

Ask Your Doctor

ABOUT

CHRONIC KIDNEY DISEASE

General Knowledge and Patient Workbook
of Chronic Kidney Disease



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Kidney Care Institute, Inc.

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FOREWARD

“No real teacher can doubt that his task is to assist his pupil to fulfill human nature against all the deforming forces of convention and prejudice.”

– Allan Bloom.

The United States is in one of the most tumultuous times in its illustrious history. Economic crises occur in almost every sector of our society. Nowhere is this felt more powerfully than in healthcare. As a nation, we spend more per capita on healthcare than any other nation in the world. Yet, the quality of care that is rendered is ranked well out of first place on many measures. Our government funded healthcare payer programs are quickly nearing bankruptcy. This occurs at a time when government regulations become more and more stringent on providers practices. Further, decreasing payments to providers limits the time providers spend with patients. There is a battle that rages among regulators, payers and providers; patients are made to be more responsible for their healthcare payments. All one has to do is look at several employee walkouts in recent times. The airline industry, the grocery store industry and the entertainment industry (to name a few) have been turned upside down partially due to the shifting of healthcare benefits' costs to the employees. Thus, patients will need to be able to better define healthcare value.

The goal of the “Ask Your Doctor” workbook series is to empower the healthcare consumer. It is surmised that an empowered healthcare consumer can drive healthcare quality better than either provider or payer alone. The major objective is to educate those affected with disease and those at risk of various diseases. However, a closely related objective is to teach people about common conditions, particularly those conditions associated with kidney disease. Kidney disease is a silent epidemic affecting 1 in 9 people in this country. Because kidney disease affects almost every organ system, it serves as a co-factor for how vigorously most diseases progress. Thus, this series will reveal to the layperson risk factors, early signs, disordered anatomy and physiology, and treatments of several groups of diseases related to kidney disease. This will help identify disease early and, in some instances, prevent disease altogether.

It is my hope that at the end of the coursework you will understand medicine on a much deeper level. Moreover, I know that you will be able to apply what you have learned to live a healthier and more productive life; you will also help your loved ones to do the same.

Vincent L. Anthony, MD, MPH, SCH, FASN

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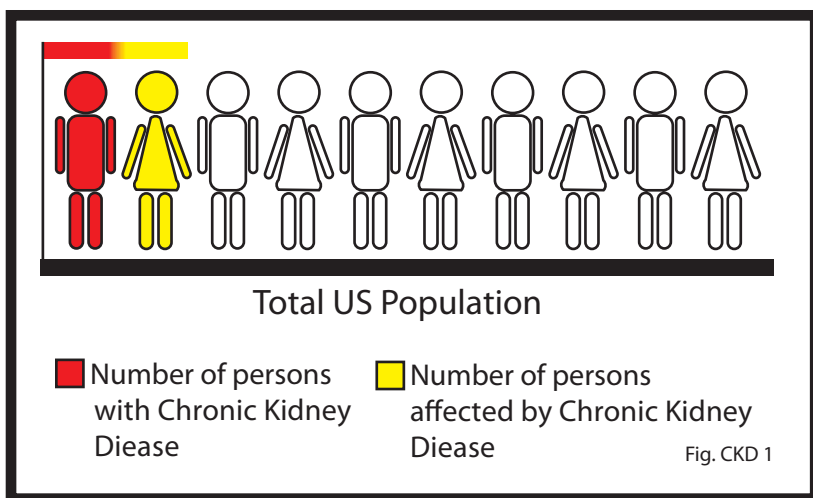
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Answer Key for CKD

Why is chronic kidney disease important?

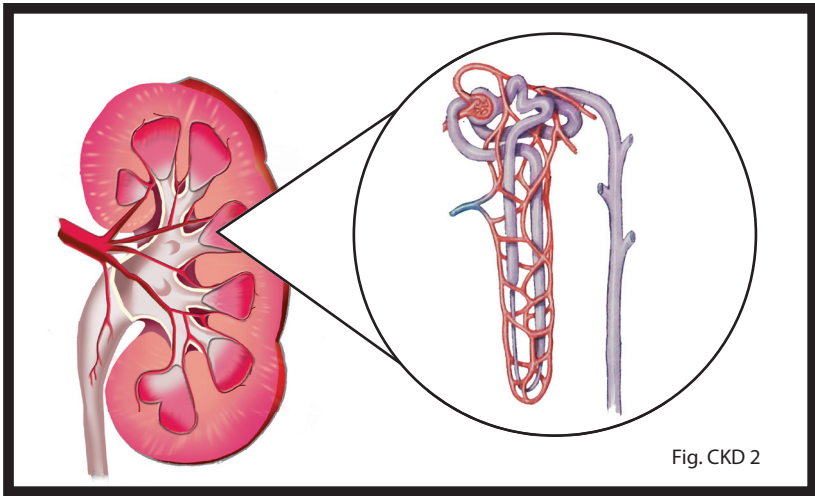


In 2003, it was estimated that there were 20 million people in the United States with Chronic Kidney disease (CKD). This represented 1 in 9 (or 11% of) U.S. adults with CKD. There were 20 million more that were at risk for CKD. Today, the United States Renal Data Service (USRDS) reports that CKD affects 13.8%-15.8% of the U.S. adult population. This represents over 26 million people with CKD.

Check Your Understanding _____

In 2003, _____ in _____ (or 11%) of the population had chronic kidney disease. _____ million more were at risk for this devastating condition. Today, CKD affects _____ to 15.8% of the U.S. adult population, representing _____ million people.

How do the kidneys work in the body?



The kidneys are responsible for a wide variety of functions in the body. These functions are primarily regulated by the basic unit of the kidney, called the nephron. The nephron is composed of several parts. There are 1 to 1.1 million nephrons per kidney in the healthy adult.

Check Your Understanding _____

The basic functional unit of the kidney is called a _____.
There are 1 to 1.1 million _____ per kidney in the healthy adult.

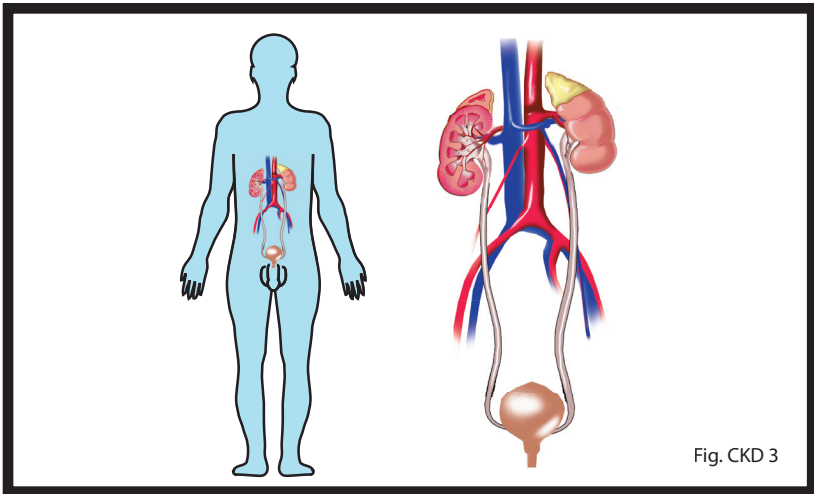
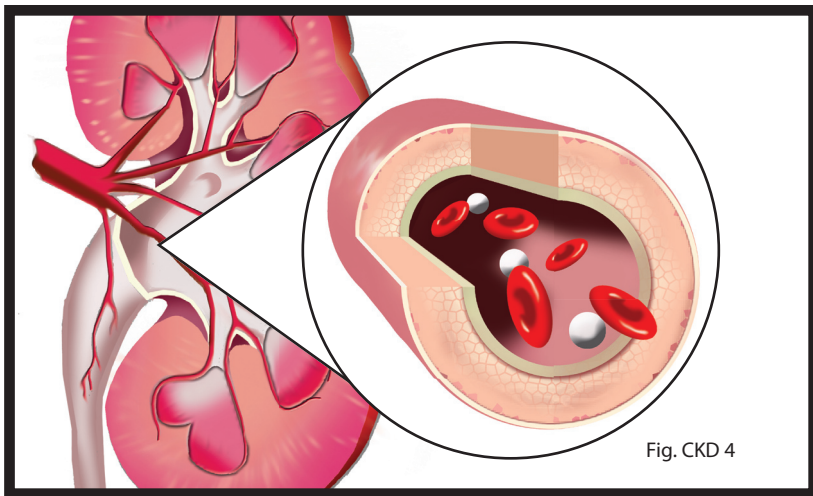


Fig. CKD 3

Most of us are keenly aware that the kidney is responsible for getting rid of excess water from the body. We are also aware that the kidney is responsible for getting rid of some of the waste products from the body. The kidney has other functions as well. One of these functions includes regulating blood minerals. Other functions include regulating long-term control of blood pressure, maintaining healthy levels of acidity in the body, and helping to maintain red blood cell growth.

Check Your Understanding _____

Many people know that the kidneys get rid of excess _____ and _____ from the body. The kidney also regulates the _____ in the blood stream. Further, the kidney also is responsible for long-term control of _____; maintains healthy _____ levels; and helps maintain red blood cell growth.



When the body cells do their normal work, they produce waste products. Those waste products then leave each cell and find their way to the blood stream. The kidneys filter the toxins out of the blood stream and place them in the urine for getting rid of them. Likewise, when we ingest certain substances that may be toxins themselves, then the kidneys also help to filter these agents out of the body before they build up and become harmful.

Check Your Understanding _____

The kidneys filter _____ and _____ out of the blood stream. Before things we ingest become toxic to the body, the kidneys _____ these agents out.

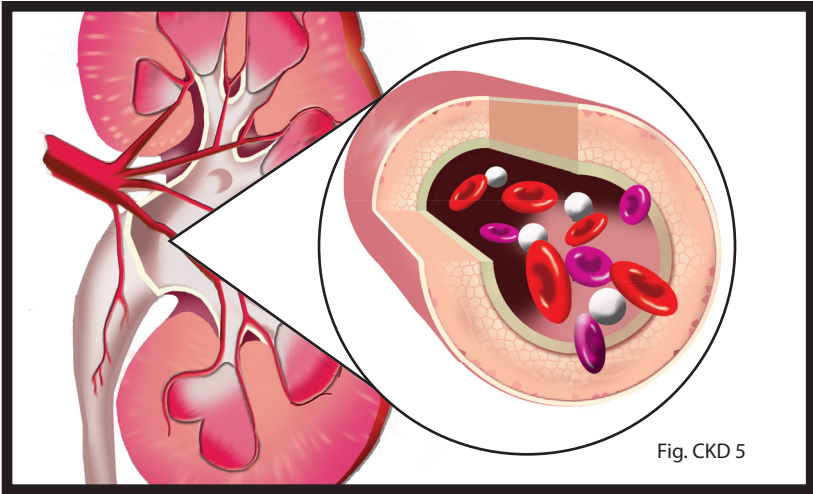
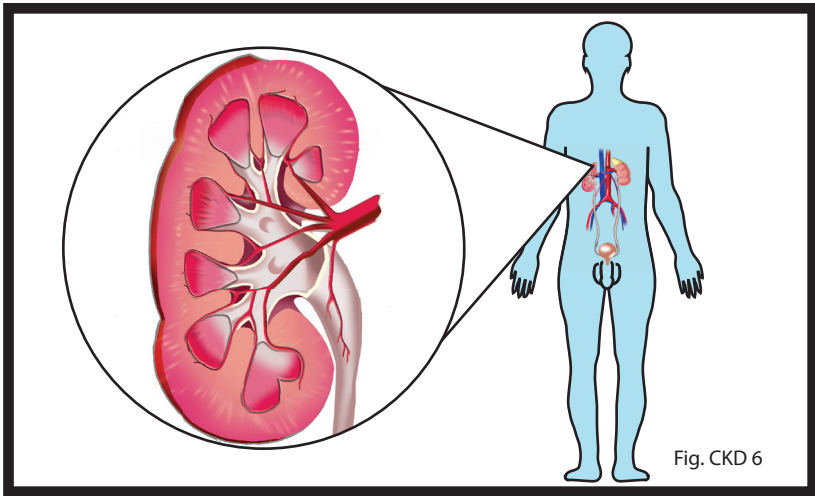


Fig. CKD 5

Further, certain medicines and vitamins that we ingest may be in excess of what the body will utilize. Thus, the kidneys get rid of the unused portion of many drugs and vitamins. This filtration function serves as a major protector to each cell in the body. If the filtration function is damaged in any way, every cell in the body is affected and therefore, every organ in the body is affected.

Check Your Understanding _____

When medicines and vitamins are in excess of what the body needs, the kidneys _____ the unused portions. Thus the kidneys serve as a major _____ for every cell in the body.



The kidneys are also responsible for long-term blood pressure control. They regulate blood pressure generally by changing the amount of fluid in the blood stream by regulating the concentration of salt in the body. Normally, the kidneys sense increases in blood pressure and get rid of salt from the body. The fluid in the blood stream leaves along with the salt, creating a state of increased urination. This increased urination lowers the blood volume thereby maintaining blood pressure.

Check Your Understanding _____

_____ blood pressure control is done by the kidneys.
The kidneys sense the amount of _____ in the blood stream.
_____ leaves the kidneys with the salt causing increased urination.

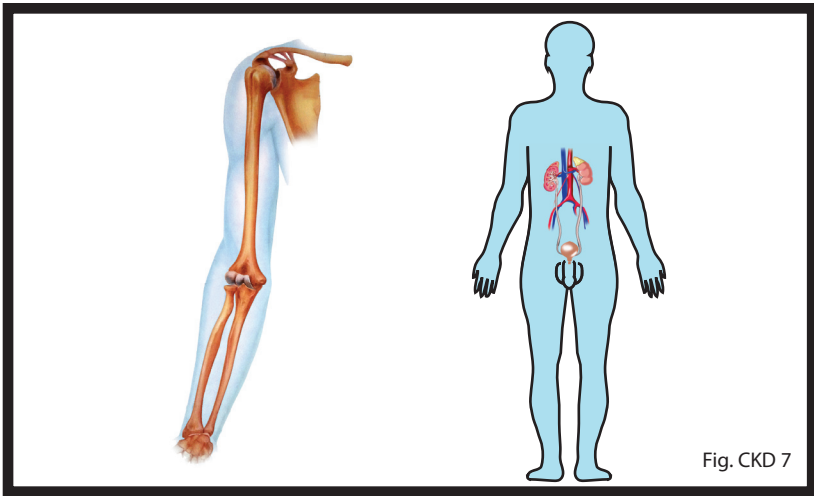
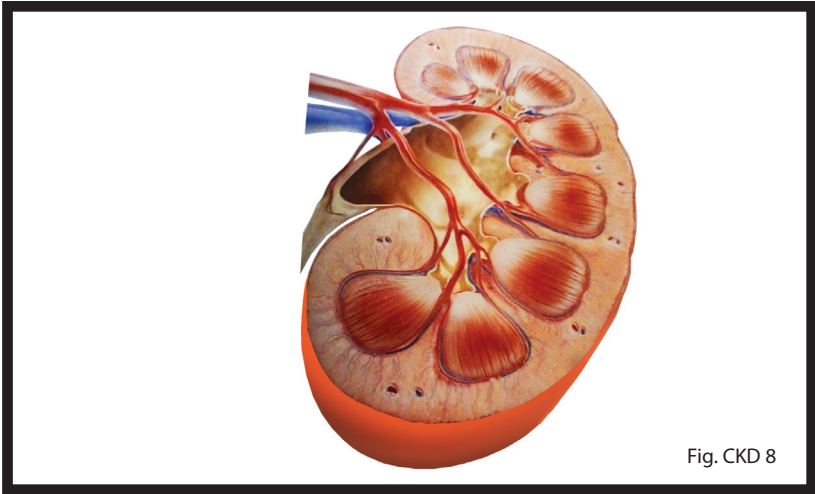


Fig. CKD 7

The kidneys regulate bone and cartilage function as well as the function of **enzymes** throughout the body by regulating mineral concentrations in the blood stream. Specifically, calcium, phosphorous, magnesium, potassium and uric acid are kept in balance by the kidney.

Check Your Understanding _____

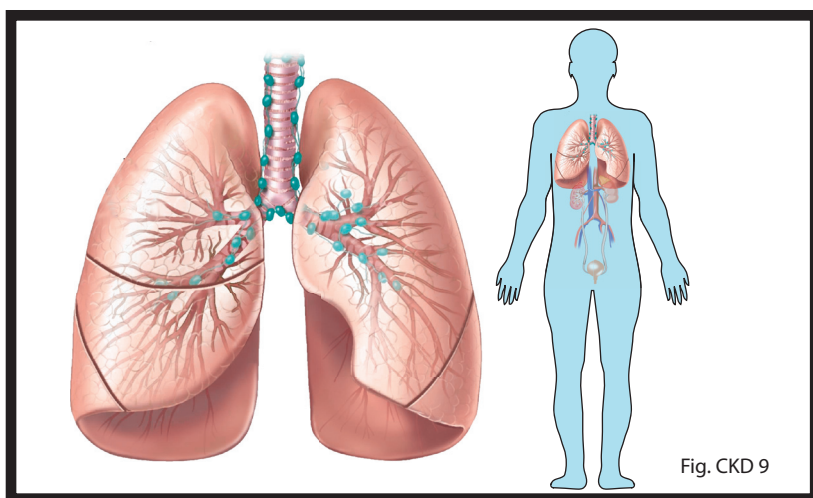
Bone, cartilage and enzymes are maintained because the kidneys regulate calcium, _____, _____, _____, and _____.



Other proteins are regulated at the kidney level as well. By keeping all these minerals and proteins in the appropriate balance, the kidneys serve to regulate the strength of bones and the flexibility of cartilage. Furthermore, every single cell in the body functions to its peak when the kidneys keep these substances regulated, because the enzymes of the body can function properly.

Check Your Understanding _____

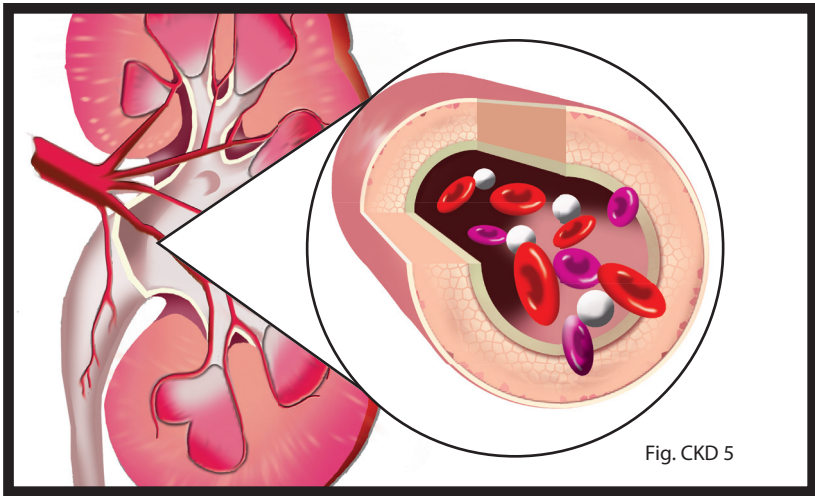
The _____ of bone and the _____ of cartilage is maintained because the kidneys keep the appropriate balance of minerals and proteins. In fact, all cells of the body function properly because the _____ are at peak performance.



Maintaining a good balance of acids in the body is extremely important to how it functions overall. The kidneys are responsible for acid balance along with the lungs. Acid levels are maintained within a very narrow range. Waste products of the cells are often acidic and thus must be eliminated because they add too much acid to the human system. The kidneys and the lungs work in concert to restore adequate levels; however long-term control of acidity is primarily a function of the kidney.

Check Your Understanding _____

Balancing _____ levels in the body serves to protect the cells from ongoing damage. The _____ and the _____ are responsible for controlling _____ levels in the body.



The normally functioning kidneys produce a hormone that helps the body make red blood cells. When red blood cells are low in the body, oxygen can't be carried to the various tissues. Thus, organs start to function very sluggishly because they need oxygen as a fuel for them doing their work. The kidneys thereby ensure that red blood cells are always in abundance to continue their work of carrying oxygen.

Check Your Understanding _____

The kidneys produce a _____ that ensures that _____ blood cells are always in abundance. When these cells are not present, _____ can't be carried to the various tissues.

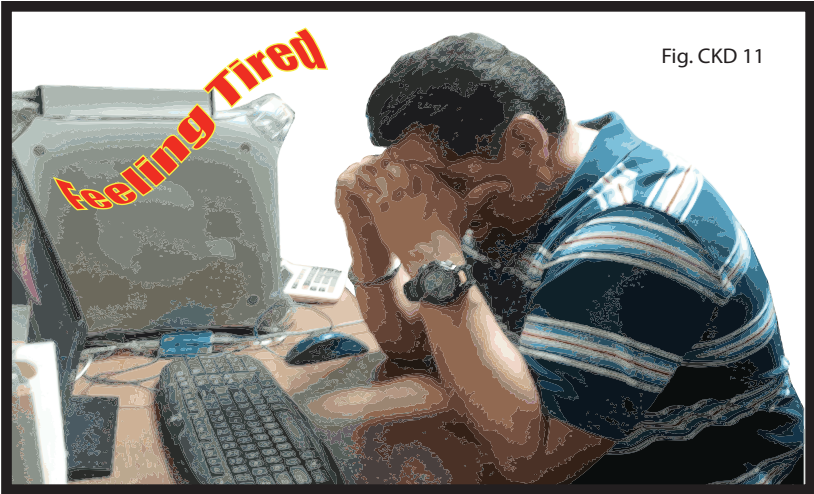
What symptoms and signs does chronic kidney disease cause?



This author has nicknamed chronic kidney disease “the second silent killer.” (Hypertension is considered “the silent killer.”) The reason CKD gets its nickname is that most patients have no symptoms early in the disease.

Check Your Understanding _____

The author considers chronic kidney disease “the second silent killer” because patients usually have no _____ early in the disease.



Other patients may have vague complaints or they may have complaints of other organs not functioning properly. The vague complaints most often encountered are increasing tiredness or sleepiness during the day and memory problems, very similar to hypertension.

Check Your Understanding _____

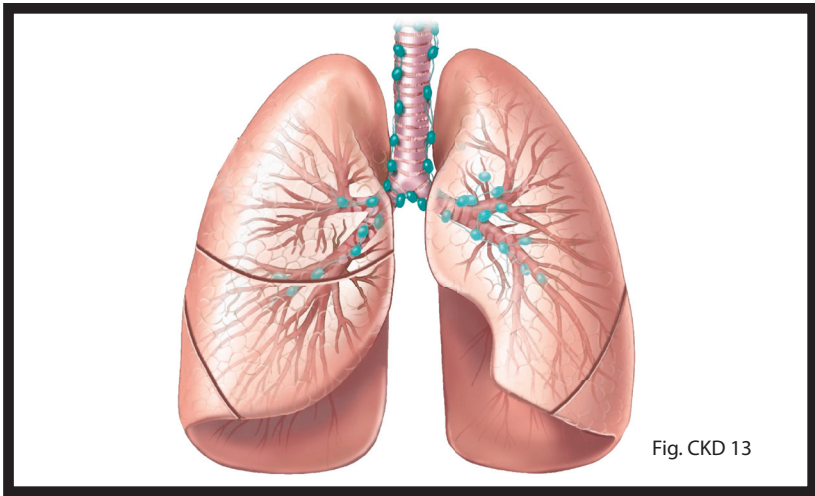
The early complaints of kidney disease, if any, are often _____. These problems include increasing tiredness or _____ as well as _____ problems.



There are a multitude of complaints that may be associated with chronic kidney disease. These include shortness of breath, swelling, increased or decreased urination, itching, “hiccups,” and depression.

Check Your Understanding _____

Chronic kidney disease can cause or be associated with shortness of breath, _____, increased or decreased _____, _____, “hiccups” and _____.



Shortness of breath may occur by two mechanisms. The increase in acid in the blood stream causes the lungs to work harder to get rid of it. Carbon dioxide is actually an acid. Thus, if this gets breathed out enough, then the acid in the blood stream leaves the body; this keeps acid levels down. The other mechanism causing the increased shortness of breath comes from increased fluid in the lungs. When kidneys can't get rid of enough fluid, some of it may go to the lungs.

Check Your Understanding _____

There are two main mechanisms of shortness of breath. When _____ increases in the bloodstream because the kidneys are malfunctioning, the lungs breathe faster and deeper to get rid of _____. Likewise the kidneys often can't get rid of fluid and it collects in the _____. This too causes shortness of breath.



Increased swelling is a symptom caused by the inability of the kidneys to get rid of salt and fluid from the body. Also, patients may experience increased or decreased urination early on depending on the where in the nephron the major damage is.

Check Your Understanding _____

Salt and fluid can also build up in the tissues causing _____ when the kidneys can't get rid of water. Urination may be _____ or _____ depending on where the damage to the kidney is.



Fig. CKD 15

Another symptom noted is itching. As kidney disease worsens, certain minerals and toxins build up underneath the skin causing profuse drying and skin irritation if they are not removed.

Check Your Understanding _____

When _____ and _____ build up underneath the skin, itching ensues. The profuse _____ and _____ are the direct result of this build up.



Patients also get “hiccups” because of the buildup of toxins. The toxins irritate nerves that supply the diaphragm causing the contraction of this muscle.

Check Your Understanding _____

“Hiccups” are caused by _____ irritating the nerves supplying the _____ causing uncontrolled _____ of the muscle.



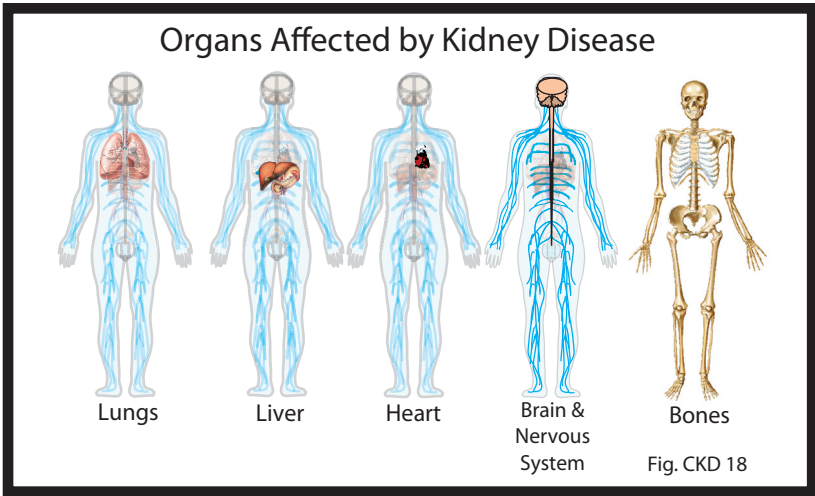
Fig. CKD 17

The final symptom mentioned here, although there are others, is depression which itself may also be a symptom of kidney disease. It is thought that changes in brain chemistry caused by the fluctuation in blood mineral concentration and increasing levels of toxins lead to the problem, particularly if an individual has a predisposition toward developing depression.

Check Your Understanding _____

Changes in _____ chemistry may influence the development of _____ in chronic kidney disease patients. Again, the buildup of _____ and _____ is responsible.

How is the body affected by chronic kidney disease?



Given that every cell in the body is affected by the buildup of waste products and changing blood chemistry, every organ is affected by kidney disease. The heart and brain, the immune system, the blood, the lungs, the pancreas, the bones...all of these systems and more are affected by chronic kidney disease.

Check Your Understanding _____

All body systems are affected by _____ because the disease affects every _____ in the body.

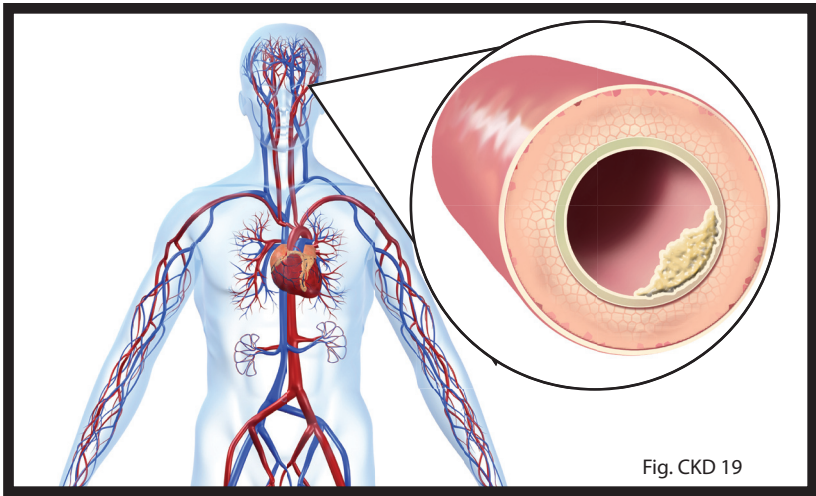
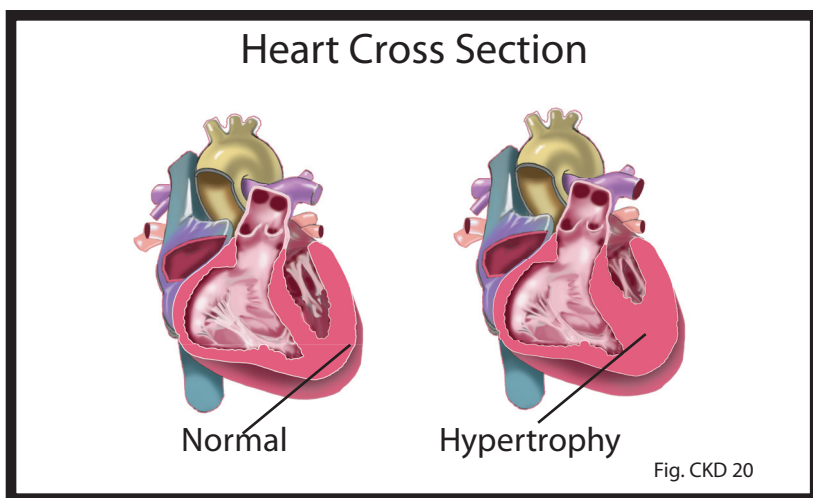


Fig. CKD 19

The common pathway of brain and heart disease in chronic kidney disease is damage to the blood vessels. Both organs have small arteries associated with them. In chronic kidney disease these arteries begin start to harden because of a buildup of calcium in the arteries' walls. This increases the likelihood of a heart attack or a stroke.

Check Your Understanding _____

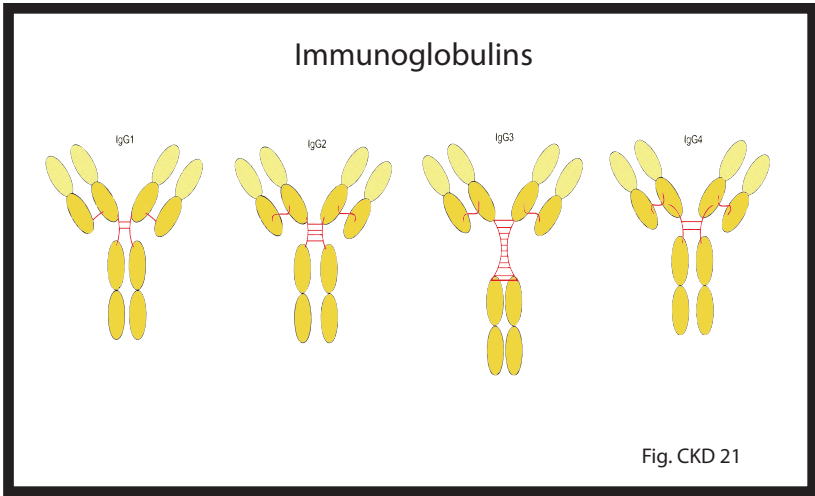
The _____ of damage to the heart and brain can lead to a _____ or stroke. _____ builds up in the wall of the arteries leading to the increased risk in these organs.



In the heart, chronic kidney disease can also lead to increasing heart muscle size called hypertrophy. This hypertrophy of the heart muscle can then lead to congestive heart failure, a condition caused by the heart not pumping blood effectively.

Check Your Understanding _____

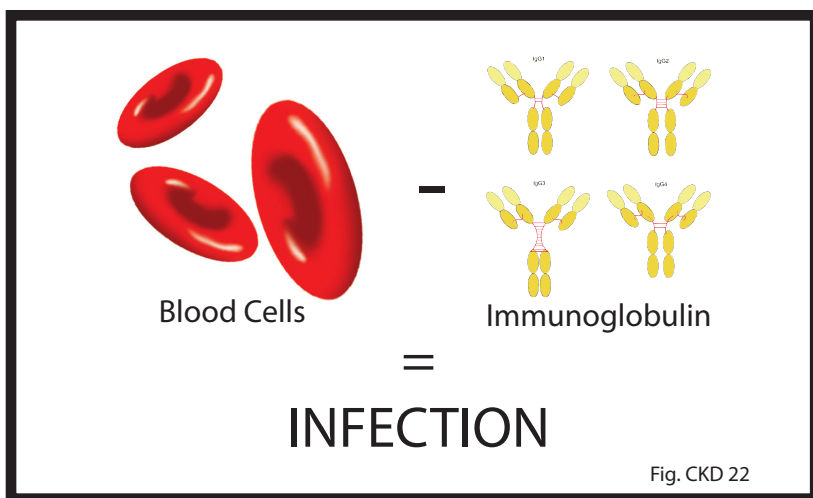
Chronic kidney disease can indirectly lead to cardiac _____.
 _____ . This in turn can lead to _____
 _____ .



The immune system is affected in chronic kidney disease by several mechanisms. The immune system is composed of cells and proteins (called immunoglobulins) that fight off germs and other substances foreign to the body. Chronic kidney disease may involve “spilling” proteins in the urine; thus, fewer proteins remain in the body. Some of the proteins spilled include these immunoglobulins.

Check Your Understanding _____

_____ fight off germs that cause infections in the body. When _____ spill into the urine, a lot of _____ may be lost.



If one has less of these immunoglobulin proteins, then there is a propensity to develop various types of infections. Further, by virtue of toxin buildup and blood mineral imbalance, the cells of the immune system do not function as well either thereby adding to the problem.

Check Your Understanding _____

People are at higher risk of developing _____ when there are fewer _____ around. The other cells of the immune system don't function well either because of _____ build up and blood _____ imbalance.

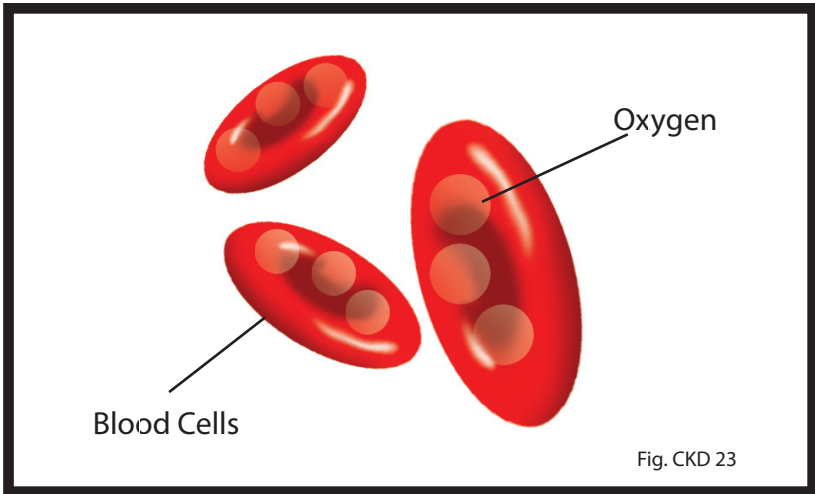
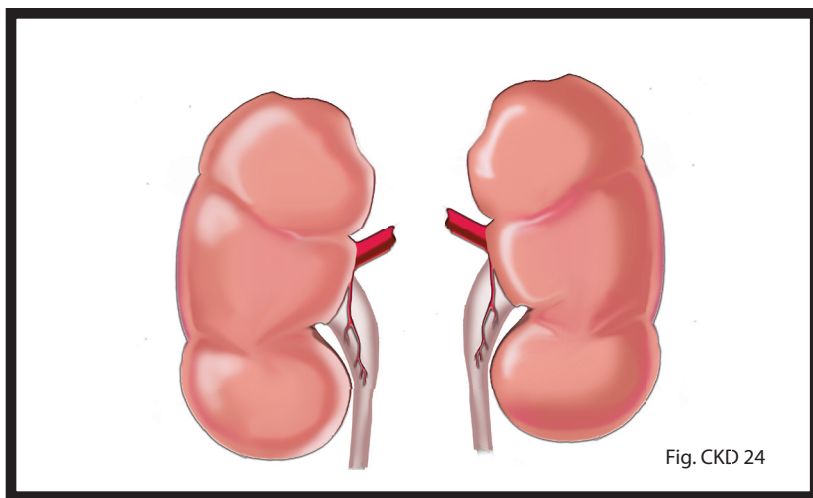


Fig. CKD 23

Blood cells carry oxygen from the blood stream to each organ in the body. Thus, if blood counts are low (namely the red blood cells), then each tissue in the body becomes oxygen starved leading to profound dysfunction.

Check Your Understanding _____

Oxygen is carried from the lungs to the bloodstream by _____ blood cells.



In chronic kidney disease, the kidneys begin decreasing the production of a hormone, called erythropoietin (or epo, for short), that helps blood cells get formed. When less of this is around, fewer red blood cells get produced leading to anemia or low red blood cell counts.

Check Your Understanding _____

The kidneys produce a hormone called _____ which helps _____ blood cell formation. If the _____ blood cell count is low, then _____ is present.

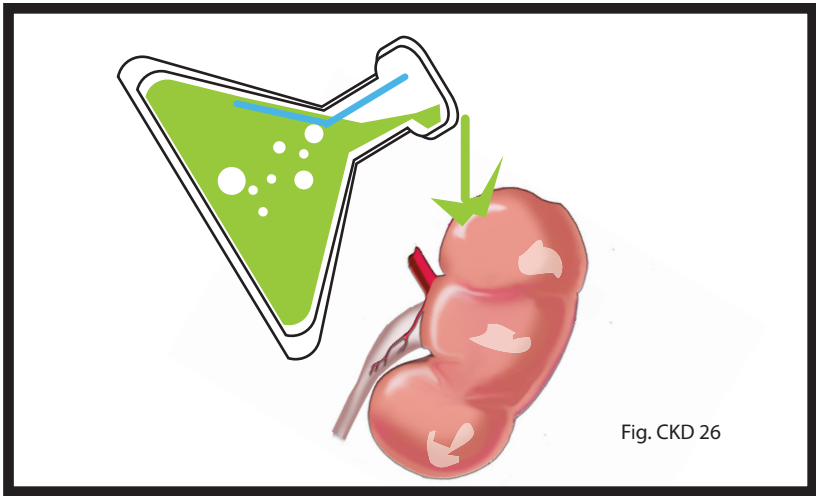


Fig. CKD 26

Acids in the body build up in the bloodstream when the kidneys don't function properly, as noted earlier. Just as acids in the environment tend to be corrosive to whatever they touch, acids in the bloodstream do the same thing to cells in the body. Thus, organs become damaged and scarred if acidity is too high for too long...or worse yet, the person could die!

Check Your Understanding _____

Some of the waste products from cells are in the form of _____. They tend to be _____ to the cells in the body.

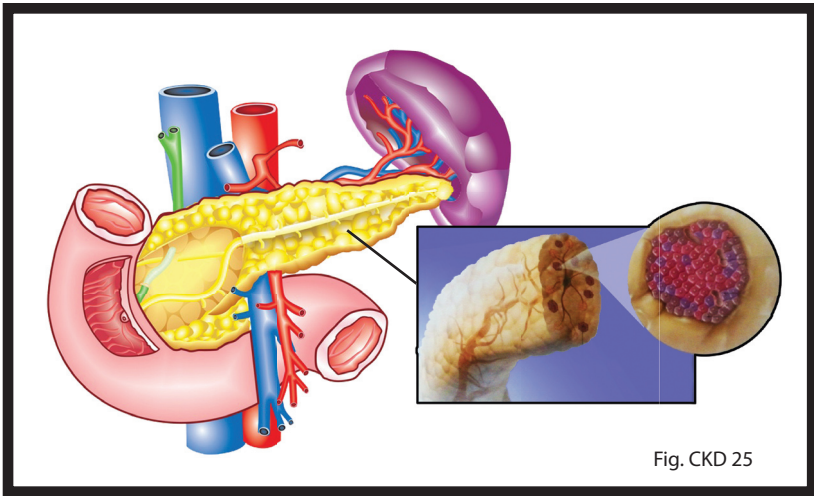
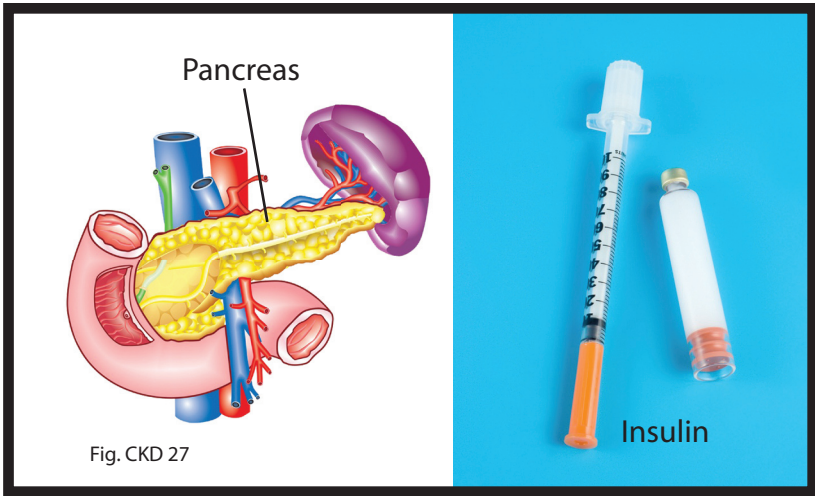


Fig. CKD 25

Insulin is a hormone produced by the body that aids the uptake of sugar by each cell in the body; this takes on increased importance in the body's muscle cells. One of the functions of the kidney is to breakdown the insulin molecule (thereby turning off its actions) to allow an appropriate balance of sugar uptake by the cells and that in the bloodstream.

Check Your Understanding

_____ helps muscle cells take up sugar from the blood stream. If the kidney is not functioning well _____ is not broken down; thus its action or lowering blood sugar continues.... very low blood sugars can result.



Diabetes occurs when this insulin is less effective, produced in lower amounts by a damaged pancreas or not produced at all leading to high blood sugars. In those patients requiring insulin or medicines that increase insulin secretion, chronic kidney disease may lead to an unsafe drop in blood sugar resulting in coma and perhaps even death!

Check Your Understanding _____

Chronic kidney disease may lead to a severe _____ in blood sugar which could lead to coma. This occurs when _____ or medicines that increase _____ are used in controlling Diabetes.

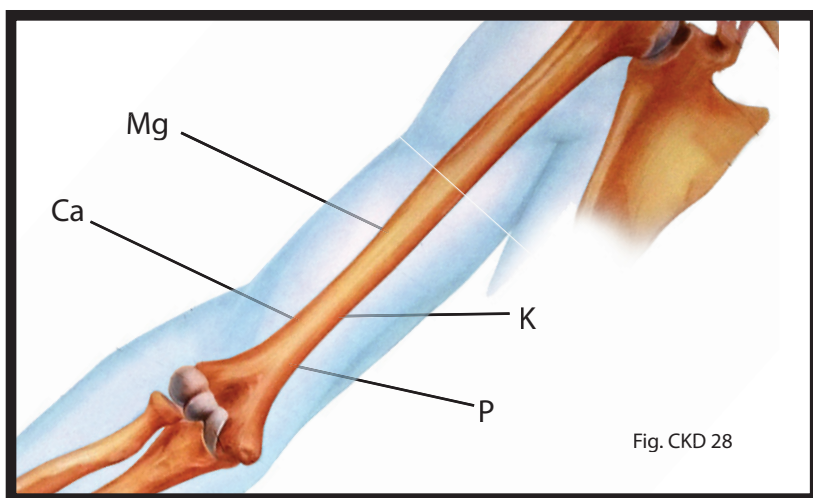
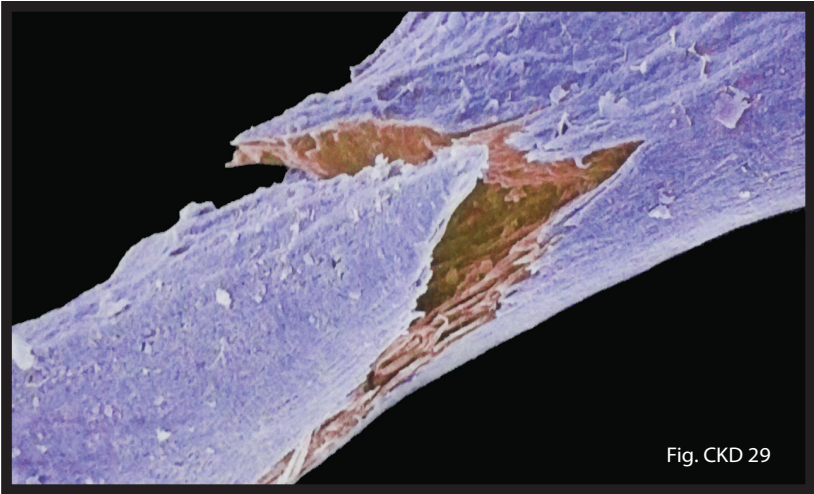


Fig. CKD 28

The minerals calcium, phosphorous and magnesium are part of the make-up of the bones. Throughout the day these minerals are stripped from bone and then replaced in a process called “bone turnover.” Chronic kidney disease interrupts this normal process because the normal blood concentrations of these bone minerals can’t be maintained.

Check Your Understanding _____

_____, phosphorous and _____ help to make up bone. “_____” is the process of continuously replacing these minerals in the bone. Chronic kidney disease interrupts the normal mineralization process.



With poor “bone turnover,” bones either become de-mineralized or thin and prone to fracture or they become over-mineralized but still prone to fracture. Further, the makeup of the bone marrow, the area of blood production, becomes physically distorted. This distortion further limits the production of red blood cells as noted above.

Check Your Understanding _____

Bones become prone to _____ with poor “bone turnover.”
Chronic kidney disease distorts bone _____, which in turn
limits _____ blood cell production.

What treatments are available and when should they be used?

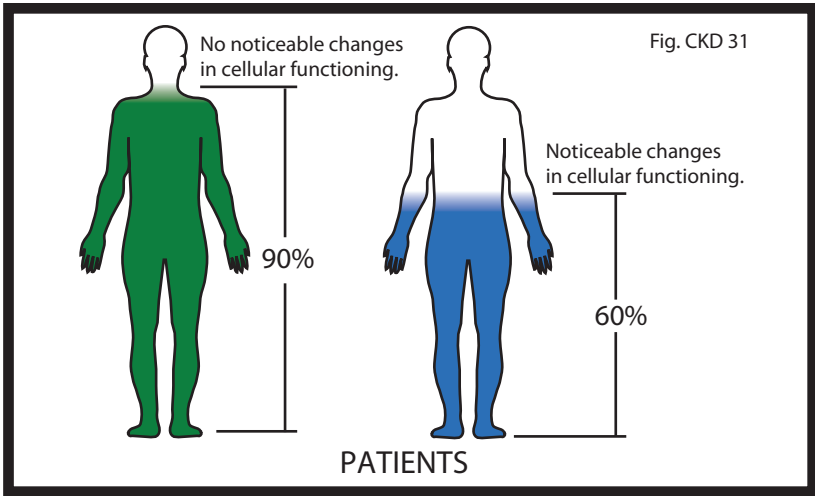
Stage	Description	GFR (mL/min/1.73 m ²)
1	Kidney damage with normal or ↑ GFR	>90
2	Mild ↓ GFR	60-89
3	Moderate ↓ GFR	30-59
4	Severe ↓ GFR	15-29
5	Kidney failure	<15 or dialysis

Fig. CKD 30

Chronic Kidney disease is divided into five stages. When one reaches stage five, or ESRD, renal (kidney) replacement therapy is needed. The Kidney Care Institute Modified Kidney Disease Outcomes Quality Initiative™ classification system (or KCare mKDOQITM) makes it easy to estimate a person's percentage of kidney function. (**the KCare mKDOQITM classification system is an educational tool developed by Kidney Care Institute, Inc. to aid patient understanding and tracking of kidney function.)

Check Your Understanding _____

The KCare mKDOQI makes it easy to estimate _____ of kidney function.



According to this classification system, patients with ninety percent (90%) function or above experience no noticeable changes in cellular functioning in the body nor do they have overt symptoms. However, below 90% down to 60% there are noticeable changes in body cell function although patients generally remain free of any symptoms. Below 60%, cellular derangement becomes profound and patients generally become symptomatic in some way.

Check Your Understanding _____

The patient experiences no symptoms nor real change in _____ functioning above 90%. Between 60% - 90%, only changes in _____ function are noted. Below _____, symptoms are more likely evident.



Fig. CKD 32

Chronic Kidney Disease can cause hypertension. The hypertension associated with chronic kidney disease is usually related to increasing salt and fluid retention. Often, this manifests as swelling.

Check Your Understanding _____

The hypertension in chronic kidney disease is largely related to _____ and _____ retention. As noted earlier, _____ is a symptom that may be associated with this.

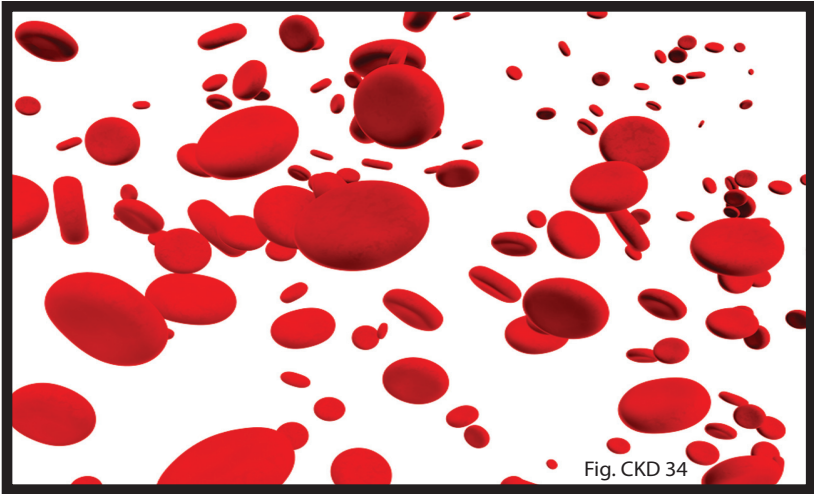


The drugs used to treat the hypertension of kidney disease are the same ones used to treat other causes of hypertension. The main classes of blood pressure medicine are the ACE inhibitors, AR blockers, Beta blockers, Alpha blockers, Calcium Channel Blockers and Diuretics (or water pills). The Diuretics serve to get rid of the extra water and fluid common to CKD-related hypertension; ACE inhibitors and AR blockers help decrease levels of protein in the urine.

Check Your Understanding _____

The hypertension seen in kidney disease is treated like other causes of hypertension.


_____, which get rid of salt and fluid, and _____ and _____, which decrease protein in the urine are key in CKD related hypertension.



Maintenance of good red blood cell counts is imperative in CKD. One of the main building blocks of red blood cells is iron. Thus, patients with CKD often are on supplemental iron therapy to maintain adequate body stores. Patients are also started on an erythropoietin (or EPO) therapy which aids blood cell production.

Check Your Understanding _____

Patients often have to take _____, one of the main building blocks of red blood cells. Externally administered _____ (or _____) also helps blood cell production.



Chronic Kidney Disease
Alters bone metabolism

- calcium
- magnesium
- phosphorous

Fig. CKD 35

Because a patient’s bone metabolism is altered in CKD, attention is given to appropriate concentrations of calcium, magnesium and phosphorous.

Check Your Understanding _____

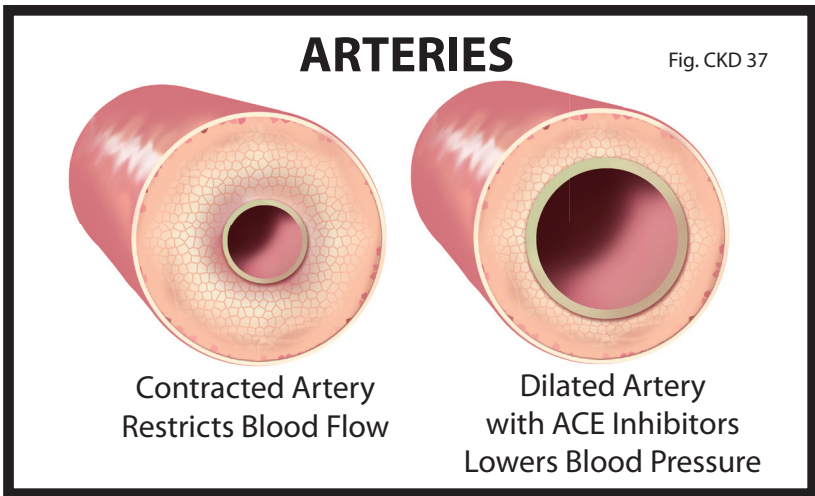
“Bone turnover” is maintained in a more normal way by managing levels of blood minerals such as _____, _____, _____.



Phosphorous may be high in patients with renal disease and thus phosphate binders are given with meals. Vitamin D levels are often low in CKD which changes the concentration of calcium in the bloodstream. Thus, patients are often placed on Vitamin D supplements to aid in maintaining these concentrations.

Check Your Understanding

In chronic kidney disease, phosphorous may be _____ and Vitamin D levels may be _____. When vitamin D levels are _____, changes in _____ are noted in the blood stream.



Increasing levels of protein in the urine reflect ongoing damage to blood vessels all over the body. ACE inhibitors and AR blockers medications used to treat hypertension noted above are used to decrease the amount of protein in the urine, thereby improving the condition of all of the blood vessels.

Check Your Understanding _____

_____ in the urine is a reflection of ongoing damage to blood vessels all over the body. By decreasing the _____ in the urine by using _____ and _____, damage is decreased in blood vessels.

Fig. CKD 38

STAGE 5 ESRD

End-Stage Renal Disease

When a person reaches stage five Chronic Kidney Disease [also termed total Kidney failure or End-Stage Renal Disease (ESRD)], there are two main modalities of treatment: Dialysis and Transplant.

Check Your Understanding _____

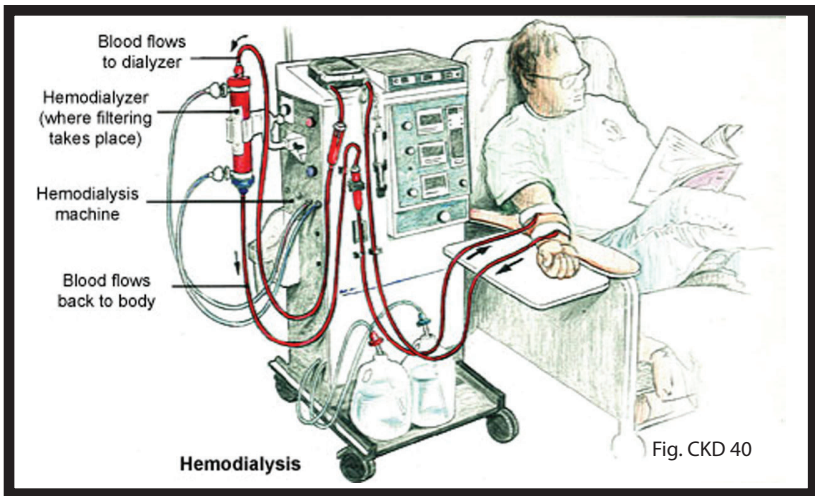
_____ (or ESRD) is treated with
_____ or _____.



Dialysis involves cleaning the blood through non-kidney means when the kidneys have failed. There are two form of dialysis currently in use. These include hemodialysis and peritoneal dialysis.

Check Your Understanding _____

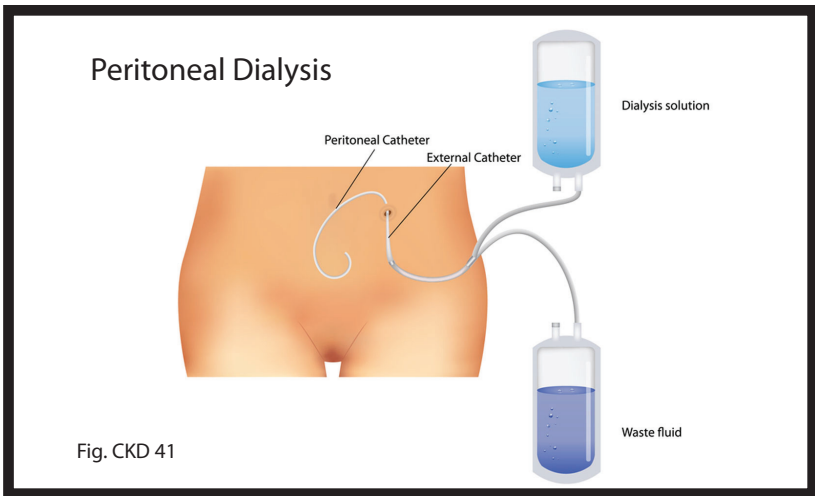
_____ and _____ are the two forms of non-kidney means to clean the blood in use today.



Hemodialysis is the form of dialysis most familiar. It involves a patient getting their “dirty” (or toxin/waste-filled) blood cycled through a machine containing an artificial kidney and the “clean blood” returned to them. This dialysis usually occurs three times per week at a dialysis center. Hemodialysis is now being done at home as well.

Check Your Understanding _____

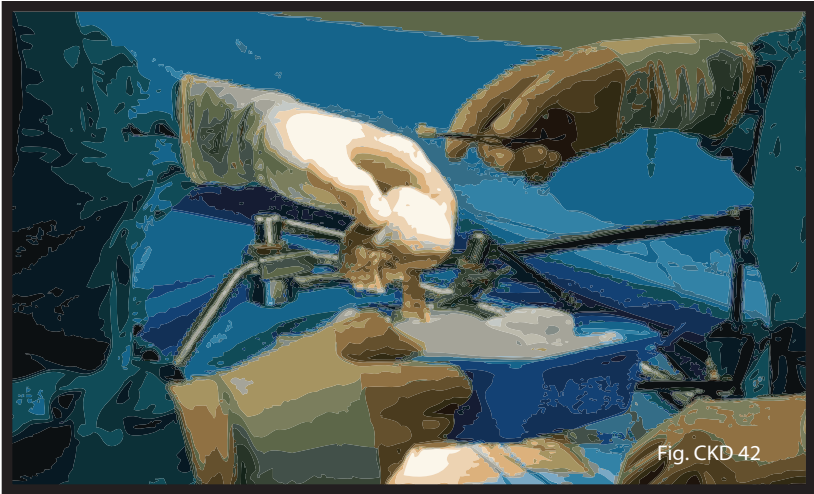
The _____ _____ cleans the blood as it goes through a machine. Hemodialysis usually occurs _____ times per week.



Peritoneal dialysis is a modality whereby the undersurface of the patient's own belly is used to clean the blood. The patient usually does the dialysis procedure nightly while sleeping.

Check Your Understanding _____

Patients on peritoneal dialysis get their blood cleaned on a _____ basis while sleeping.



Transplant is the other modality treating ESRD. In transplant, a kidney from a live donor or a deceased donor is connected to the blood vessel system in the abdominal cavity. The patient then takes medicines (called immunosuppressive medicines) to ensure that the kidney is not rejected by the patient's body.

Check Your Understanding _____

A transplant can be donated from a _____ donor or a _____ donor. Patients must take _____ medicines to prevent their body from _____ the donated kidney.

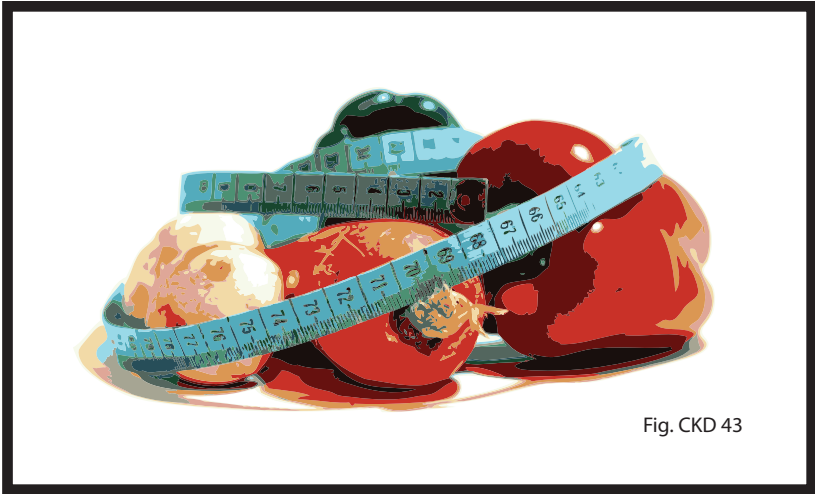
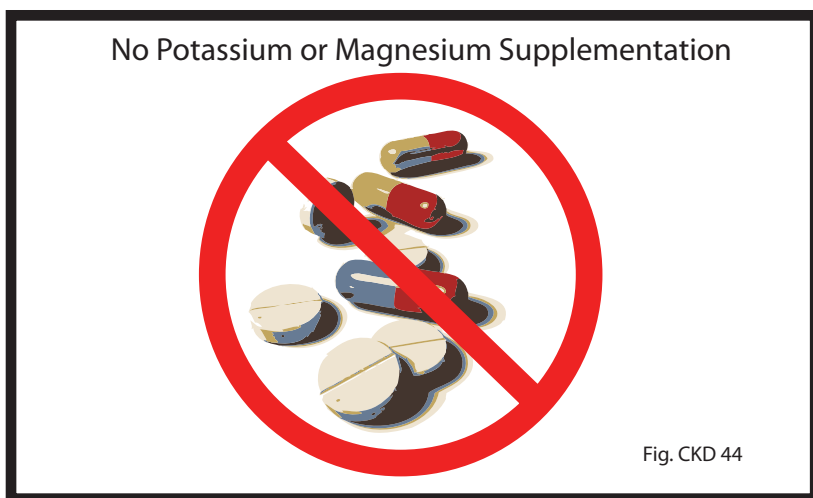


Fig. CKD 43

Diet also plays a role in maintaining kidney function. In particular, diets low in salt are beneficial to maintaining this function in patients with Chronic Kidney Disease. In CKD low in salt means 2 grams per day or less.

Check Your Understanding _____

A diet low in salt for a chronic kidney disease patient means _____ per day or _____.



Potassium supplementation can be dangerous in kidney disease as the mineral may increase rapidly leading to heart effects. Likewise, magnesium supplementation may cause a buildup which then leads to nervous system problems.

Check Your Understanding _____

_____ and _____ supplements can be dangerous in chronic kidney disease patients. The _____ and _____, respectively, can be at risk.

How can chronic kidney disease be prevented and good kidney function be maintained?



Fig. CKD 45

Chronic Kidney Disease can be prevented by adhering to a regular exercise regimen, proper intake of fluids (namely water and teas high in antioxidants) and diets high in fruits and vegetables. It is surmised that increasing antioxidant intake may also thwart the ability of injurious agents to affect kidney function.

Check Your Understanding _____

A regular _____ regimen as well as diets high in fruits and _____ can help prevent kidney disease. Increased intake of _____ will help limit kidney injury caused by certain agents.



Anything done to protect blood vessels in the body also protects the kidneys. Therefore, stopping smoking and watching cholesterol can have a great impact on preventing kidney disease altogether, but also slowing the progression of disease once developed.

Check Your Understanding _____

The kidney can be considered a “ball” of specialized blood vessels. Therefore, _____ smoking and watching _____ can help prevent kidney disease or _____ the progression.



Patients with certain diseases noted to cause kidney disease should strive to keep these diseases controlled. Notably, diseases such as Diabetes, Hypertention, Lupus, HIV, Obesity and Gout can directly lead to chronic kidney disease if they are not controlled. Thus, medication regimens, diets and complementary therapies used to control the progression of these diseases will decrease the risk of chronic kidney disease development.

Check Your Understanding _____

Keeping diseases which may lead to kidney disease _____ through adhering to _____ regimens, _____ and complementary therapies will limit the development and _____ of chronic kidney disease.

Vincent L. Anthony, MD, MPH, SCH, FASN, CPE



Dr. Anthony is a board certified Internist and Nephrologist, a Specialist in Clinical Hypertension, a Fellow of the American Society of Nephrology and a Certified Physician Executive who currently practices Clinical Nephrology in Los Angeles, CA. He completed his subspecialty training in nephrology and hypertension at Nassau University Medical Center in East Meadow, NY. Dr. Anthony received his Bachelor of Science degree from Tulane University College of Arts and Sciences where he majored in Biology.

He then went on to complete a Master of Public Health degree at the Tulane University School of Public Health and Tropical medicine, where he studied the impact of disease in various populations, with an interest in hypertension and cardiovascular disease outcomes. Subsequently, he attended Thomas Jefferson Medical College. While there, he served as president of the Jefferson Chapter of the Student National Medical Association as well as president of the Jefferson Internal Medicine Society. He completed his Internal Medicine residency at Thomas Jefferson University Hospital, where he conducted research on Diabetic Kidney Disease.

Dr. Anthony founded Kidney Care Institute, Inc. in 2005 to treat kidney disease and educate the public about the epidemic problem. He created the service model used in Kidney Care Institute's product offerings to focus on driving healthcare quality and international company growth. Kidney Care Institute has a subsidiary company, Kidney Health Mediaworks, which serves to educate the masses about health topics related to kidney disease through television and radio media.

Dr. Anthony and Kidney Care Institute are affiliated with the following professional organizations: National Kidney Foundation, American Society of Hypertension, National Medical Association, American Society of Nephrology, NextGen Network, American College of Physician Executives and Philippine Nurses Association.

Answer Key for CKD

- 1, 9, 20, 13.8%, 26
- Nephron, nephrons
- Water, waste, minerals, blood pressure, acid
- Waste, toxins, filter
- Filter, protector
- Long-term, salt, fluid
- Phosphorous, magnesium, potassium, uric acid
- Strength, flexibility, enzymes
- Acid, kidneys, lungs, acid
- Hormone, red, oxygen
- Symptoms
- Vague, sleepiness, memory
- Swelling, urination, itching, depression
- Acid, carbon dioxide, lungs
- Swelling, increased, decreased
- Minerals, toxins, drying, irritation
- Toxins, diaphragm, contraction
- Brain, depression, minerals, toxins
- Chronic kidney disease, cell
- Common pathway, heart attack, calcium
- Hypertrophy, congestive heart failure
- Immunoglobulins, proteins, immunoglobulins
- Infections, immunoglobulins, toxins, mineral
- Red
- Erythropoietin (or epo), red, red, anemia
- Acids, corrosive

- Insulin, insulin
- Drop, insulin, insulin secretion
- Calcium, magnesium, bone turnover
- Fracture, marrow, red
- Percentage
- Cellular, cellular, 60%
- Salt, fluid, swelling
- Diuretics, ACE inhibitors, AR blockers
- Iron, erythropoietin, EPO
- Calcium, magnesium, phosphorous
- High, low, low, calcium
- Protein, protein, ACE inhibitors, AR blockers
- End-Stage Renal Disease, dialysis, transplant
- Hemodialysis, peritoneal dialysis
- Artificial kidney, three
- Nightly
- Live, deceased, immunosuppressive, rejecting
- Two grams, less
- Potassium, magnesium, heart, nervous system
- Exercise, vegetables, antioxidants
- Stopping, cholesterol, slowing
- Controlled, medicine, diets, progression

Glossary

Notes

Notes

What questions should you ask your doctor about chronic kidney disease?

- What is my percentage of kidney function now?
- At what percentage of kidney function should I see a kidney specialist?
- Are there any medicines in my regimen that may increase my risk of kidney disease? Is the benefit of these medicines greater than the risk?
- How often should the protein in my urine be checked if I have diabetes or pre-diabetes?
- What is my goal blood pressure if I have kidney disease



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