REASONS FOR INITIATING EMERGENT HEMODIALYSIS

aka :“A-E-I-O-U”

- A = ACIDOSIS
- E = ELECTROLYTES (high K)
- I = INGESTIONS
- O = OVERLOAD
- U = UREMIA

(uremic ENCEPHALITIS/PERICARDITIS)
ACE / ARB treatment

- When starting ACE-inhibitor, CKD pts often have initial decrease in GFR (usually less than 10 mL per minute per 1.73 m\(^2\)) \(\rightarrow\) EXPECT a mild increase in creatinine (less than 20-30 % of baseline), and mild increase in K+

- Creatinine and potassium levels should be monitored 1 to 2 weeks after the initiation of therapy with ACE inhibitor—COMMON MISTAKE IS TO STOP THE ACE/ARB WHEN Cr increases by \(\leq 30\%\)!
  - DO NOT STOP \(\rightarrow\) RECHECK AGAIN IN 1-2 WKS
Angiotensin II has more effect on efferent than afferent arteriole

- ACEI (blocking conversion A I $\rightarrow$ A II) means less A II, so less constriction/more dilation of efferent than afferent arteriole, so expect decrease in GFR:
<table>
<thead>
<tr>
<th>Clue</th>
<th>Potential Diagnosis</th>
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<tbody>
<tr>
<td><strong>Review of Systems</strong></td>
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<tr>
<td>Symptoms during urination</td>
<td>Usually suggest disorders of the urinary tract such as infection, obstruction or stones</td>
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<td>Recent infections</td>
<td>May suggest post-infectious glomerulonephritis or HIV-associated nephropathy</td>
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<td>Skin rash or arthritis</td>
<td>Suggests autoimmune disease, such as systemic lupus erythematosus or cryoglobulinemia</td>
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<td>Risk factors for parenterally transmitted disease</td>
<td>May suggest HIV, hepatitis B or hepatitis C infection and associated kidney diseases</td>
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<tr>
<td><strong>Chronic Diseases</strong></td>
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<tr>
<td>Heart failure, cirrhosis, or gastrointestinal fluid losses</td>
<td>Usually suggest reduced kidney perfusion (“pre-renal factors”).</td>
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<tr>
<td>Diabetes&lt;sup&gt;a&lt;/sup&gt;</td>
<td>As a cause of chronic kidney disease: Diabetic kidney disease usually follows a typical clinical course after onset, first with microalbuminuria, followed by clinical proteinuria, hypertension and declining GFR.</td>
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<tr>
<td>Hypertension&lt;sup&gt;a&lt;/sup&gt;</td>
<td>As a cause of chronic kidney disease: Hypertensive nephrosclerosis is usually characterized by severely elevated blood pressure readings over a long period of time, with associated end-organ damage in addition to kidney disease. Recent worsening of hypertension, in association with findings of diffuse atherosclerosis, suggests large vessel disease due to atherosclerosis. Recent onset of severe hypertension in young women suggests large vessel disease due to fibromuscular dysplasia</td>
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<tr>
<td><strong>Past Medical History</strong></td>
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<tr>
<td>Findings from past “routine” examinations</td>
<td>May reveal a history of hypertension or proteinuria during childhood, during pregnancy, or on examinations for school, military service, or insurance.</td>
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<tr>
<td>Past urologic evaluations</td>
<td>Details may disclose radiologic abnormalities associated with kidney disease.</td>
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<tr>
<td><strong>Family History of Kidney Diseases</strong></td>
<td></td>
</tr>
<tr>
<td>Every generation; equal susceptibility in males and females</td>
<td>Suggests an autosomal dominant disease, such as polycystic kidney disease.</td>
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<tr>
<td>Every generation; predominant male susceptibility</td>
<td>Suggests a sex-linked recessive disease, such as Alport’s syndrome.</td>
</tr>
<tr>
<td>Less frequent than every generation</td>
<td>Suggests an autosomal recessive disease, such as medullary cystic kidney disease or autosomal recessive polycystic kidney disease.</td>
</tr>
</tbody>
</table>

<sup>a</sup> Extremely common in elderly patients, and often non-specific.
<table>
<thead>
<tr>
<th>Imaging Modality/Feature</th>
<th>Associated Kidney Disease</th>
</tr>
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</table>
| **Ultrasonography**                      | **General appearance** May show nephrocalcinosis or discrete stones, hydronephrosis, cysts or masses.  
|                                          | **Increased echogenicity** May indicate cystic disease or "medical renal disease."        
|                                          | **Small, "hyperechoic" kidneys** Generally indicate chronic kidney disease.                     
|                                          | **Large kidneys** Generally indicate tumors, infiltrating diseases or diseases causing nephrotic syndrome.  
|                                          | **Size disparities and scarring** Suggest vascular, urologic or tubulointerstitial diseases due to stones or infection.  
|                                          | **Doppler interrogation** May be useful in investigation of venous thrombosis, less so in arterial stenosis.  |
| **Intravenous pyelography (IVP)**        | May reveal asymmetry of kidney size or function, presence of obstructing stones, tumors, scars, or dilated collecting ducts in medullary sponge kidney.  |
| **Computed tomography (CT)**             | May show obstruction, tumors (e.g. angiomyolipoma), cysts or ureteral calculi.  
|                                          | Helical CT with contrast may show sites of anatomic renal artery stenosis.  |
| **Magnetic resonance imaging (MRI)**     | May show mass lesions, renal vein thrombosis, cysts, etc. MR angiography using gadolinium may be useful in patients with decreased kidney function.  |
| **Nuclear scans**                        | May reveal asymmetry of kidney size or function, functional evidence of renal artery stenosis, acute pyelonephritis, or scars.  |

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*a* This modality has been largely supplanted by computed tomography, although it remains useful to describe fine detail in the collecting system.

*b* With or without contrast

*c* Captopril renography, mercaptoacetyltriglycine (MAG3), dimercaptosuccinic acid (DMSA)
Table 148. Additional Clinical Interventions for Adults with GFR <60 mL/min/1.73 m²

<table>
<thead>
<tr>
<th>Clinical Problem</th>
<th>Parameters to Assess</th>
<th>Possible Additional Parameters to Assess</th>
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</thead>
</table>
| Anemia                 | Hemoglobin                            | If anemic:  
- Red blood cell indices  
- Reticulocyte count  
- Iron studies (serum iron, total binding capacity, percent transferrin saturation and ferritin)  
- Test for occult blood in stool  
- Medical evaluation for comorbid conditions |
| Malnutrition           | Weight  
Serum albumin  
Dietary history  
Subjective global assessment (SGA) | If malnourished:  
- 24-hour urine collection for urea nitrogen excretion  
- Food recall/records for protein and total energy intake  
- Medical evaluation for comorbid conditions |
| Bone Disease           | Serum PTH  
Serum calcium  
Serum phosphorus | If abnormal:  
- Consider Vitamin D levels  
- Consider bone x-rays  
- Consider DEXA scan |
| Neuropathy             | Paresthesias  
Mental status abnormalities  
Sleep disturbances  
Restless legs | If symptomatic:  
- Neurologic exam, including mental status  
- Serum electrolytes  
- Medical evaluation for comorbid conditions  
- Consider nerve conduction velocity  
- Consider EEG/sleep studies |

**Reduced Functioning and Well-Being**

- Standardized, self-administered instruments such as:  
  - Dartmouth COOP charts  
  - DUKE/DUSOI  
  - SF-36  
  - KDQOL

If abnormal:  
- Medical evaluation for comorbid conditions  
- Self-management education  
- Physical rehabilitation  
- Mental health treatment  
- Social support  
- Vocational rehabilitation

Evaluations are in addition to those listed in Tables 141 and 142.

* Symptoms, physical functioning, depression, employment and usual activities, social functioning

**Abbreviations:**  
- DEXA, dual energy x-ray absorptiometry (Bone densitometry)  
- EEG, electroencephalogram