56] and recent surgery.[38] Regarding co-morbidities of the patients, DM was in 14 (23.3%)

patients and cerebrovascular disease was in 2 (3.3%) patients.[55] Found DM (32.0%) in their study.[54] Found DM (39.0%) and Coronary disease (18.8%). Most of the patients were found to have mild to moderate anemia. Anemia was moderate in 57.2% cases in central venous catheter and 45.7% cases in AV fistula. Mild anemia was presence in 35.7% cases in central venous catheter and 34.8% cases in AV fistula.[55] Showed anemia were significantly associated with bacteremia. Bloodstream infections rate due to hemodialysis were recorded. In this study, total 28 bacteria were identified at an infection rate of 1.19/1000 patient-days. Of the 28 bacteria 5 involved permanent fistula (0.24/1000 patientdays); and 9 involved permanent-tunneled central venous catheter (3.05/1000 patient-days). There were 14 bloodstream infections (0.59/1000 patient days). In the study of[30] the BSI rate was 0.52 per 1000 patient-days. Of the 148 episodes, 34 occurred in patients with permanent fistula (0.18/1000 patient-days); 19 in patients with grafts (0.39/1000 patient-days); 28 in patients with permanent tunneled central catheters (1.03/1000 patient-days); and 67 in those with temporary catheter (3.18/1000 patient-days).[57] Identified a total of 109 infections, for a rate of 11.32/1000 dialysis sessions (ds). Of the 109, 23 involved permanent fistulae or grafts (4.23/1000 ds); 18 involved permanent-tunneled central catheter infections (10.1/1000 ds); and 68 involved temporary-catheter infections (28.23/1000 ds). There were 38 bloodstream infections (3.95/1000 ds). Pattern of Acinetobacter spp. Piperacillin + Tazobactum(4/4), Amikacin(4/4), Ciprofloxacin(4/4) and Colistin(4/4) antibiotics were sensitive in 100% cases. Imipenem(1/3) was sensitive in 33.3% cases. Netilmicin(3/4) and co-trimoxazole(3/4) was sensitive in 75% cases. Cefuroxime (2/2), Ceftazidime(3/3), Ceftriaxone(1/1), Amoxicillin(3/3), cefotaxime(2/2), Ticarcillin(2/2) and Aztreonam(4/4) were resistant 100% cases. Positive growth was significantly higher in central venous catheter 9 (64.3%) than that of AV fistula 5 (10.9%) cases. In their study[54,55] described hemodialysis catheter were major risk factors for bacteremia particularly when compared to synthetic graft or native arteriovenous fistula. Out of 46 AV fistula cases, culture was positive in peripheral veins 8 (13.3%) cases and in fistula 5 (10.8%) cases. Out of 11 permanent CV catheter cases, culture was positive in peripheral veins 6 (54.5%) cases and in catheter 7 (63.3%) cases. Out of 3 catheter tip cases, culture was positive in catheter tip 2 (66.7%) cases. Out of 7 Urine for C/S & 1 pleural fluid culture revealed no growth. Regarding source of bacteremia: 3 cases were primary bacteremia and rests of the cases were either due to permanent catheter or due to AV fistula.[44] Found primary bacteremia 51%, CRBSI 28% and 21% secondary to other sources. Sensitivity pattern of Acinetobacter spp. in AV fistula and central Venus catheter.

VI CONCLUSION

We identified a high incidence of catheter-related infections caused by resistant microorganisms in patients undergoing hemodialysis via central venous catheters. The risk of BSI in patients undergoing hemodialysis is related to the vascular access (tunneled central venous catheter), low haemoglobin, underweight, low serum total protein and low serum albumin. The prevalence of blood stream infection in hemodialysis patients is much higher than in the general population. Furthermore, bacteremia is sometimes life-threatening. Improvement of basic infection control measures, including appropriate hand hygiene, catheter care, and education for medical staff and patients, could reduce the occurrence of bacteremia, although this is difficult because the blood streams of these patients are frequently exposed to extracorporeal devices.

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