Disease State Education for Patients & Caregivers

This sheet highlights some basic facts about chronic kidney disease. It is not intended to substitute the advice of your healthcare professional, i.e. doctor, pharmacist, nurse, etc…

If you have any concerns after reading this fact sheet, please contact your healthcare provider (i.e. Doctor or pharmacist).

Chronic Kidney Disease

What is the role of the kidneys in the body?

Kidneys play an important role in the body:

- They filter out waste, toxins, and excess fluid from the blood,
- They keep minerals in balance so the body can function,
- They release hormones that keep bones healthy, regulate blood pressure and make red blood cells.

What is Chronic Kidney Disease (CKD)?

Also known as chronic renal disease or CKD is a condition in which the kidneys are damaged and gradually lose their functions overtime. They cannot filter blood as well as they should, and therefore, waste can build to high levels in the blood.

What are the symptoms of CKD?

There are usually no symptoms of kidney disease in the early stages, i.e. people with CKD may not feel ill or notice any symptoms.

- Specific blood and urine tests are needed to check for CKD.
- Tests include measurement of both the creatinine level in the blood (aka, serum creatinine) and protein in the urine (aka, proteinuria).

At a more advanced stage, particularly known as end-stage kidney disease, symptoms can include:

- tiredness
- feeling sick
- blood in the urine
- shortness of breath
- muscle cramps
- difficulty sleeping
- weight loss and poor appetite
- swollen ankles, feet or hands

What are the risk factors for the development of CKD?

Major risk factors include pre-existing health conditions such as:

- Diabetes
- High blood pressure
- Family history of CKD
- High-cholesterol
- Heart disease
- Obesity
- Kidney Infections or inflammation (aka, glomerulonephritis)
- Long-term, regular use of certain medicines – such as lithium and non-steroidal anti-inflammatory drugs (NSAIDs)

What are the main causes of chronic kidney disease?

Diabetes and high blood pressure, or hypertension, are responsible for about two-thirds of chronic kidney disease cases.

What are the different stages of chronic kidney disease?

CKD has varying levels of seriousness. The so-called “stages” of chronic kidney disease indicate how much kidney damage has occurred. Each stage is measured by how much blood the kidneys can filter per minute, also known as the glomerular filtration rate.

- Stage 1 — normal or high kidney function (GFR of more than 90 mL/min).

- Stage 2 — mild decline in kidney function (GFR of 60-89 mL/min).
- Stage 3A — mild to moderate decline in kidney function (GFR of 45-59 mL/min).
- Stage 3B — moderate to severe decline in kidney function (GFR of 30-44 mL/min).
- Stage 4 — severe decline in kidney function (GFR of 15-29 mL/min).
- Stage 5 — end-stage kidney disease, also known as kidney failure (GFR of less than 15 mL/min).

What is End-stage kidney disease (ESKD)?

When kidney disease progresses, it may eventually lead to kidney failure.
ESKD or ESRD (end-stage renal disease), aka kidney failure, refers to kidney damage so significant that kidneys stop working. ESKD is the most severe stage of CKD and a dialysis or a kidney transplant is needed for survival.
However, CKD is manageable and not all patients with kidney disease progress to kidney failure.

How can chronic kidney disease affect my health?

The health consequences of CKD may include:

- Heart disease & high blood pressure
- Anemia or low number of red blood cells
- Increased occurrence of infections
- Low calcium levels, high potassium levels, and high phosphorus levels in the blood
- Weak bones
- Poor nutritional health
- Loss of appetite or eating less
- Uremia is a sign of advanced chronic kidney disease, it may cause nausea and vomiting, swelling, trouble thinking clearly, extreme tiredness, shortness of breath, and heart problems.
- Nerve damage

- Depression

What can I do to live well with chronic kidney disease?

To help prevent CKD progression and lower the risk for kidney failure, you should:

- Adopt a healthy lifestyle: exercise regularly, sleep well and get good nutrition.
- Get active—physical activity helps control blood pressure and blood sugar levels.
- Eat well– meet with a dietician to create a kidney-healthy eating plan.
- Lose weight if you're overweight.
- Take care of your heart health.
- If you smoke, quit!; as smoking can worsen kidney disease and interfere with medications that lowers blood pressure.
- Manage diabetes by monitoring blood sugar to keep it in the target range as much as possible.
- Control high blood pressure, keep your blood pressure below 140/90 mm Hg (or the target your physician establishes for you).
- Get tested at least once a year; as early detection can help prevent the progression of kidney disease to kidney failure.
- Take medications as instructed by your healthcare providers, and see your healthcare team regularly.

Dialysis

What is Dialysis?

Dialysis is a procedure to remove waste products and excess fluid from the blood. The treatment uses a machine to help filter the blood outside the body.

What happens during dialysis?

There 2 main types of dialysis: haemodialysis and peritoneal dialysis:

- **Hemodialysis (HD) is** the most common type of dialysis that uses a machine to regularly clean the blood.During the procedure, a tube is attached to a

needle in your arm. Blood passes along the tube and into an external machine that filters it, before it's passed back into the arm along another tube. Most people get hemodialysis three to four days a week at a hospital or dialysis clinic with each session lasting around 4 hours..

- **Peritoneal dialysis (PD)** uses the inside lining of the abdomen (the peritoneum) as the filter, rather than a machine. A provider attaches a bag with a dialysis solution to a catheter in the abdominal lining. The solution flows from the bag into the abdominal lining. As blood passes through the blood vessels lining the abdominal cavity, waste products and excess fluid are drawn out of the blood and into the dialysis solution. The used solution is drained into a bag a few hours later and replaced with fresh fluid.

Can dialysis be done at home?

Yes, there are many dialysis programs that provide dialysis care & follow-up at home.

Types of home dialysis

Home hemodialysis

A small, more portable machine is kept in your home to clean your blood. Your blood flows from two needles connected to tubing (like IV lines), usually in your arm, to a machine that removes wastes and fluid. The clean blood is then returned to your body.

Peritoneal dialysis (PD)

PD can be done quite easily at home and can sometimes be done while you sleep, but it needs to be done every day. Two types of (PD): continuous ambulatory peritoneal dialysis (CAPD) and automated peritoneal dialysis (APD).

What side effects does dialysis have?

Dialysis can make you feel exhausted.

Haemodialysis can cause itchy skin and muscle cramps.

Peritoneal dialysis can put you at risk of developing an infection of the thin membrane that surrounds your abdomen (*aka, peritonitis*).

CKD Anemia

What is CKD Anemia?

Anemia is a common complication of chronic kidney failure (CKD). It is defined as a condition in which the blood has a lower-than-normal amount of red blood cells or hemoglobin.

Anemia due to CKD is less common in early kidney disease, and it often gets worse as kidney disease progresses and more kidney function is lost.

What causes anemia in CKD?

Anemia in people with CKD has multiple causes.

- Damaged kidneys produce less erythropoietin (EPO), a hormone that regulates the production of red blood cells. With less EPO, the body makes fewer red blood cells, and less oxygen is delivered to the organs and tissues.
- Red blood cells of people with anemia and CKD tend to live in the bloodstream for a shorter time than normal, causing the blood cells to die faster than they can be replaced.
- People with anemia and CKD may have low levels of nutrients, such as iron, vitamin B12, and folate, that are needed to make healthy red blood cells.
- Other causes of anemia related to CKD include blood loss, particularly with dialysis, infection, inflammation, malnutrition.

What are the symptoms of anemia in CKD?

Symptoms of anemia in CKD may include some or all of the following:

- fatigue or tiredness & unusually pale skin
- reduced ability to exercise, weakness & body aches
- chest pain & shortness of breath
- fast or irregular heartbeat
- dizziness & fainting
- headaches
- sleep problems & trouble concentrating

How is CKD anemia treated?

Mild anemia causes few symptoms and may not need treatment at first.

Treatments for anemia may include iron, vitamins, prescription medicines, and/ or blood transfusions. The aim of treating anemia is to ease symptoms and improve quality of life.

Iron- helps the body make healthy red blood cells. Iron supplements may be given either as a pill or intravenous (IV) infusion. IV iron supplement is given during dialysis treatment.

Vitamins- vitamin B12 or folate, both needed to make healthy blood cells

Prescription medicines- erythropoiesis-stimulating agent (ESA) may ease anemia symptoms and help avoid blood transfusions. ESAs send a signal to the bone marrow to make more red blood cells. During hemodialysis, ESA is given as an IV or subcutaneous injection.

Blood transfusions- blood transfusions may be needed to treat severe anemia in CKD. A blood transfusion can quickly increase the number of red blood cells and temporarily relieve the symptoms of anemia.

Hyperparathyroidism secondary to CKD

What is secondary hyperparathyroidism SHPT?

Hyperparathyroidism is a disease that causes parathyroid glands to make too much parathyroid hormone (PTH). The parathyroid glands are 4 small glands in the neck that make PTH.

Secondary hyperparathyroidism (SHPT) is a type of hyperparathyroidism that is common in people who have end-stage renal disease or kidney failure (stage 5 kidney disease).It happens when the body's levels of calcium, vitamin D and phosphorus are not in balance.

What causes SHPT?

SHPT results from conditions that cause low levels of calcium in the blood.

In end-stage renal disease or kidney failure, kidneys are no longer able to change inactive vitamin D to active vitamin D. This creates low levels of vitamin D in the body. When there are low levels of vitamin D, the body absorbs less calcium, and the level of calcium in the blood becomes low. This signals the parathyroid glands to make more PTH and grow larger, which causes SHPT.

What are the symptoms of SHPT?

Symptoms of SHPT include:

- Weak or broken bones (osteoporosis)
- Bone and joint pain
- Kidney stones
- Urinating (peeing) more often than normal
- Belly pain
- Feeling weak or tired easily
- Feeling sick to your stomach or throwing up
- Feeling less hungry than usual (loss of appetite)

How is SHPT treated?

The main treatments to manage SHPT are to:

- Treat the other disease that caused it – for example, if SHPT is caused by kidney failure, then doctors treat kidney failure with dialysis or a kidney transplant
- Take medicines, including:
    - Vitamin D or calcium supplements to help your body absorb calcium
    - Calcimimetics, which tell your parathyroid glands to make less PTH
- It is important to limit the amount of phosphorus in your diet. Examples of foods high in phosphorous include tea, soda, beer, cheese, milk, cream, fish, chicken or beef liver, beans, peas, cereals, nuts, and grains.

- Have surgery to remove one or more of the parathyroid glands – however, surgery does not treat the disease that caused SHPT, so there is a high chance that SHPT will come back.

What will happen if SHPT is left untreated?

If left untreated, SHPT can cause other health problems, such as:

- A buildup of calcium under your skin, which can cause painful, open skin sores and infections
- A buildup of calcium in other parts of your body, such as your blood vessels and heart, which can lead to heart attack or stroke
- Bone disease