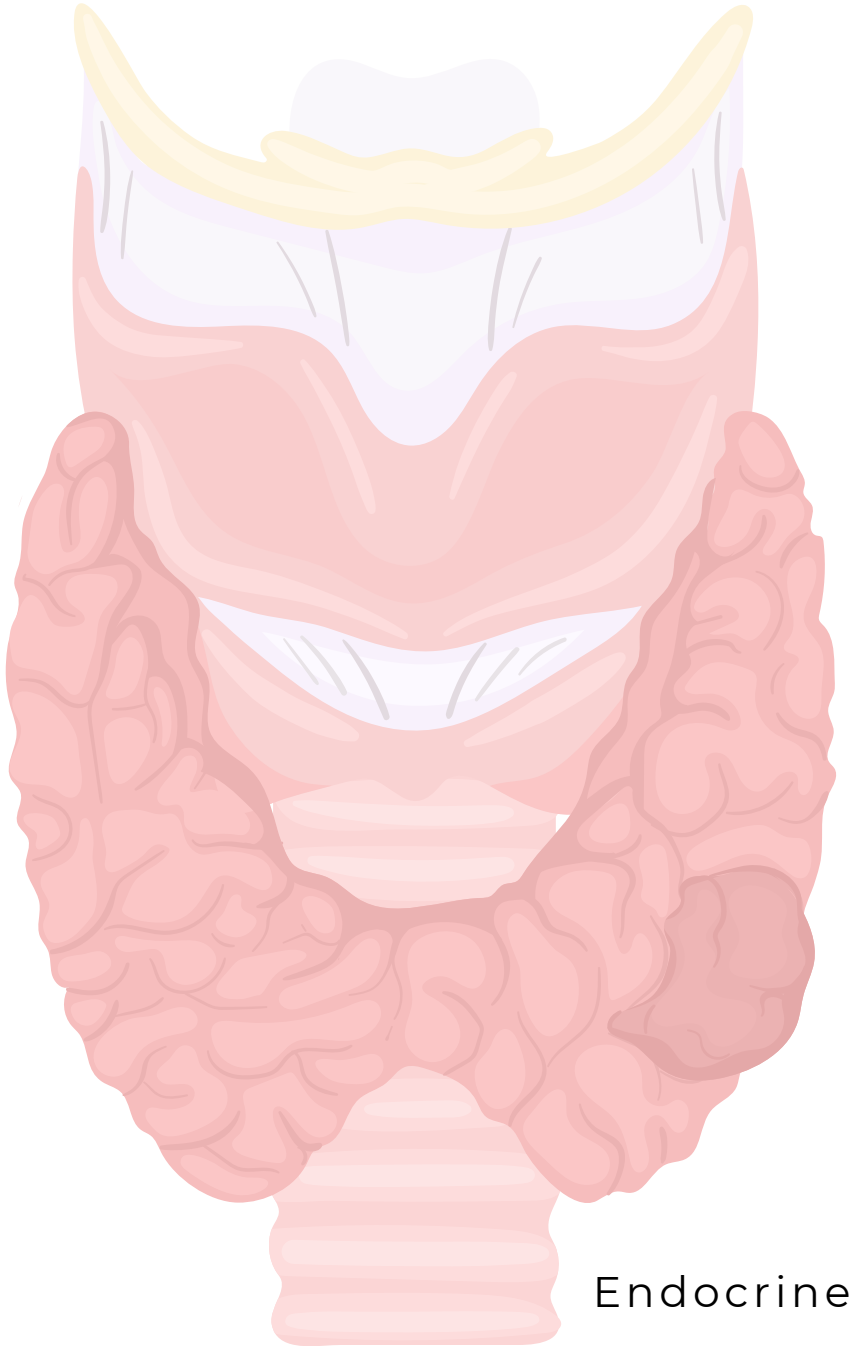
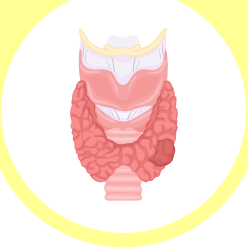
STUDY GUIDE

ADDISON'S DISEASE



Endocrine NursingSOS



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DEFINITION

Addison's Disease is also called adrenal cortex insufficiency. The adrenal glands are insufficient at making aldosterone, cortisol, and androgens.

PATHOPHYSIOLOGY

Normal Physiology

Aldosterone is a mineralocorticoid hormone, and it has 3 main jobs: to tell the kidneys to hold onto water, to tell the kidneys to hold onto sodium, and to tell the kidneys to get rid of potassium.

Cortisol is a glucocorticoid hormone, and it's one of your fight or flight hormones. Cortisol does 4 main things: it reduces inflammation and suppresses the immune system, it causes the body to break down protein and fat, causes blood glucose levels to rise, and helps regulate your mood.

Androgens are sex hormones, and they are responsible for regulating the reproductive system.

Pathophysiology of Addison's:

During Addison's disease, the body isn't making enough aldosterone, cortisol and androgens.

Step 1

There is breakdown of the adrenal cortex tissue, so it can't release aldosterone, cortisol and androgen hormones. This can be caused by autoimmune disorders that attack the adrenal cortex, infections, tumors, or even certain medications.

Step 2

Aldosterone, cortisol and androgens cannot be released.

Step 3

Decreased blood pressure and impaired metabolism. The blood pressure is going to drop because there isn't enough aldosterone. Aldosterone's job is the tell the kidneys to hold onto water and sodium, and get rid of potassium. But without enough aldosterone, the kidneys can't hold onto water, and it just gets urinated out, causing dehydration, low blood volume, and low blood pressure. Because cortisol is required to regulate protein, fat and glucose metabolism, without enough cortisol

those processes are impaired, and the body has a hard time getting the nutrients it needs.

Step 4

Electrolytes and glucose levels are affected. The sodium level may drop and the potassium level may rise because there isn't enough aldosterone to regulate them properly, and there isn't enough glucose in the blood for the cells to use because there isn't enough cortisol to help break down nutrients like protein into glucose.

Step 5

Metabolic acidosis and blood vessel collapse. Because the body can't use glucose for energy and there isn't enough blood and oxygen going to the tissues, anaerobic metabolism begins to try and get energy to the cells to keep them functioning, but anaerobic metabolism causes acids to be produced, and this can lead to metabolic acidosis. Eventually, if the low fluid volume continues, and there isn't enough aldosterone and cortisol to regulate fluid volume, the blood vessels can collapse.

SIGNS AND SYMPTOMS

These are all related to the lack of aldosterone, cortisol, and androgens.

Low Sodium

There isn't enough aldosterone to tell the kidneys to hold onto sodium, so the sodium level will drop.

Low Blood Pressure

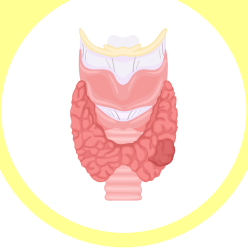
There isn't enough aldosterone to tell the kidneys to hold onto water and keep the fluid volume up. So the blood pressure will drop.

Dehydration

There isn't enough aldosterone to tell the kidneys to hold onto water and keep the fluid volume up, causing dehydration.

Increased Potassium Level

There isn't enough aldosterone to tell the kidneys to get rid of potassium, so the potassium level will rise.



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Low Blood Glucose Level

Without enough cortisol to help raise the blood glucose level, the blood glucose level will fall.

Low Calcium Level

Without cortisol, the intestines will take up more calcium, leading to lower calcium levels.

Weight Loss

Without enough cortisol, there isn't as much fat and protein in the body because the body can't break it down and store it. Weight loss also occurs because of the lack of water in the body, as the body is losing water.

Weakness and Fatigue

Water is necessary to help keep the blood flowing and the muscles and organs perfused, so without enough fluid volume, the organs and muscles can't do their job as effectively, which can lead to weakness and fatigue. A low sodium level can also lead to weakness and fatigue, because sodium is vital to neurological function.

GI Symptoms

There just isn't enough water to keep the GI tract happy and functioning. That decreased sodium level can also be an issue here, because sodium is vital to muscle function, including the muscles in the GI system. Without enough sodium to keep the muscles contracting well, those GI symptoms can occur.

Changes in Menstruation or Erectile Dysfunction

With a decrease in androgen hormones, such as testosterone, it can cause changes in menstruation for women, and erectile dysfunction for men. So that's why those happen.

Hyperpigmentation of the Skin

This has to do with the hormone ACTH, or adrenocorticotropic hormone (ACTH). ACTH stimulates the adrenal cortex to release aldosterone, cortisol and androgen hormones. But because the adrenal cortex isn't releasing those hormones, there is a build up of ACTH in the body because the adrenal glands aren't responding to it. ACTH also binds to melanocytes on the skin, which produces a darker skin color. So with all of that ACTH build up in the body, they bind to those melanocytes on the skin, and the skin pigment becomes darker.

NURSING ASSESSMENT

Blood Pressure

With the lowered fluid volume because of the decrease in aldosterone, the blood pressure may decrease simply because there isn't enough water in the blood to keep that pressure up.

Heart Rate

The heart rate may increase to try and compensate for the low blood pressure, because the heart tries to keep the blood circulating.

Daily Weight Checks

Weight is the most sensitive indicator for fluid status. Check their weight at the same time of day, with the same scale, and with them wearing the same clothes.

Track Intake and Output

Document all of the fluids they are getting (including IV fluids), and track the amount of urine they produce. They should have a hat in the toilet, or use a bedside urinal, or have a catheter in place so that you can accurately record their urine output.

ECG

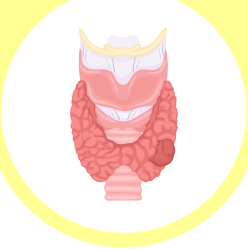
Make sure your patient is on an ECG monitor, and that you're tracking their heart rhythm. Aldosterone helps the kidneys get rid of potassium, so if there's not enough aldosterone, the kidneys will hold onto potassium. High potassium levels can cause many problems with the heart and disrupt the cardiac rhythm.

Monitor for GI symptoms (such as nausea, vomiting and diarrhea):

Because the fluid volume and sodium level may be lowered in the body, the GI tract and muscles may not be getting the hydration and sodium that they need to function.

Energy Level, Fatigue, and Weakness

Because the fluid volume and sodium level may be lowered in the body, the brain and other organs won't be getting the hydration and sodium that they need to function.



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Electrolyte Levels (especially sodium and potassium)

The sodium level may be low, and the potassium level may be high with that decrease in aldosterone hormone.

Lab Values (especially glucose, white blood cell count, sodium, potassium and calcium)

Cortisol helps to reduce inflammation and suppress the immune system, break down protein and fat, raise blood glucose levels, and regulate your mood. So you'll definitely need to be monitoring their white blood cell count and glucose levels to make sure they aren't getting too low. Cortisol can also mess with calcium balance in the body, so you'll need to check their calcium level to make sure it's not getting too high.

Ask About Reproductive Changes (such as erectile dysfunction in men and menstrual cycle changes in women)

The androgen hormones are low, which can cause changes in menstruation or erectile dysfunction in men.

Hyperpigmentation

ACTH stimulates the adrenal cortex to release aldosterone, cortisol and those androgen hormones. But because the adrenal cortex isn't releasing those hormones, there is a build up of ACTH in the body because the adrenal glands aren't responding to it. ACTH also binds to melanocytes on the skin, which produces a darker skin color. So with all of that ACTH build up in the body, the skin pigment can become darker.

Addisonian Crisis

This occurs when the cortisol levels in the body are dangerously low. If This can cause things like very low blood pressure, shock, headache, weakness, and stomach, leg and back pain.

An Addisonian crisis is life threatening, so it's really important to recognize it early if it does occur, and to treat it right away.

NURSING INTERVENTIONS

Assess

- Assess their vital signs, especially blood pressure and heart rate. With the lowered fluid volume because of the decrease in aldosterone, the blood pressure may decrease simply because there isn't enough water in the blood to keep that pressure up. The heart rate may increase to try and compensate for the low blood pressure, because the heart tries to keep the blood circulating.
- Monitor their cardiac rhythm through an ECG. Because aldosterone helps the kidneys get rid of potassium, if there's not enough aldosterone, the kidneys will hold onto potassium. And high potassium levels can cause many problems with the heart and disrupt the cardiac rhythm.

Daily Weight Checks

Check their weight at the same time of day, with the same scale, and with them wearing the same clothes.

Track Intake and Output

Document all of the fluids they are getting (including IV fluids), and track the amount of urine they produce. They should have a hat in the toilet, or use a bedside urinal, or have a catheter in place so that you can accurately record their urine output.

Assess Electrolyte Status

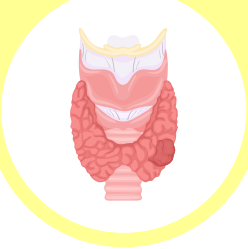
Especially sodium, potassium, and calcium. Their sodium level may be low, and the potassium level may be high with that decrease in aldosterone hormone. Cortisol can also mess with calcium balance in the body, so you'll need to check their calcium level to make sure it's not getting too high.

Assess Electrolyte Status

Especially sodium, potassium, and calcium. Their sodium level may be low, and the potassium level may be high with that decrease in aldosterone hormone. Cortisol can also mess with calcium balance in the body, so you'll need to check their calcium level to make sure it's not getting too high.

Monitor White Blood Cell Count (WBC) and Glucose Levels

Cortisol suppresses the immune system, so monitor their WBC values to make sure they aren't getting too low.



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Monitor Glucose Level

Cortisol raises blood glucose levels. Monitor their glucose levels to make sure they aren't getting too high.

Give Medications as Prescribed

Possible medications include Kayexalate, which will help get rid of excess potassium, Prednisone or Hydrocortisone to increase cortisol levels, and Fludrocortisone to replace aldosterone. Make sure you keep assessing your patient before, during and after giving medications to make sure it's working and there are no complications.

IV Care

You might be giving medications and fluids through an IV, so make sure to assess and flush their IV per facility policy to make sure it's working and ready to go anytime, especially in case of an emergency.

Patient education

Addison's disease is a life long condition, so you will need to do a lot of patient education to make sure they know how to manage it at home, and take all of their medications properly.

- Educate them on the medications they are receiving (what it is, what it's for, and how to take it).

> *Instruct the patient that they MUST take their medications as prescribed. It's really important that they know that if they suddenly stop taking their steroid medications, they could have an Addisonian crisis, which is life-threatening.*

- Lifestyle and diet changes: Encourage them to reduce stress as much as possible, and eat a high-protein and high-carb diet.
- When to call the doctor: They should contact the doctor if they feel weak, fatigued, have a severe headache, are passing out or feeling faint, experience vomiting, diarrhea, or are having stomach, leg or back pain. These are all possible symptoms of an Addisonian crisis, so they should be seen right away.

> *You must educate your patient on the sings and symptoms of an Addisonian crisis. And they should seek medical care right away if they experience those signs or symptoms.*