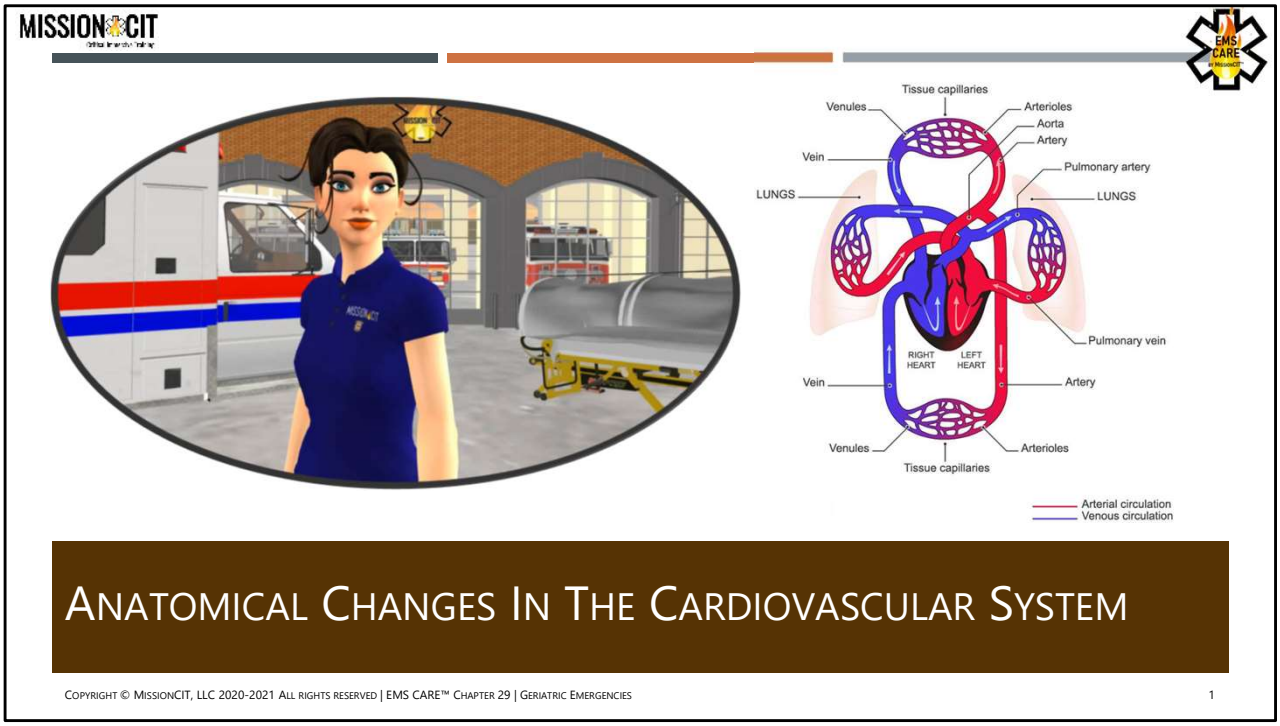
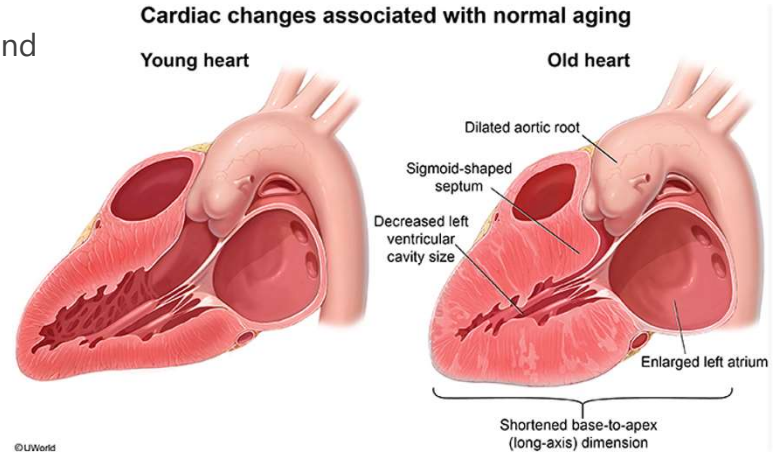


Many anatomical changes happen with age. In this lesson, we will be exploring cardiovascular changes. Along with these differences, we review myocardial infarction and heart failure.

So, good studying!

Cardiovascular Changes - I

- Consists of heart, blood, and blood vessels
- Fibrous muscles and fat deposits in the heart
- Cells are lost and not regenerated
- Heart walls thicken
- Lipofuscin gets deposited
- Muscles degenerate
- Rhythms vary



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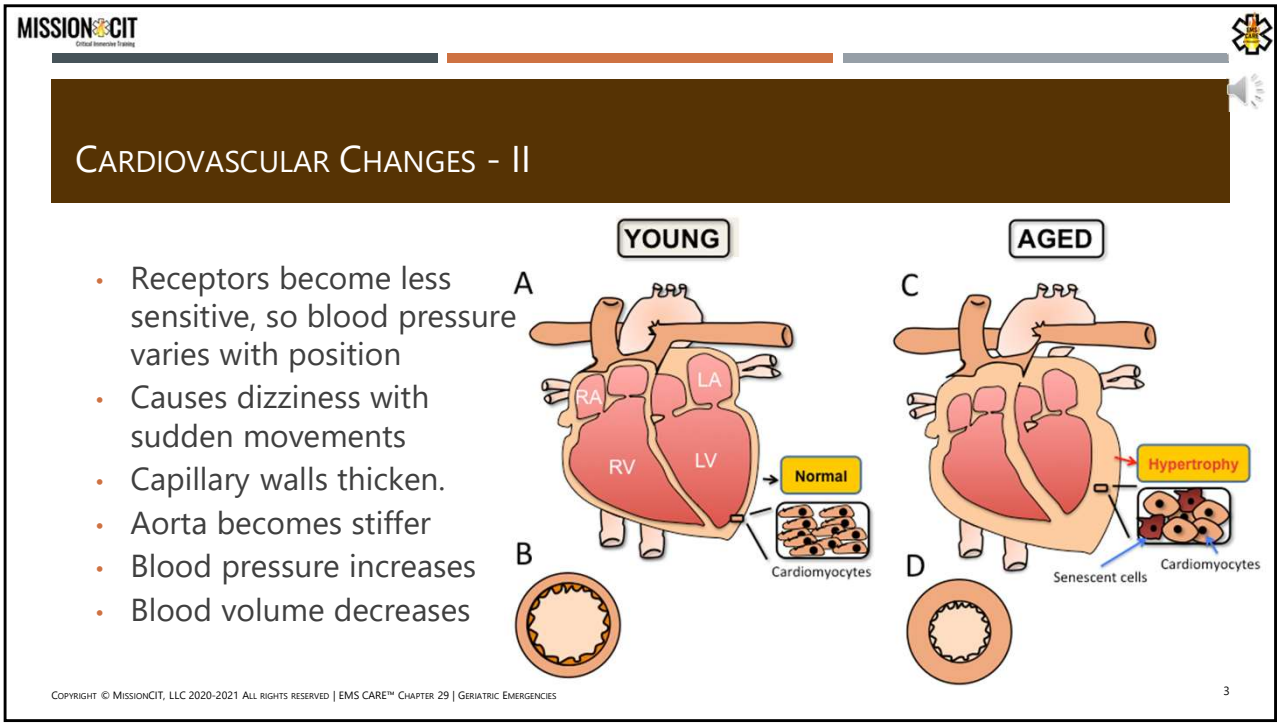
The cardiovascular system consists of the heart, blood, and blood vessels. Let's see how age affects each of these.

The first is the heart, where a natural pacemaker mechanism monitors the heartbeat and keeps it at the required levels. Over the years, some pathways of this pacemaker tend to develop fibrous muscles and fat deposits, and some cells are lost and not regenerated. All these causes a degeneration of the system and leads to a slower heart rate.

Another possible change is that the heart walls thicken,

so the amount of blood that the heart can hold reduces.

Further, an aging pigment called lipofuscin gets deposited in the heart, the muscle cells tend to degenerate quickly, the valves become thicker and stiffer, so less blood flows through it, and the rhythms tend to vary due to the presence of heart diseases. Such changes can lead to conditions like atrial fibrillation and a heart murmur.



Besides the heart, there are many changes to the blood vessels and the overall conduction system as well.

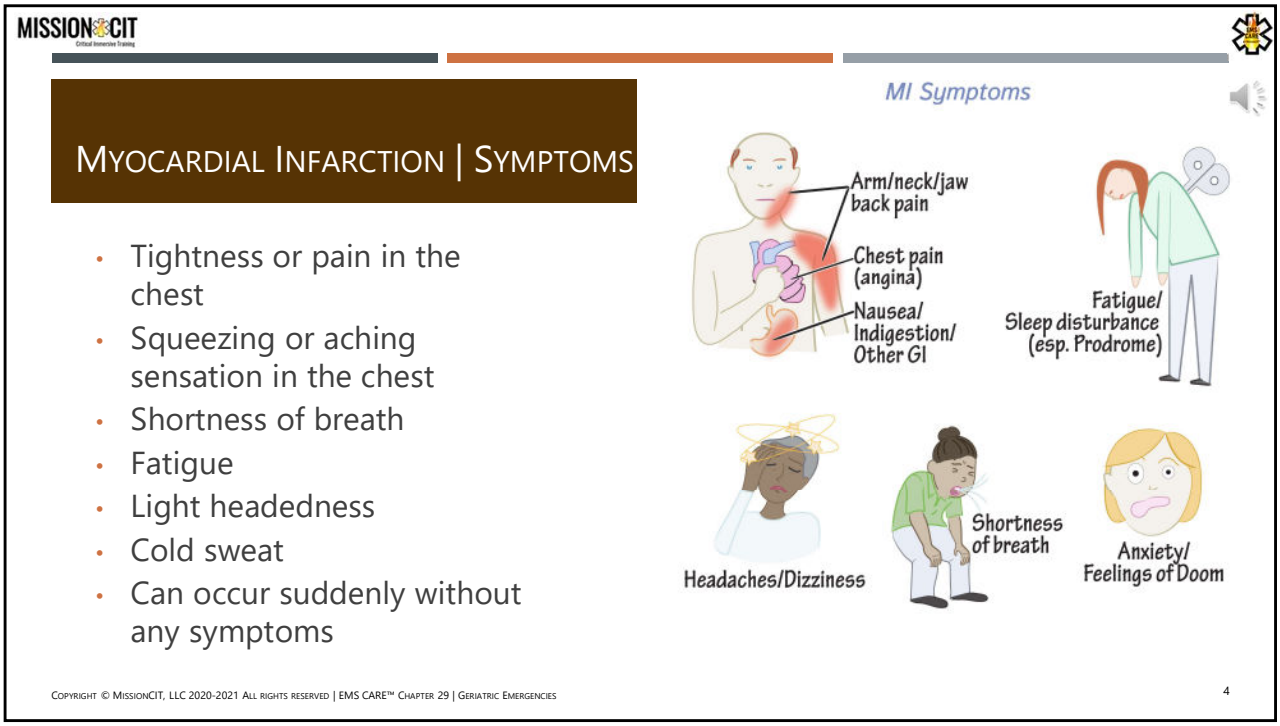
The cardiovascular system contains receptors called baroreceptors that monitor the blood pressure of an individual and ensures that the same is maintained when a person changes position, from sitting to standing. With aging, these receptors become less sensitive, so the blood pressure varies when the position of a senior change. This can lead to dizziness with sudden movement changes.

Other than this, the capillary walls thicken and the main

artery from the heart called the aorta becomes stiffer. Both these increase blood pressure, so the heart must work harder to pump the same amount of blood. Therefore, blood pressure tends to be higher among seniors.

Lastly, there are changes in the blood itself. The overall blood volume decreases because age causes fluids in the body to dry up. Also, the speed of red blood cell production goes down. Hence, serious injuries and loss of blood take a long time to recover.

Thus, these are some of the cardiovascular changes that occur in seniors because of age.



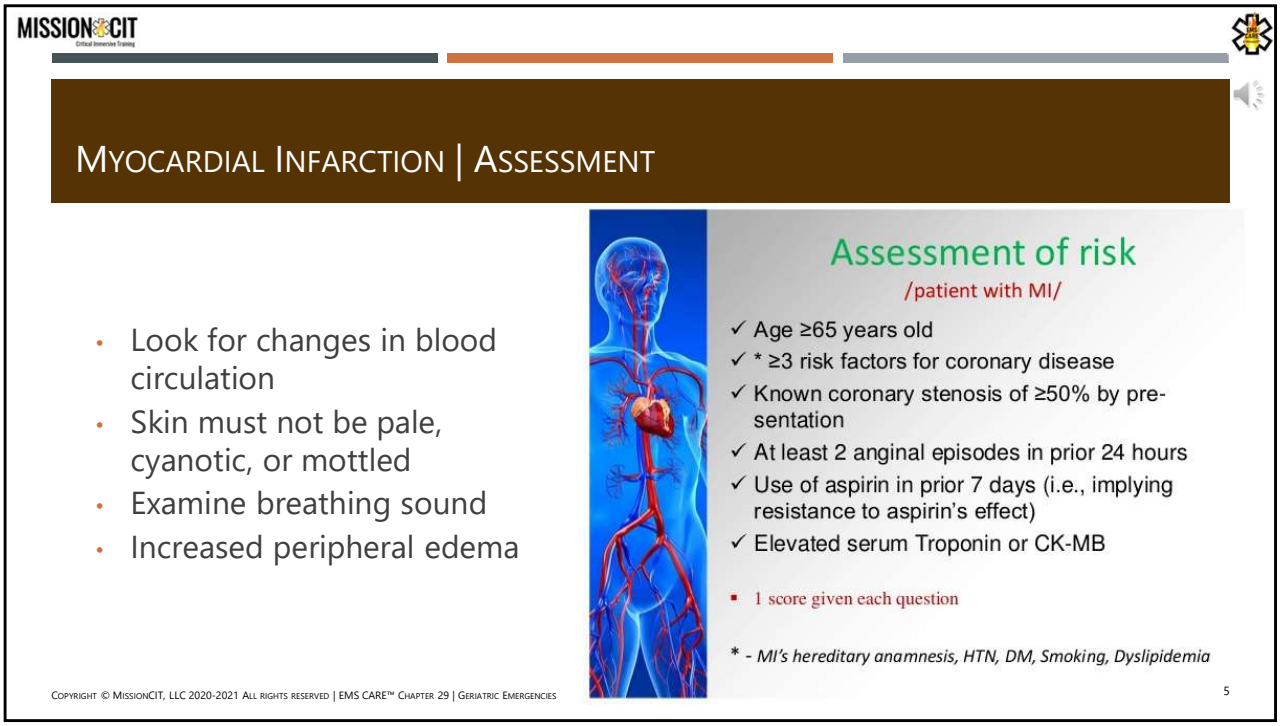
Myocardial infarction or a heart attack occurs when there is some impediment to the blood flowing to the heart. This blockage can be a buildup of fat, cholesterol, or any other substance that can form plaque in the arteries.

Some of the common signs and symptoms associated with this condition are:

- Tightness or pain in the chest
- Squeezing or aching sensation that starts at the chest and can spread to the neck, jaw, and back.
- Shortness of breath

- Fatigue
- Lightheadedness
- Cold sweat

Many times, heart attacks occur suddenly without any symptoms. Or it can be extremely severe that there may not be enough time to revive the patient.



If you notice any of these signs and symptoms, it could indicate that a patient is suffering from myocardial infarction or heart failure.

While assessing these patients, check if there are any changes to the blood circulation. This can be best identified by looking at the skin. It should be pale, cyanotic, and mottled. Next, examine the breathing sound and rate, and you must notice a marked decrease when compared to an individual of the same age.

Another clue is the increased peripheral edema.

Myocardial Infarction | Treatment

- Start CPR
- Arrange emergency transport
- Continue to do CPR until the patient reaches the hospital
- Provide oxygen if local protocols allow
- Reassess and evaluate the patient

	ANGINA PECTORIS	MYOCARDIAL INFARCTION
Location of pain	Substantial or across chest	Same
Radiation of pain	Neck, jaw or arms	Same
Nature of pain	Dull or heavy discomfort with a pressure or squeezing sensation	Same but maybe more intense
Duration	Usually lasts 3 to 8 minutes rarely longer	Usually lasts longer then 30 minutes
Other symptoms	Usually none	Persperation, weakness, nausea, pale gray colour
Precipitating factors	Extremes in weather, exertion, stress, meals	Often none
Factors giving relief	Stopping physical activity, reducing stress, nitroglycerin	Nitroglycerin may give incomplete, or no relief



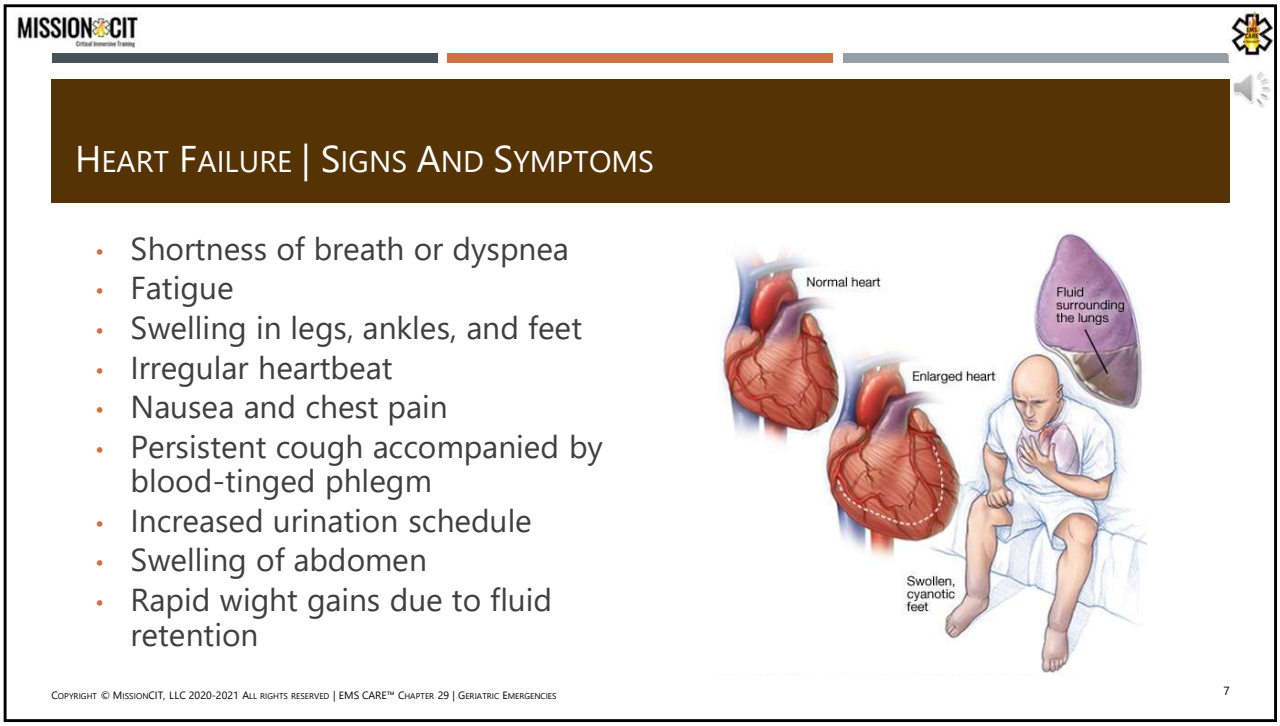
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If you think the patient is likely to die soon, start C P R, arrange emergency transport, and continue to do CPR until the patient reaches the hospital.

On the other hand, if the patient is not extremely critical, assess the circulation, breathing, and airways. If the local protocols allow, provide oxygen with adjuncts that are appropriate to the patient's age and condition.

In the meantime, arrange for emergency transport. Constantly evaluate and reassess the patient until another healthcare provider takes over.



Heart failure is a condition when the heart doesn't pump as much blood as it should. It is a condition caused by a failure of the left and right ventricles, and it is always accompanied by pulmonary edema.

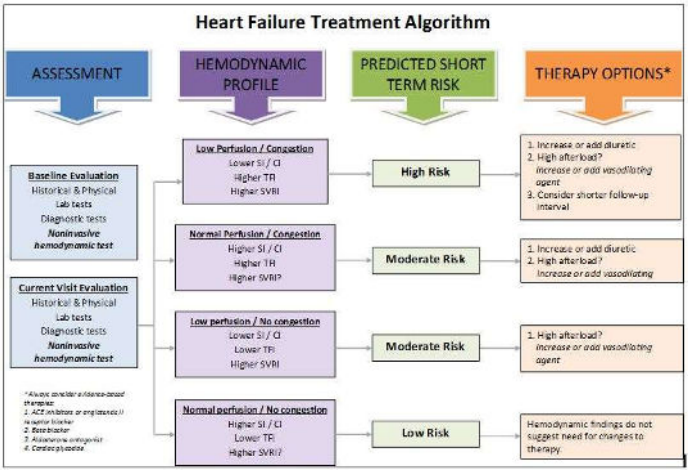
Some of the signs and symptoms of heart failure are:

- Shortness of breath or dyspnea
- Fatigue
- Swelling in legs, ankles, and feet
- Irregular heartbeat
- Persistent cough or wheezing accompanied by blood-tinged phlegm

- Substantially increased urination schedule
- Swelling of abdomen
- Rapid weight gains due to high fluid retention
- Lack of appetite
- Nausea
- Chest pain

Heart Failure | Assessment

- Check for visible changes in blood circulation
- Pale, bluish or mottle skin
- Sounds such as crackles, wheezing, or rales
- Tachycardia - > 100 beats per minute
- Diaphoresis – excessive sweating



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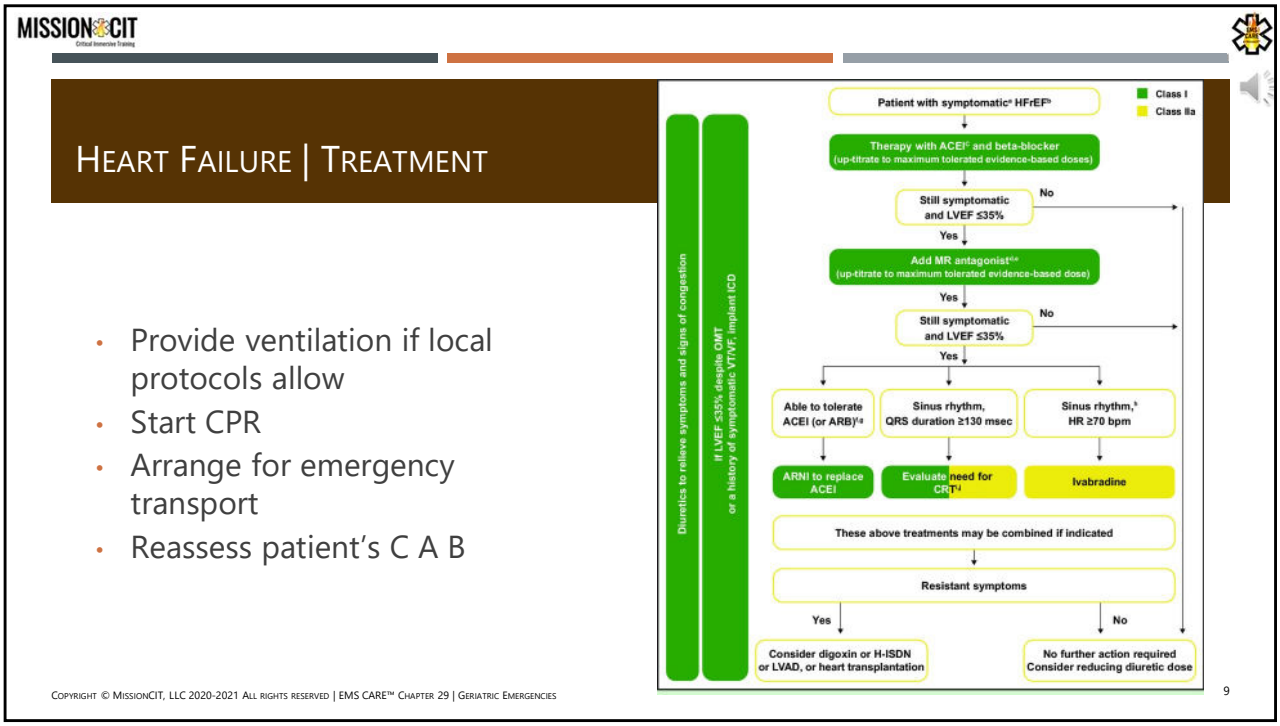
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As a first thing, check for visible changes in blood circulation. You can get clues by observing the skin. If it is bluish, pale, or mottle, it could indicate that there are problems in blood circulation.

Next, look for sounds such as crackles, wheezing, or rales to get an idea of the breathing rates.

Other signs to watch out for are tachycardia, where the heart rate is more than 100 beats per minute, and Diaphoresis, which is excessive sweating.

All these can help you identify heart failure.



Provide ventilation if your local protocols allow, and start CPR if you think the patient is extremely critical. Arrange for emergency transportation, and continue to reassess the patient's circulation, breathing, and airways until your hand over care to another healthcare professional.

With this, we come to the end of this lesson. In the next one, Justin will talk about changes in the respiratory system and the possible conditions that come with it.