

Chronic Kidney Disease Patient for the Perioperative Organization

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Short Communication

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INTRODUCTION

Chronic kidney disease is a single of the important co-morbidities at current times. With the increasing prevalence of diabetes mellitus and hypertension, more and more peoples are developing diabetic and hypertensive nephropathy. As chronic kidney disease persevering can present-day as an asymptomatic steady persistent in one finish and a multi-organ involved complex end-stage disease in additional ends, their organization strategy also differs. The serum creatinine stages of as low as 1.5 mg% have been related to perioperative main cardiac measures like myocardial infarction and arrest; these patients pose a task to the perioperative team. Furthermore, a coincidental of evolving acute kidney injury on the chronic kidney disease is too developed. These patients are also often elderly, with diabetes mellitus and/or hypertension. Consequently, accepting such persistence for perioperative care needs systematic and meticulous method. Preoperative valuation, danger stratification, and optimization play an excessive role. Both intraoperative and postoperative management needs a tailored approach. The current narrative review is organized to stretch the present insight on these features.

Keywords: Chronic Kidney Disease; Preoperative Assessment; Risk Stratification; Hemodialysis; Anesthesia.

Chronic kidney disease (CKD) has a high prevalence worldwide. These patients will undergo surgical procedures many a time related to dialysis or surgeries related to their co-morbidities. Major surgeries like joint replacements, renal transplants are also increasingly done now a day. Chronic kidney disease is a multitude of systemic disorders primarily arising with the involvement of the kidney. The mechanism of development of this disorder basically depends on two phenomena; a) loss of a significant number of functional nephrons, and b) compensatory reversible/irreversible pathological changes in the remaining nephrons. It is the end result of various kidney diseases. Reduction in the number of nephrons lead to hyperfiltration by the rest of the nephrons; Estimates of single nephron glomerular filtration rate (GFR) in humans support hyperfiltration as a relevant pathophysiologic mechanism; on a long run, distortion of glomerular architecture, abnormal podocyte function, and disruption of the filtration barrier lead to sclerosis. The disharmony of the internal milieu produces systemic inflammatory changes, atherosclerotic and calcific changes in vessels, dysplastic bones, especially in children. Knowledge of the above malfunctions holds the key for delivering a safe anesthesia to a patient of CKD posted for various surgeries.

Cardiovascular System: Cardiovascular diseases in CKD are the major cause of mortality with higher relative risk in young patients. Calcific changes and sodium and water imbalance contribute significantly towards congestive heart failure, left ventricular hypertrophy (LVH), ischemic heart disease, sudden death, cerebrovascular accidents, and peripheral artery diseases. LVH is an independent risk factor for producing arrhythmia, myocardial infarction, and heart failure. Diuretics can be used to reduce fluid

overload. Patient with the diuretic resistant disease may need dialysis before a scheduled surgery. Permanent arterio-venous fistula also produces fluid overload and status has to be confirmed before surgery. Furthermore, raised renin-angiotensin levels cause endothelial hypertrophy and sclerosis.

Respiratory System: CKD can complicate respiratory system in multiple ways, including pulmonary edema, fibrinous pleuritis, pulmonary calcification; etc. Sleep disturbances and sleep apnea are extremely common in patients with ESRD. Fluid excess is thoroughly related with preventive and obstructive respiratory abnormalities in patients getting renal replacement therapy (RRT).

Central Nervous System: Generalized fatigue, malaise, lack of concentration, impaired cognition gradually leading to mental obtundation, seizure, coma, and death. These facts need to be remembered while obtaining the consent of evaluating postoperative recovery and progression of such patients.

Hematological and Coagulation System: In CKD, erythropoietin-producing cells in the kidney i.e. peritubular and endothelial cells of the cortex and outer medulla are damaged resulting in reduced erythrocyte production and differentiation. Decreased red cell lifespan, increased hemolysis and bleeding, repeated loss during HD, uremia induced bone marrow suppression and iron, folate, and vitamin B6 and B12 deficiencies altogether produces anemia.

Bone Mineral Disease: Hyperphosphatemia is a common complication of CKD but a relatively late event. Initially, the hypersecretion of PTH maintains calcium and phosphate balance. But gradually secondary hyperparathyroidism lead to the development of renal osteodystrophy and multiple major bone disorders.

Fluid, Electrolyte and Acid-Base Balance: When the GFR falls below 10-15 ml/min/1.73 m², the homeostasis of sodium and water and free acids get compromised severely leading to volume overload. This results in relative hyponatremia, hyperchloremia, hyperkalemia, and metabolic acidosis. Some authors claimed that a reduction in sodium intake halts the disease progression by increasing intra-glomerular pressure over a period of time.

Gastrointestinal System: The gastric and small intestinal epithelial tight junctions get disrupted in CKD.²¹ Erosive gastritis and duodenitis are common,²² leading to anorexia, nausea, vomiting, gastrointestinal bleeding, diarrhea, delayed gastric emptying time, increased acidity and gastric volume necessitate the use of H₂ blockers and proton pump inhibitors. Rapid sequence intubation has to be considered for these patients if general anesthesia is planned.