## 2 Chronic kidney disease/hypertension/atrial fibrillation

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Management of the chronic kidney disease (CKD) depends on the stage of the disease and is determined by checking the estimated glomerular filtration rate (eGFR) level[[1]](#footnote-1). A patient with advanced CKD (eGFR < 60) needs to be checked for anemia and if it is present – managed accordingly. Anemic patient with hemoglobin level below 100 g/L should be given erythropoiesis-stimulating agent (ESA, e.g. epoetin alfa or darbepoetin alfa). Moreover, if the patient’s ferritin level is below 100 ng/mL, oral iron therapy is initiated. A patient diagnosed with a metabolic abnormality is prescribed one of the calcium-based phosphate binders (e.g. calcium acetate) to treat high blood phosphorus levels.

Management of hypertension (HTN) should be determined after prolonged period of serial blood pressure (BP) measurements both in a clinic and at patient’s home[[2]](#footnote-2). While there is ongoing discussion regarding what constitutes high BP and the definition often is guideline specific, there is an agreement that people with BP greater than 140/90 mmHg should be considered as candidates for pharmacological HTN treatment combined with lifestyle changes. HTN is treated in three steps, depending if BP is controlled. In step 1, patients who are younger than 55 years are prescribed ACE inhibitor (such as capoten or monopril) while older patients are prescribed calcium channel blocker (CCB) (such as amlodipine or diltiazem). Associated lifestyle changes involve diet (reduction in coffee and alcohol intake, low sodium diet) and exercise. Step 2 treatment, irrespective of patient’s age, involves combining ACE inhibitor with a diuretic (such as chlorthalidone or hydrochlorothiazide). If such treatment does not result in controlled BP, step 3 treatment asks that all patients, irrespective of age, are additionally prescribed CCB medication.

Management of a symptomatic non-valvular atrial fibrillation (AFib) depends on persistence of the symptoms[[3]](#footnote-3). Unless special circumstances are present, rate control therapy is attempted as first line of treatment and it usually involves a beta blocker (BB) or non-dihydropyridine calcium channel blocker (CCB). However, it is suggested that digoxin be considered as a therapeutic option to achieve rate control in patients with AFib and symptoms caused by rapid ventricular rates whose response to BB and/or CCB is inadequate, or where such rate-controlling drugs are contraindicated or not tolerated. Oral anticoagulation therapy (warfarin or DOAC) is always initiated for symptomatic AFib patients to prevent thrombotic event. If rate control does not produce desired results for about 3-4 weeks, rhythm control therapy is initiated and it most often involves dronedarone, flecainide, or amiodarone. According to Khouri, amiodarone is contra-indicated for patient diagnosed with CKD and it is advised to prescribe sodium channel blocker (SCB) such as propafenone6. Long term maintenance therapy is often combined with the oral anticoagulation.

**Patient case:** John is a 70 years old male managed for CKD and HTN. He has severely decreased kidney function (eGFR = 35, absence of proteinuric CKD), has significant anemia (hemoglobin level of 95), no metabolic disturbances, and stable ferritin level of 110. John’s HTN is managed according to step 3 treatment (capoten (ACE inhibitor), diltiazem (CCB) and chlorthalidone (diuretics)). In addition, John takes low dose aspirin for lowering risk of CVD[[4]](#footnote-4).

**Current problems**: CKD, HTN managed according to step 3 treatment.

**Current medications:** ESA (darbepoetin alfa), Low dose aspirin, ACE inhibitor (capoten), CCB (dilitiazem), Diuretic (chlorthalidone). Dosages for all the medications are optimized at the maximal level for John’s condition. His lifestyle is managed to lower the risk of CVD and control the HTN.

**New problem:** AFib

**Management scenario:** For last year John experienced multiple episodes of irregular heart beat that resolved on its own. However, for last 2 days John is experiencing pronounced irregular heart beat with the increasing intensity of the associated symptoms of breathlessness, dizziness, and chest discomfort. Upon admission to the Emergency Department, John is diagnosed with tachycardia and persistent, highly symptomatic acute, non-valvular AFib that is confirmed by standard ECG recording.

John’s CHA2DS2-VASc score is greater than 2.

As a first line of urgent treatment John is administered intravenous heparin and his condition is stabilized with urgent direct-current cardioversion that results in significant improvement of the symptoms of AFib.

**Adverse interactions and revisions:** AFib is a newly diagnosed condition for John and long-term treatment following the diagnosis impacts his current therapy for CKD and HTN.

1. Considering current episode of AFib, CVD prevention (see the CKD guideline) needs to be more aggressive and low dose aspirin needs to be replaced with anticoagulant such as warfarin[[5]](#footnote-5).
2. Considering that John has persistent and highly symptomatic AFib with symptoms improved after urgent cardioversion, his anti-arrhythmic therapy might include potassium channel blocker (PCB) such as amiodarone. However, amiodarone is contra-indicated for patient diagnosed with CKD and it is advised to prescribe sodium channel blocker (SCB) such as propafenone[[6]](#footnote-6).
3. Considering that John experienced tachycardia, he should be prescribed BB for rate control and also for recurrence prevention in long term AFib pharmacological therapy. However, combining BB medication with ACE inhibitor or with non-dihydropyridine CCB (such as diltiazem) is not recommended, so BB medication should not be prescribed[[7]](#footnote-7).

**John’s preferences:** To have warfarin replaced by one of the DOACs (apixaban) in order to avoid hassle around checking the INR level on a regular basis.

**Revised treatment for CKD, HTN, and AFib:** ESA, DOAC, ACE inhibitor, CCB, Diuretic, SCB (all medications are at their optimal levels for John’s condition).Lifestyle management to lower the risk of CVD and control HTN, as previously. John was advised to report immediately to his physician if experiencing any bleeding.

Considering that John is prescribed ACE inhibitors, his kidney function needs to be tested within the next 3 months for possible deterioration. It is also advised that while conducting the blood test, at the same time the patient has the ECG test to assess efficacy of prescribed treatment for AFib.

1. Guidelines for the Management of Chronic Kidney Disease, 2008, CMAJ. See p. 1154, 1158, 1159, 1160 (highlighted). [Levin-2008] [↑](#footnote-ref-1)
2. Hypertension in adults: diagnosis and management. 2019, NICE Guideline. See p. 5, 9, 12, 14, 15, 16 (highlighted). [NICE-2019] [↑](#footnote-ref-2)
3. 2018 Focused Update of the Canadian Cardiovascular Society Guidelines for the Management of Atrial Fibrillation. Canadian Journal of Cardiology 2018; 34 (11): Online Supplement. See p.9, 12, 13, 21 (highlighted). [Andrade-2018]. [↑](#footnote-ref-3)
4. 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines, 2019, Journal of American College of Cardiology. See p. e204 (highlighted). [Arnett-2019] [↑](#footnote-ref-4)
5. Antiplatelet therapy for stroke prevention in atrial fibrillation. Missouri Medicine2010; 107 (1): 44-7. See p. 45, 46 (highlighted). [Garg-2010] [↑](#footnote-ref-5)
6. Understanding and Managing Atrial Fibrillation in Patients with Kidney Disease. Journal of Atrial Fibrillation2015; 7 (6): 1069. See p. 64 (highlighted). [Khouri-2015] [↑](#footnote-ref-6)
7. Combining other antihypertensive drugs with beta-blockers in hypertension: a focus on safety and tolerability. Canadian Journal of Cardiology2014; 30 (5 Suppl): S42-6. See p. s43, s44 (highlighted). [Richards-2014] [↑](#footnote-ref-7)