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Background

- Chronic kidney disease (CKD) can be described as the loss of the kidney function over time. Symptoms usually develop slowly, and it may not appear in early stages. Lab tests can confirm the CKD diagnosis.
- The approximate number of incidents per year is more than 200,000 cases, and approximately 30 million people are living with CKD today in the United States.
- This long-standing disease ultimately leads to renal failure at the end.
- At present, there are no known cures for CKD, and the only treatment available is dialysis.
- The purpose of this study is to determine the association between chronic kidney disease on hemodialysis (HD) and medical condition such as cardiac complications cardiogenic shock, hemorrhage, anemia, vascular complication, postop respiratory failure, post op infarct hemorrhage, acute renal failure, new temporary pacemaker, new permanent pacemaker, pericardial complications and death.

Methods

- This was a cross-sectional study design and secondary data was used was used.
- The study population consist of 106,969 CKD patients on hemodialysis.
- The outcome variables were a diagnosis of CKD and/or CKD on HD. The independent variables were cardiac complications, cardiogenic shock, hemorrhage, anemia, vascular complication, postop respiratory failure, post op infarct hemorrhage, acute renal failure, new temporary pacemaker, new permanent pacemaker, pericardial complications and death.
- Simple Logistic regression was conducted to analyze the relationship between outcome variable and each independent variable.
- Variables with a p-value <0.05 were considered significant.
- Odds ratio (OR) and 95% confidence intervals (CI) were reported and discussed.
- The statistical analysis was performed using SAS version 9.4.

Table 1: Outcome of CKD with and without HD

Variables	Overall (106,969)	CKD vs No CKD			CKD Groups (Without HD vs. With HD)		
		No CKD	CKD	P-Value	Without HD	With HD	P-value
Any cardiac complications				<0.0001			0.035
No	97.60	97.55	97.96		98.01	97.65	
Yes	2.40	2.45	2.04		1.99	2.35	
Cardiogenicshock				<0.0001			<0.0001
No	88.64	89.34	81.81		82.16	79.63	
Yes	11.36	10.66	18.19		17.84	20.37	
Hemorhage or Hematoma				<0.0001			0.81
No	97.84	97.87	97.51		97.51	97.47	
Yes	2.16	2.13	2.49		2.49	2.53	
Anemia/hemorrhage requiring blood transfusion				<0.0001			<0.0001
No	95.96	96.61	88.85		89.88	82.35	
Yes	4.04	3.39	11.15		10.12	17.65	
Vascular complications				0.49			0.026
No	99.97	99.97	99.97		99.98	99.94	
Yes	0.03	0.03	0.03		0.02	0.06	
Post-op respiratory failure				<0.0001			<0.0001
No	98.88	98.93	98.23		98.37	97.35	
Yes	1.12	1.07	1.77		1.63	2.65	
Post-op infarct or hemorrhage				<0.0001			0.023
No	99.84	99.85	99.75		99.77	99.63	
Yes	0.16	0.15	0.25		0.23	0.37	
Acute renal failure				<0.0001			<0.0001
No	89.57	92.83	62.91		59.38	85.25	
Yes	10.43	7.17	37.09		40.62	14.75	
New Temporary Pacemaker				<0.0001			0.014
No	97.48	97.57	96.57		96.65	96.11	
Yes	2.52	2.43	3.43		3.35	3.89	
New Permanent Pacemaker				<0.0001			0.143
No	99.45	99.54	98.65		98.63	98.83	
Yes	0.55	0.46	1.35		1.37	1.17	
Pericradial complications				<0.0001			<0.0001
No	99.68	99.69	99.57		99.62	99.26	
Yes	0.32	0.31	0.43		0.38	0.74	
Death				<0.0001			<0.0001
No	92.08	92.88	83.48		84.74	75.49	
Yes	7.92	7.12	16.52		15.26	24.51	
Death/Acute renal failure requiring hemodialysis				<0.0001			<0.0001
No	84.26	87.77	53.46		51.75	64.26	

Table 2: Association between CKD and Clinical Outcomes

Variables	CKD vs. No CKD				CKD (With HD vs. Without HD) ‡			
	Odds Ratio	LL	UL	P-value	Odds Ratio	LL	UL	P-Value
Any cardiac complications	0.83	0.78	0.88	<0.0001	1.18	1.01	1.39	0.034
Cardiogenicshock	1.86	1.82	1.91	<0.0001	1.18	1.11	1.25	<0.0001
Hemorhage or Hematoma	1.18	1.11	1.24	<0.0001	1.02	0.88	1.18	0.81
Anemia or hemorrhage requiring blood transfusion	3.58	3.48	3.69	<0.0001	1.90	1.79	2.03	<0.0001
Vascular complications	0.83	0.48	0.49	<0.0001	3.17	1.08	9.27	0.035
Post-op respiratory failure	1.67	1.56	1.79	<0.0001	1.65	1.42	1.92	<0.0001
Post-op infarct or hemorrhage	1.68	1.41	2.01	<0.0001	1.59	1.06	2.37	0.024
Acute renal failure	7.63	7.48	7.79	<0.0001	0.25	0.24	0.27	<0.0001
New Temporary Pacemaker	1.42	1.36	1.49	<0.0001	1.17	1.03	1.32	0.014
New Permanent Pacemaker	2.94	2.71	3.19	<0.0001	0.85	0.69	1.06	0.144
Pericradial complications	1.39	1.21	1.58	<0.0001	1.96	1.46	2.61	<0.0001
Death	2.58	2.52	2.65	<0.0001	1.80	1.70	1.91	<0.0001
Death or Acute renal failure requiring hemodialysis	6.36	6.14	6.36	<0.0001	0.60	0.57	0.63	<0.0001

Results

- Analysis shows that subjects with cardiac complications were 17% less likely to have CKD as compared to those who did not have cardiac complications (OR: 0.83, 95% CI: 0.78-0.88).
- CKD patients who had cardiac complications were 18% more likely to have HD than the subjects who did not have cardiac complications (OR: 1.18, 95% CI: 1.01-1.39).
- Patients with cardiogenic shock were 86% more likely to have CKD than the subjects who did not have cardiogenic shock (OR: 1.86, 95% CI: 1.82-1.91).
- CKD patients who had cardiogenic shock were also 18% more likely to have HD than the subjects who did not have cardiogenic shock (OR: 1.18, 95% CI: 1.11-1.25).
- We have similar results if a patient had other conditions.

Conclusions and Recommendations

- Chronic kidney disease patients on hemodialysis is significantly associated with the other medical conditions such as cardiac complications, cardiogenic shock, hemorrhage, anemia, vascular complication, postop respiratory failure, post op infarct hemorrhage, acute renal failure, new temporary pacemaker, new permanent pacemaker, pericardial complications and death in the United States. Further studies are needed to confirm the results and to understand the prognosis of the disease.

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