Acute Kidney Injury (AKI) and Chronic Kidney Disease (CKD)

- **Acute Kidney Injury is both a cause and a contributing factor in Chronic Kidney Disease (CKD). Greater than one-third of U.S COVID hospitalized patients developed AKI with approximately 15% requiring kidney replacement therapy (KRT) (Hirsch et.al., 2020) (American Nephrology Nurses Association (ANNA), CKD Module 1, 2021)**

Chronic Kidney Disease Prevalence

- **Nine out of 10 adults do not know they have CKD. It is more common in >65 years of age or older (38%), 45-64 years (13%); women (15%) than men (12%); non-Hispanic blacks (16%) than non-Hispanic whites (13%) or non-Hispanic Asians (12%); and about 14%of Hispanics have CKD. (CDC, 2020) (ANNA, 2021)**

Refer CKD patients (GFR < 60) to a nephrologist in a timely manner

- Impaired kidney function and proteinuria increase the risk of cardiovascular disease 2 to 4 times, even after adjusting for traditional cardiovascular risk factors. (Gansevoort RT et al. Lancet. 2013 Jul;382(9889):339-52)
- Early appointments with patients who have Stage 5 Kidney Failure (beginning 6 months or more before dialysis) and frequent care (at least one nephrology visit every 3 months) are associated with 10% lower risk for major adverse cardiovascular events (acute MI, acute heart failure, acute stroke, or sudden death). (Yang J, et al. Am J Kidney Dis. 2017)
- The figure below provides recommended frequency of monitoring patients with CKD

Guide to Frequency of Monitoring (Number of times per year) by GFR and Albuminuria Category

GFR categories (ml/min/1.73 m²) Description and range				Persistent albuminuria categories Description and range		
				A1	**A2**	**A3**
				Normal to mildly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmol	30-300 mg/g 3-30 mg/mmol	>30 mg/g >30mg/mmol
	G1	Normal or high	>90	1 if CKD	1	2
	G2	Mildly decreased	60-89	1 if CKD	1	2
	G3a	Mildly to moderately decreased	45-59	1	2	3
	G3b	Mildly to severely decreased	30-44	2	3	3
	G4	Severely decreased	15-29	3	3	4+
	G5	Kidney failure	<15	4+	4+	4+

GFR and albuminuria grid to reflect the risk of progression by intensity of colouring (green, yellow, orange, red, deep red). The numbers in the boxes are a guide to the frequency of monitoring (number of times per year).

(KDIGO, 2012)

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Home Dialysis Preferred (includes Home Hemodialysis and Peritoneal Dialysis)

- Most nephrologists would choose Home Kidney Replacement therapies such as peritoneal dialysis (PD) over hemodialysis (HD) for themselves. "96% of nephrologists surveyed recently would choose PD over HD if they had to go on dialysis themselves" (Merighi, JR et al. Hemodial Int. 2012; 16: 242-251)
- Residual kidney function is maintained longer with PD than HD: In a prospective study, PD patients had an 8.1% decline in GFR per month compared to 10.7% decline in GFR per month for HD patients (Jansen M, et al. Kidney Int 2002; 62: 1046-53)
- PD reduces vascular access interventions. In a prospective observational study in Canada between 2007 and 2010, mean number of access interventions was significantly less in PD than HD patients (p=0.005) (Oliver MJ, et al. Nephrol Diol Transplant 2012; 27:810-816)
- Absolute PD Contraindications are few: bowel cancer, diverticulitis, colostomy/ileostomy, ischemic bowel, excessive abdominal scarring from prior abdominal surgeries.

Refer patients early to vascular surgeon for PD catheter or fistula/graft to avoid central venous catheter

- AV fistulas or AV grafts result in much better outcomes. Hemodialysis catheter use needs to be avoided or minimized to avoid complications, especially central vein stenosis, which substantially reduces the success of future AV fistulas. In a retrospective review, the cumulative risk of any catheter-related complications was 30 percent at one year and 38 percent at two years. The one-year risk of bacteremia was 9 percent. Central vein stenosis or thrombosis occurred in 1.5 percent of patients (Poinen K et al. Am J Kidney Dis. 2019;73(4):467)
- Fistula First Catheter Last from CMS has evolved since its inception of 2003. The goal is to improve the survival and quality of life by optimizing vascular access selection.
    - Increasing AV Fistula in all appropriate hemodialysis patients to 68%
    - Decreasing the use of long-term catheters (> 90 days) to < 10% (CMS.com/fistula first 2021)
- To minimize catheter use, all pre-dialysis patients with an expected start of hemodialysis within one year and patients who have initiated hemodialysis urgently with a catheter should be referred to a vascular surgeon to determine eligibility for AV access or PD catheter. Central venous catheters should be reserved only for those with limited life expectancy (e.g., metastatic cancer) or patients with a very short expected duration of hemodialysis (e.g., pending live-related transplant)

Transplant Evaluation

- Patients who are interested in transplantation and who have no known contraindications should be referred to a transplantation program before they even start dialysis, when the estimated glomerular filtration rate (eGFR) is <30 GM mL/min/1.73 m^2. (Bunnapradist S, Danovitch Am J Kidney Dis. 2007;50(5):890)
- Kidney transplant patients have better long-term survival than on kidney replacements therapies, more energy, regular diet, and resume a normal lifestyle (ANNA.com/CKD modules 2021).
- Waiting list for a kidney may be shortened if the patient is willing to receive a Hep C+ kidney. (ANNA.Com/CKD module 6, 2021).
- Absolute contraindications for transplant include: active substance abuse, active malignancy, active infection, reversible renal failure, uncontrolled psychiatric disease, documented active and ongoing treatment nonadherence, or a significantly shortened life expectancy.

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