



A RETROSPECTIVE COHORT STUDY ON RISK FACTORS FOR CATHETER RELATED BLOODSTREAM INFECTIONS (CRBSI) IN ESRD PATIENTS OF OSPITAL NG MAKATI FROM 2017 TO 2021



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BACKGROUND

The estimated incidence of CRBSI among Filipino hemodialysis patients ranges from 0.6 to 6.5 episodes per 1,000 catheter-days. A review of the risk factors contributing to CRBSI in a tertiary government hospital was conducted to determine if they align with both international and local data. This study examined risk factors and bacteriologic profile in the development of CRBSIs in hemodialysis patients at Ospital ng Makati.

METHOD

The study included adult Chronic Kidney Disease inserted with central venous catheters (CVC) for hemodialysis at Ospital ng Makati from 2017 to 2021. Baseline demographic, clinical, laboratory, and microbiological data were collected retrospectively. Patient records were reviewed to monitor for occurrence of CRBSI within six months post CVC insertion.

RESULTS

An incidence rate of 27% of CRBSI was recorded. Gram-positive bacteria were the most common pathogens (58%), predominantly Methicillin-resistant *Staphylococcus aureus* (25%). Among gram-negative bacteria (22%), *Burkholderia cepacia* (7%) was the most common. Thirty eight percent (38%) of the isolates were multi-drug resistant (MDR). Baseline risk factors such as leukocytosis ($p < 0.01$), hypoalbuminemia ($p < 0.01$), benign prostatic hyperplasia ($p < 0.05$), ventricular hypertrophy ($p < 0.05$), and sepsis ($p < 0.05$) during hospitalization were clinically significant in development of CRBSI.

Variable	With CRBSI (n = 45)		Without CRBSI (n = 124)		p-values
	n	%	n	%	
Sex					
Females	22	48.89	58	46.77	0.808
Males	23	51.11	66	53.23	
Age (in years)					
Mean (Standard Deviation)	56.25 (± 13.12)		56.80 (± 13.46)		0.816
Comorbidities					
Benign prostatic hyperplasia	4	8.89	2	1.61	≤ 0.05
Cardiac disease	9	20.00	27	21.77	0.803
Diabetes mellitus	26	57.78	75	60.48	0.751
Gouty arthritis	2	4.44	3	2.42	0.492
Hypertension	40	88.89	104	83.87	0.417
Malignancy	0	0	5	4.03	0.171
Neurologic disease	5	11.11	18	14.52	0.568
Systemic lupus erythematosus	2	4.44	0	0	0.180
Others	10	22.22	21	16.94	0.432
Baseline Laboratory data					
Hemoglobin (g/dL)	8.59 (± 1.94)		8.48 (± 2.21)		0.771
Albumin (g/L)	26.83 (± 6.23)		22.00 (± 6.10)		≤ 0.01
White Blood Cell count	15.18 (± 9.35)		11.23 (± 5.56)		≤ 0.01
Platelet Count	261.58 (± 148.75)		267.73 (± 103.10)		0.763
Baseline ECG data					
Cardiac dysrhythmia	19	15.32	8	17.78	0.700
Hypertrophy	9	20.00	10	8.06	≤ 0.05
Ischemic changes	5	11.11	15	12.10	0.861
Baseline CXR data					
Cardiomegaly	22	48.89	63	50.81	0.826
Pleural effusion	8	17.78	27	21.77	0.571
Pneumonia	13	28.89	38	30.65	0.826
Pulmonary congestion	19	42.22	54	43.55	0.878
Pulmonary tuberculosis	6	13.33	18	14.52	0.846
Indications for initiation of hemodialysis					
Fluid overload	18	40.00	42	33.87	0.462
Intoxication	6	13.33	20	16.13	0.656
Intractable hyperkalemia	14	31.11	34	27.42	0.638
Intractable metabolic acidosis	14	31.11	43	34.68	0.665
Intractable uremic encephalopathy	20	44.44	54	43.55	0.917
Catheter					
Tunneled	45	100.00	123	100.00	0.546
Non-tunneled	45	100.00	1	0.81	
Catheter access					
Femoral	16	35.56	43	34.68	0.916
Internal jugular	29	64.44	81	65.32	
Dialysis frequency					
Two times a week	0	0	4	3.23	0.223
Three times a week	45	100.00	120	96.77	
Access use					
Transfusion	44	97.78	121	97.58	0.941
Parenteral nutrition	0	0	2	1.61	0.391
Antibiotics	2	4.44	2	1.61	0.284
Others	1	2.22	9	7.26	0.220
Setting					
Bedside	3	6.67	17	13.71	0.210
Operating room	42	93.33	107	86.29	
Concomitant reason for admission					
Cardiac disease	3	6.67	13	10.48	0.454
Neurologic disease	1	2.22	4	3.23	0.734
Respiratory failure	6	13.33	22	17.74	0.496
Sepsis	17	37.78	28	22.58	≤ 0.05
Severe anemia	8	17.78	23	18.55	0.909
Others	2	4.44	7	5.65	0.759
Etiology of ESRD					
Cardiorenal	2	4.44	4	3.23	0.705
Diabetic kidney disease	9	20.00	38	30.65	0.172
Drug-induced nephropathy	0	0	1	0.81	0.546
Glomerulonephritis	6	13.33	16	12.90	0.941
Hypertensive kidney disease	24	53.33	51	41.13	0.158
Obstructive uropathy	3	6.67	7	5.65	0.804
Polycystic kidney disease	1	2.22	4	3.23	0.734
Renal hypoperfusion	1	2.22	0	0	0.096
Sepsis	0	0	1	0.81	0.546

Table 1: Demographic and Clinical Profile of ESRD Patients Inserted with Central Venous Catheter in Ospital ng Makati from January 1, 2017 to December 31, 2021

CONCLUSIONS

Gram-positive bacteria continue to be a common cause of CRBSI. There is a growing number of multidrug-resistant organisms isolated. Additionally, new risk factors have been identified as potential independent contributors to the development of CRBSI.