Takeaways for Clinicians from the KDIGO 2021 Clinical Practice Guideline for the Management of ANCA-Associated Vasculitis (AAV)

### Diagnosis of ANCA-associated vasculitis
Diagnosis of AAV must be made as early as possible to decrease the risk of permanent loss of kidney function and life-threatening complications. In case of clinical presentation compatible with small-vessel vasculitis in combination with positive myeloperoxidase (MPO)- or proteinase 3 (PR3)-ANCA serology, waiting for kidney biopsy should not delay starting immunosuppressive treatment, especially in patients who are rapidly deteriorating (Figure 1).

### Initial treatment
Initial treatment of AAV is glucocorticoids in combination with cyclophosphamide or rituximab. In patients with markedly reduced or rapidly declining kidney function, cyclophosphamide is preferred because of limited experience with rituximab (Figure 2).

### Rituximab as initial treatment
Rituximab is the preferred initial treatment in children and adolescents, pre-menopausal women and men concerned about their fertility, frail older adults, patients with relapsing disease, patients with PR3-ANCA disease and in patients in whom glucocorticoid-sparing is especially important.

### Plasma exchange
Plasma exchange should be considered for patients with Scr >5.7 mg/dl (500 µmol/l) requiring dialysis or with rapidly increasing Scr, and in patients with diffuse alveolar hemorrhage who have hypoxemia (Figure 2). Plasma exchange should be added to initial treatment for patients with an overlap syndrome of ANCA vasculitis and anti-GBM.

### Tapering of glucocorticoids
Although high-dose glucocorticoids have traditionally been given during the initial treatment of AAV, recent data demonstrated that lower doses are equally effective but with fewer short- and long-term toxicities.

### Maintenance treatment
Maintenance therapy with either rituximab or azathioprine and low dose glucocorticoids is recommended after induction of remission (Figure 2). Optimal duration of the maintenance treatment is not known, but should be between 18 months and 4 years.

### Preferred maintenance treatment
Rituximab as maintenance treatment is preferred in patients with relapsing disease, PR3-ANCA disease, frail older adults, azathioprine allergy, or when glucocorticoid-sparing is especially important.

### Withdrawal of maintenance therapy
When considering withdrawal of maintenance therapy, the risk of relapse should be factored in, and patients should be informed of the need for prompt attention if symptoms recur.

### Relapsing disease
Patients with relapsing disease (life- or organ-threatening) should be re-induced, preferably with rituximab.

### Refractory disease
Patients with refractory disease can be treated by an increase in glucocorticoids (intravenous or oral), by the addition of rituximab if cyclophosphamide induction had been used previously, or vice vers.

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**Figure 1**

Suspected kidney vasculitis

- Clinical presentation compatible with ANCA vasculitis
  - PR3- or MPO-ANCA positive
  - Low suspicion for secondary vasculitis

- Clinical presentation compatible with any primary small-vessel vasculitis
  - PR3- and MPO–ANCA negative

**Figure 2**

Diagnosis of AAV

- Disease assessment
  - Induction of remission
    - No organ-threatening involvement
      - Consider mycophenolate mofetil
      - Cyclophosphamide + glucocorticoids
      - Rituximab + glucocorticoids
      - Consider plasmapheresis
    - Vital organ/ life-threatening involvement
      - Serum creatinine >5.7 mg/dl (>500 µmol/l)
      - Plasma exchange

- Disease control
  - 'On drug' remission
    - Switch to azathioprine
    - Continue rituximab
  - 'Off drug' remission
    - Taper azathioprine
    - Stop rituximab

- Maintenance
  - Continued treatment
    - Taper glucocorticoids
    - Continue rituximab

- Relapsing disease
  - Re-induced
    - Preferably with rituximab

- Refractory disease
  - Increased glucocorticoids
  - Addition of rituximab
  - Plasma exchange