UNDERSTANDING ANEMIA OF CHRONIC KIDNEY DISEASE

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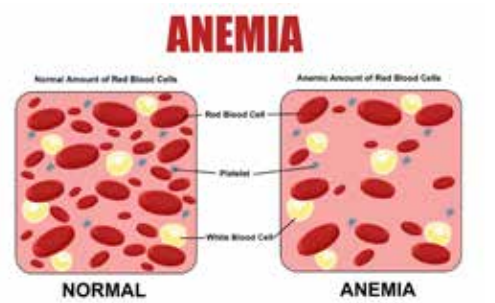
WHAT IS CHRONIC KIDNEY DISEASE (CKD)?

When someone has CKD, it means that their kidney function has slowed down. These changes usually take place over time. There are a variety of diseases or conditions that can lead to CKD. Two of these are diabetes and high blood pressure. A lot of people have those diseases and are at risk for CKD. Other diseases, present at birth, can cause CKD. Among them can be Polycystic Kidney Disease, Fabry Disease, among others.

There are five stages of CKD. The stages show how well the kidneys are doing their job. Your healthcare provider can do a blood test to see what stage you are in. In Stage 1, there is very little kidney damage. By Stage 5, the kidneys will have lost most of their function. Even though complications due to CKD, such as anemia, can occur as early as in CKD Stage 3, more serious symptoms of anemia usually become noticeable in CKD Stage 5. Stage 5 patients, who do not receive a kidney transplant, go on dialysis; more serious anemia symptoms occur in this stage of CKD. Ask your healthcare provider to check your blood to see if you have any signs of anemia.

WHAT IS ANEMIA?

Our blood consists mainly of red blood cells, white blood cells and platelets. When a person has anemia, it means that they have fewer red blood cells than normal. Why is that important? Red blood cells carry oxygen throughout the body. Organs and tissues need oxygen to function and stay healthy. So, fewer red blood cells cause low oxygen and low oxygen makes us feel weak and tired.



CKD STAGE-5 AND ANEMIA

The kidneys make a hormone called erythropoietin (Er-wreath-ro-po-i-tin). Often it is called ESA for short. ESA coupled with iron make red blood cells in the bone marrow. CKD affects the amount of ESA that the kidneys make. As kidney function gets worse, the ability for the kidneys to produce ESA decreases in later stages of CKD. Additionally, ESA needs iron

to make hemoglobin. Dialysis patients lose blood during dialysis as well as due to more frequent blood testing. Not receiving enough ESA and not replacing lost iron are the main reasons dialysis patients suffer with anemia.

Other contributing factors that lead to decreased hemoglobin levels:

- low Vitamin B12
- low folic acid
- poor diet
- bleeding due to heavy periods in women
- bleeding in the stomach or bowels
- diseases that affect the bone marrow

Some medications may play a role too. Your healthcare provider should do a complete review of the medications you are taking. Usually, red blood cells live for about 120 days. The reaction of some medications may shorten this. This can cause the hemoglobin level in your blood to fall. Blood thinners can cause bleeding that you can't see because it is internal.

DOES ANEMIA EFFECT HOW I FEEL?

If you have anemia, you may experience a variety of symptoms. The symptoms may be a lot like those from other diseases. This can make it hard to tell if the way you feel is due to anemia or if there's something else going on. Here are some of the ways people say they feel when they have anemia.

- I never have enough energy
- I feel weak
- I feel tired
- It's hard to concentrate, I feel like I have "brain fog"
- It feels like my heart is beating too fast
- Sometimes my heart skips beats
- I get short of breath
- I am having headaches
- I am not sleeping very well
- My appetite does not seem to be as good as it once was
- My hands and feet won't stay warm
- I may feel dizzy
- I sometimes feel sad or "down in the dumps"
- It's hard to do everyday tasks like make a sandwich or walk up stairs

Some people don't have any symptoms. However, as anemia gets worse, a person may start having more and more of these symptoms.

HOW CAN I FIND OUT IF I HAVE ANEMIA?

If you have any or many of the symptoms it may be because:

- You are not getting enough ESA;
- Your iron levels may be low;
- You may not be getting enough dialysis; or
- You may have an infection or inflammation.

So whether you are on dialysis or not, a thorough check-up is recommended.

If you have any of the symptoms of anemia, tell the healthcare professional who is doing your check-up. Your check-up should include:

- Questions to find out how you are feeling right now
- Current health history
- Past health history
- Medication review
- Physical exam
- Urine test if indicated
- Blood tests

Blood tests measure:

- Kidney function (creatinine)
- The levels of the different cells in your blood
- The number, type, size and shape of the cells in your blood
- Vitamin B12 level
- Folic acid level
- Changes related to other diseases Ferritin level (stored iron in the body)

The complete blood count or CBC is the main test that tells if a person has anemia. Two of the red blood cell tests are:

- **Hemoglobin (Hgb)** is part of the blood cell that contains the iron that takes oxygen to tissues and organs.
- **Hematocrit (Hct)** tells how many cells are in a certain amount of blood. This can be used to tell if the number of red blood cells in the blood is too low, just right or too high.

Target hemoglobin value:

The optimal target Hgb level for patients with CKD is not well defined or "one size fits all". In patients with CKD on dialysis or not on dialysis, anemia treatment should be individualized. A patient's target Hgb level should

be determined based on a discussion between the patient and their physician as to what is best for him/her and how he/she feels and can function on a daily basis at various Hgb levels.

For most CKD patients not on dialysis, who are anemic and are on ESA therapy, Hgb levels should be maintained between 10-11.5g/dL using the lowest ESA dose. The U.S. Food and Drug Administration (FDA) approved label on ESAs states that, for patients with CKD who are not on dialysis, one should consider ESA treatment only when the Hb level is <10 g/dL and reduce or stop the ESA dose if the Hgb level exceeds 10 g/dL.

In most dialysis patients who are anemic and are treated with ESAs, Hgb levels should be maintained between 10 -11.5 g/dL, using the lowest ESA dose.

Other blood tests are done to check how much iron is in the body. Those tests are:

- **Serum iron** – level of iron circulating in the blood.
- **Serum ferritin** – amount of iron stored in the body and inflammation.
- **Transferrin saturation or TSAT** – amount of iron that is bound to transferrin and can be used to make red blood cells.

HOW IS THE ANEMIA OF CKD TREATED?

The anemia of CKD is different than the other types of anemia. The primary reason of anemia in CKD is the decreased production of ESA along with not enough iron to be incorporated into ESA to produce sufficient hemoglobin.

PATIENTS WITH CKD NOT ON DIALYSIS:

Your healthcare provider should check iron levels and if low, will likely prescribe oral iron pills (iron pills take by the mouth). If iron pills do not increase your iron level, you may need intravenous iron (iron shot in the vein). If your Hgb is still low after iron shots, you may need an ESA to replace your body's natural production of erythropoietin. ESA shots are like a person taking insulin shots for diabetes. Your healthcare provider should routinely check your Hgb and iron levels to adjust iron and ESA doses as needed.

PATIENTS WITH CKD ON PERITONEAL DIALYSIS OR HOME HEMODIALYSIS:

Similar to patients with CKD who are not on dialysis, home dialysis patients should regularly have

their Hgb and iron levels checked. If a home dialysis patient has low iron levels, they should start an iron therapy and if Hgb remains low, they should be started on an ESA.

PATIENTS WITH CKD ON HEMODIALYSIS:

Hemodialysis patients tend to lose more iron and have low iron levels. This is due to blood loss during hemodialysis because of waste during dialysis treatment as well as due to more frequent blood testing. Most, if not all, of patients on hemodialysis require iron treatment, usually given intravenously, in the machine. **More recently a new therapy has been approved by the FDA and has become available for patients on hemodialysis.**

The new iron therapy is mixed into a patient's dialysis fluid (dialysate) and delivered during treatment. This dialysate iron therapy does not require iron to be given intravenously, so no needles are involved. Be sure to ask your doctor or nurse about all available iron therapies and discuss which iron treatment is right for you.

In addition to iron treatment, most hemodialysis patients also require an ESA be given by a dialysis nurse intravenously through the machine during dialysis treatment.

OTHER TREATMENTS FOR ANEMIA

If the anemia is bad enough, it may need to be treated with a blood transfusion. This is very rare and you should not worry. This is not how most anemia is treated. Your healthcare team will work with you to make a plan for the best way to treat the conditions causing your anemia.

THINGS YOU CAN DO TO HELP FEEL BETTER AND ENJOY YOUR LIFE

Even though you are being treated for the anemia of CKD, there are some things you can do to help take care of yourself.

- Keep all your appointments with your healthcare teams.
- If you are on hemodialysis, don't miss or shorten your treatments.
- If you are on peritoneal dialysis, keep doing it as instructed.
- If you are using a catheter for hemodialysis make sure the nurse is using a sterile field and a clean pair of gloves to

put you on and off of treatment; this will limit the risk of infection and infections can make your anemia worse. Or talk to your dialysis care team to consider a fistula or graft.

- Stick to your kidney-friendly diet and include iron-rich foods.
- Take your medications as directed.
- Make sure to keep your flu and pneumonia shots up-to-date.
- Try to get some exercise every day. Ask your healthcare team what exercises might work best for you.
- Get enough rest.

SUMMARY

- Anemia can be caused by many conditions, however most individuals with Chronic Kidney Disease get anemia due to not producing enough red blood cells to carry oxygen throughout the body and low iron levels.
- The kidneys naturally produce a hormone called erythropoietin which helps create red blood cells.
- There are a number of questions your healthcare provider can ask and a number of tests your healthcare provider can do to determine the cause of your anemia.
- There are a number of ways your healthcare provider can treat your anemia, be sure to discuss all options to determine which treatment option is best for you.

WORDS TO KNOW

Erythropoietin: A hormone produced by the kidney that helps the development of red blood cells by the bone marrow.

Hemoglobin: The molecule in red blood cells that carries oxygen.

Vitamin B12: A water-soluble vitamin that has a key role in the normal functioning of the brain and nervous system, and the formation of red blood cells.

Folic Acid: A form of Vitamin B that is needed for normal production of red blood cells.

Bone Marrow: Flexible tissue in the interior of bones where red blood cells are produced.

Blood Thinners: Medication that helps blood clots from forming.

Ferritin: A protein that stores iron and releases it in a controlled fashion as your body needs.

Dialysate: Dialysis fluid used during treatment that removes waste in the blood.

NOTES

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