جامعة المستقبل
كلية التقنيات الصحية والطبية
قسم تقنيات الاشعة

الفحوصات الشعاعية الخاصة
المرحلة الثالثة

Lecture 9

Cardiac CT Scan and Coronary arteries CT
CCTA

اعداد

م.م. مرتضى عبد الامير محمد

د. مهند احمد صاحب

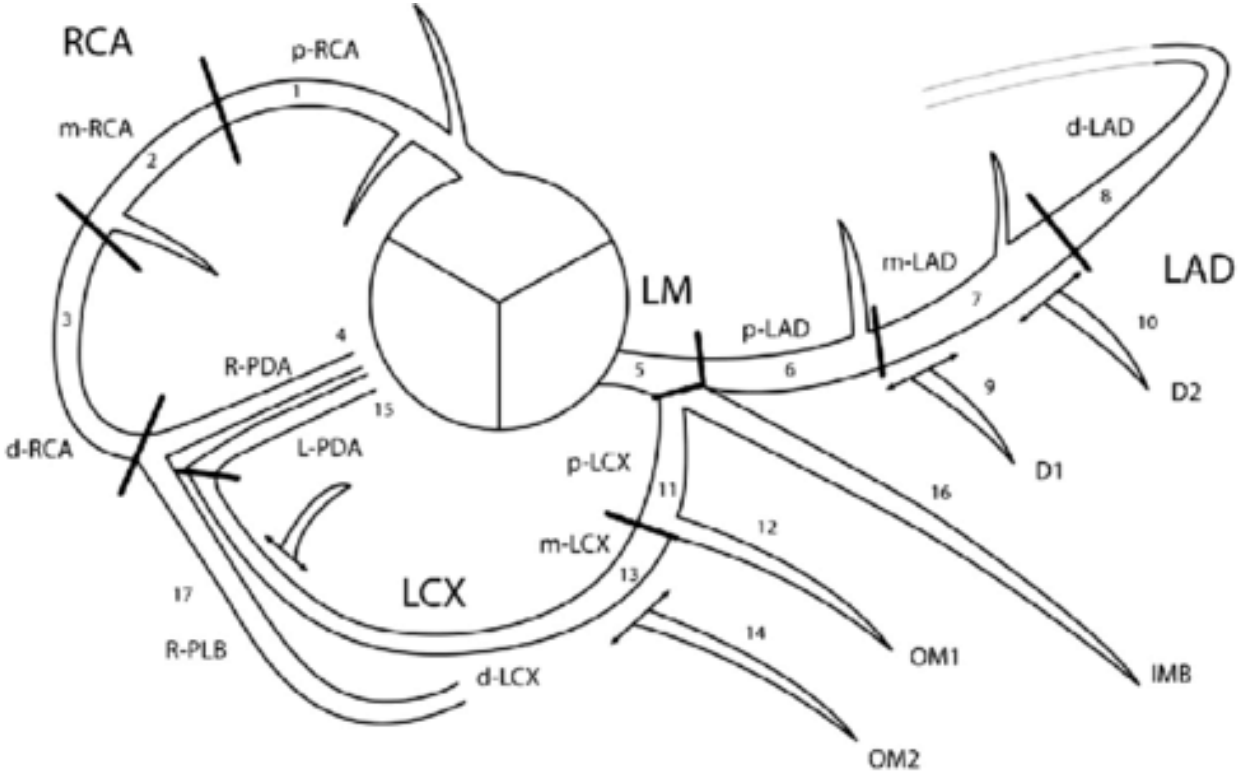
Cardiac CT angiography (CCTA) :

Coronary computed tomography angiography (CCTA) is a heart imaging test that helps determine if plaque buildup has narrowed the coronary arteries, the blood vessels that supply the heart.

Plaque is made of various substances such as fat, cholesterol and calcium that deposit along the inner lining of the arteries. Plaque, which builds up over time, can reduce or in some cases completely block blood flow. Patients undergoing a CCTA scan receive an iodine-containing contrast material as an intravenous (IV) injection to ensure the best possible images of the heart blood vessels.

Coronary arteries circulation

For your Information's :



Why Cardiac CT ?

- To evaluate the cause of chest pain and shortness of breath.
- To check your heart arteries for calcium, narrowing or blockages.
- To assess your heart valves.
- To see if there's a problem with your aorta, including aneurysms and dissection.
- To plan for open or minimally invasive/robotic heart surgery.
- To plan for transcatheter/percutaneous valve procedures.
- To plan for arrhythmia ablation procedures.
- To assess for complications associated with the above procedures.
- To see if you have a congenital (since birth) heart problem.
- To see and characterize any tumor or mass in or around your heart.
- To look at the sac around your heart, if there's fluid or calcification there.

Cardiac CT angiography (CCTA)

Patient preparations :

1- Ask the patient to Visiting the cardiologist one week prior to the exam to reduce the heart rate lower than 60 bpm /min .(by consuming specific drugs).

Heart rate control by pre CT medication(beta-blocker) in patient with **HR(70-60) bpm**

2-Check Blood urea and serum creatinine before the test.

* Please note the hair of the chest should be removed before performing the scan

3-Ask the patent to Fast a day before the exam & avoid caffeinated products.

4-Diabetic patient should stop the metformin/insulin in the day of your test

5-Let the patient rest min 15 min before measuring the heart rate in the time of the exam day.

Cardiac CT angiography (CCTA)

Patient preparations :

6- Inset a Cannula and check it by NS and few C.M (4 cc) to have An allergic test

7- Asking about the history of allergy .

8- Patients with Heart rate is about 60-68: IV drugs may be injected to lower the rate

And be careful the blood pressure of the patient should be normal (14/7)

9-Teaching the Breath holding instructions to the patients .

10-Inform the patient to predict a warmth feeling of the C.M during injection.

11- Sitting about 50-90cc C.M & 30-50 normal saline for adults in the injector.

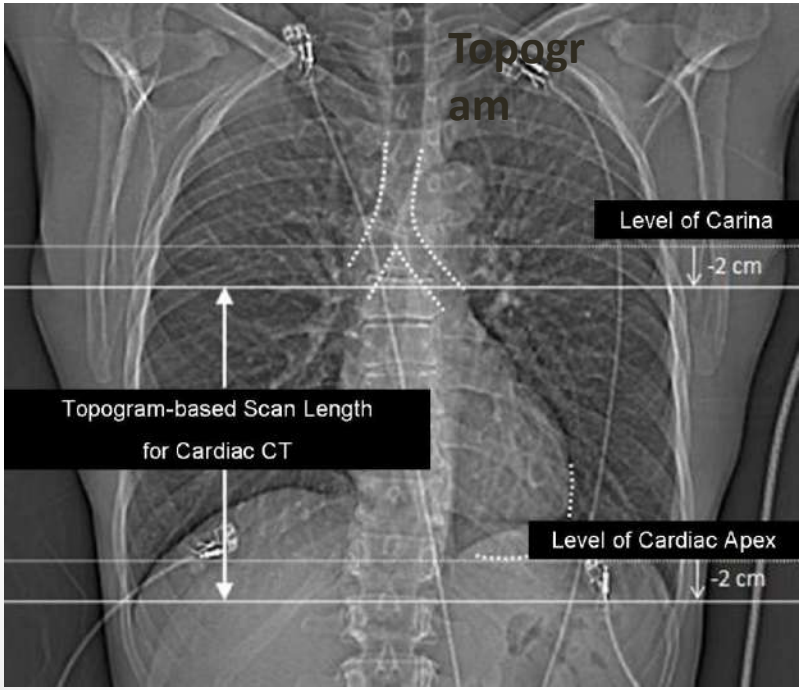
And the injector Flow rate should be within 5-6.5 cc/s for both NS and C.M.

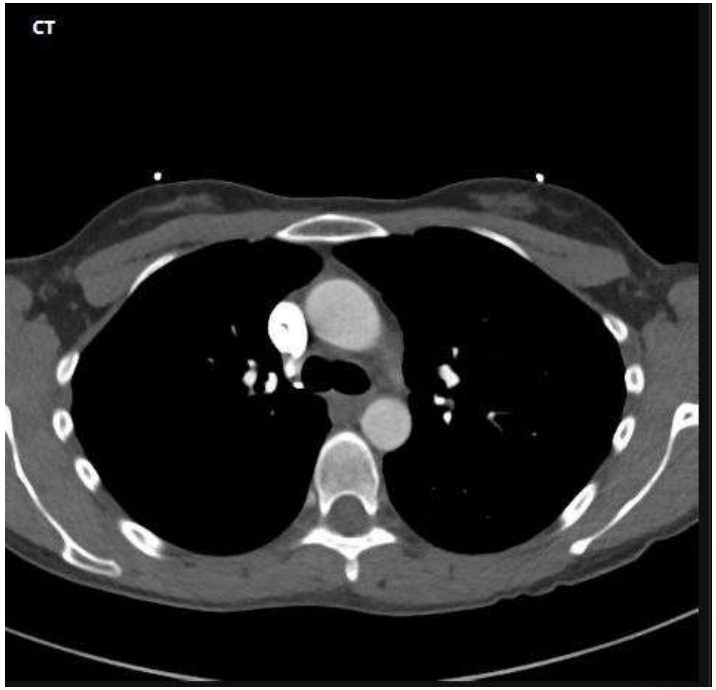
12- Apply the ECG leads to eliminate the Cardiac motion artifact to avoid the irregular continuity in the coronary arteries after the reconstruction.

Cardiac CT angiography (CCTA)

1-Please consider the Breath holding time (unnecessary long FOV = longer breath holding)

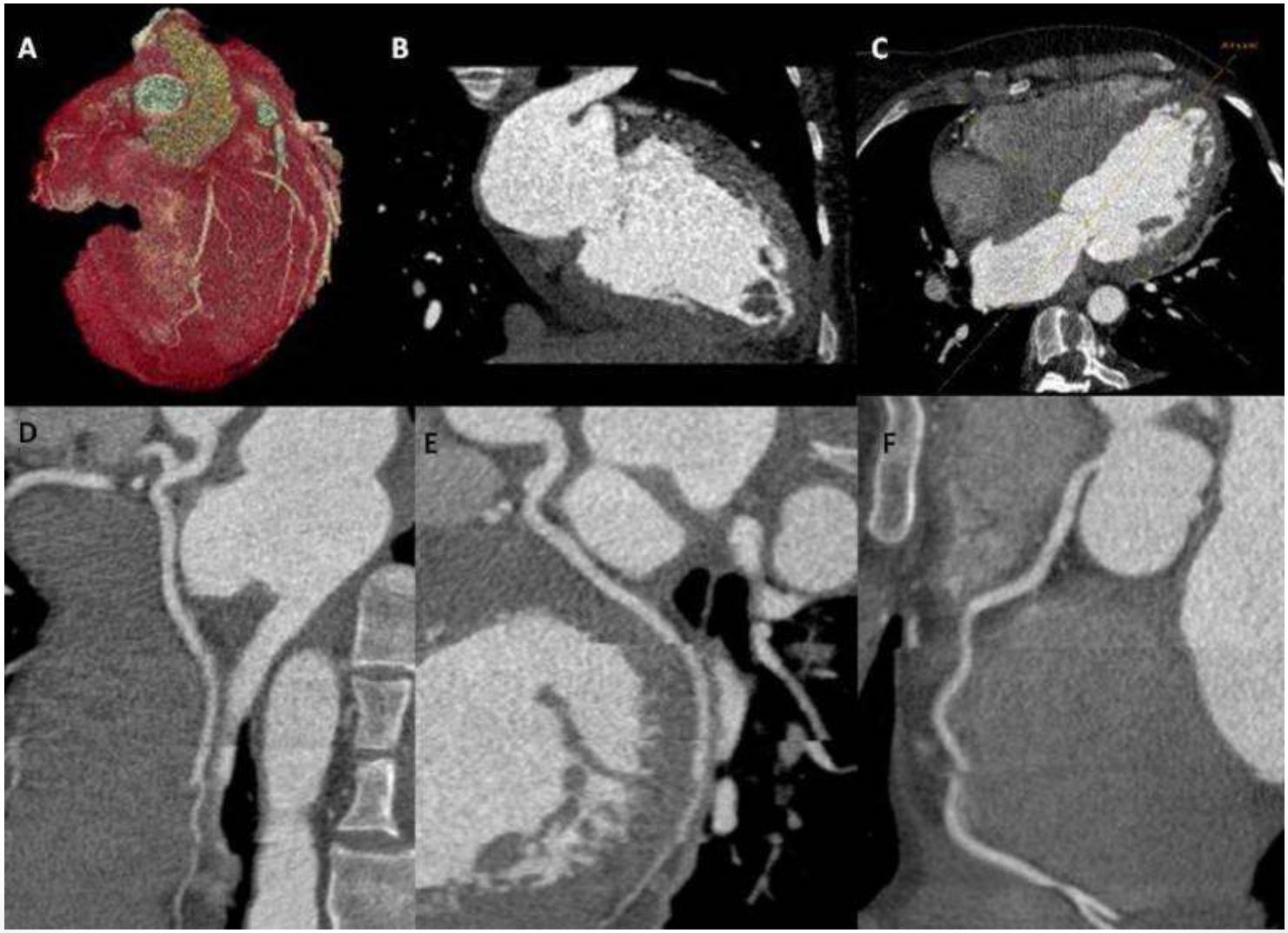
2-Sacn and View (S&V) scout should be below the bifurcation of the trachea (Carina)





Cardiac CT angiography (CCTA)

High resolution images of the coronary arteries and the heart using CT scan



Cardiac CT angiography (CCTA)

1- Calcium score :

A heart scan, also known as a coronary calcium scan, is a specialized X-ray test that provides pictures of your heart that can help your doctor detect and measure calcium-containing plaque in your arteries.

Plaque inside the arteries of your heart can grow and restrict blood flow to the muscles of your heart. Measuring calcified plaque with a heart scan may allow your doctor to identify possible coronary artery disease before you have signs and symptoms. (If > 400 the exam will not be applicable)

2-Breath exercise :

It will prepare the patient for the scan (heart rate should remain > 60)

3- Site the Bolus:

Usually on the descending (thoracic) aorta and sit a 180 HU for auto starting mode.

Cardiac CT angiography (CCTA)

1- Calcium score :

Cardiac CT angiography (CCTA)

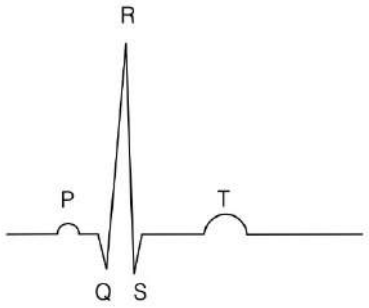
4- The CCTA:

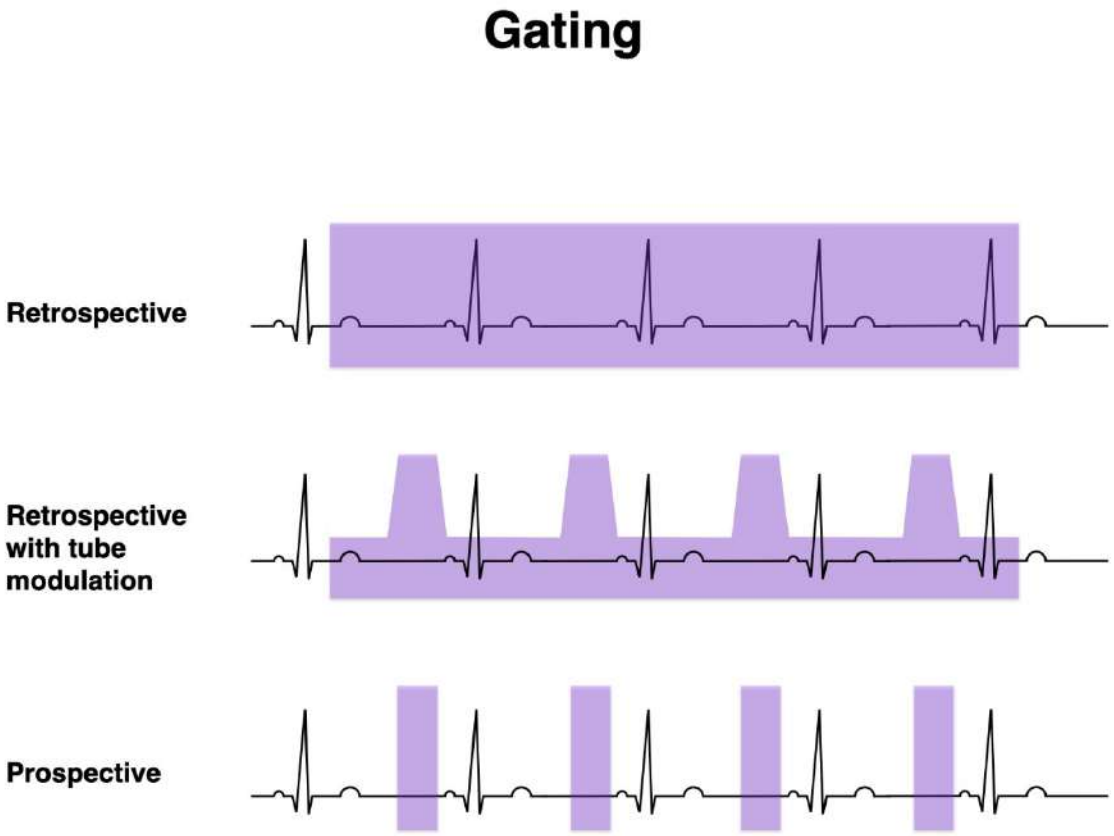
The right Ventricle and the right Atrium should have no C.M in order to visualize the Coronary arteries .

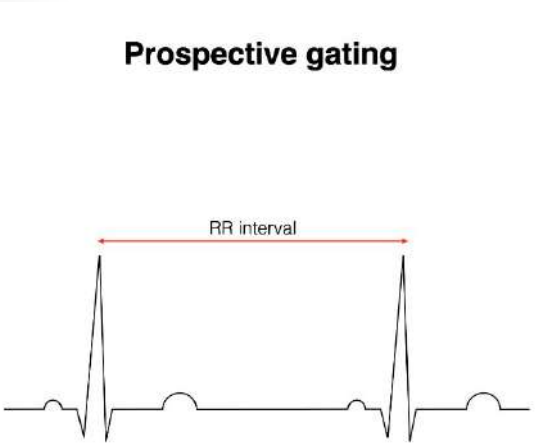
Reconstruction

CT and MRI cardiac studies employ a variety of different ECG-gating to allow assessment of the moving cardiac structures, particularly the coronary arteries.
Some times that the ECG acquisition get a problem so you have to choose your imaging phase manually .

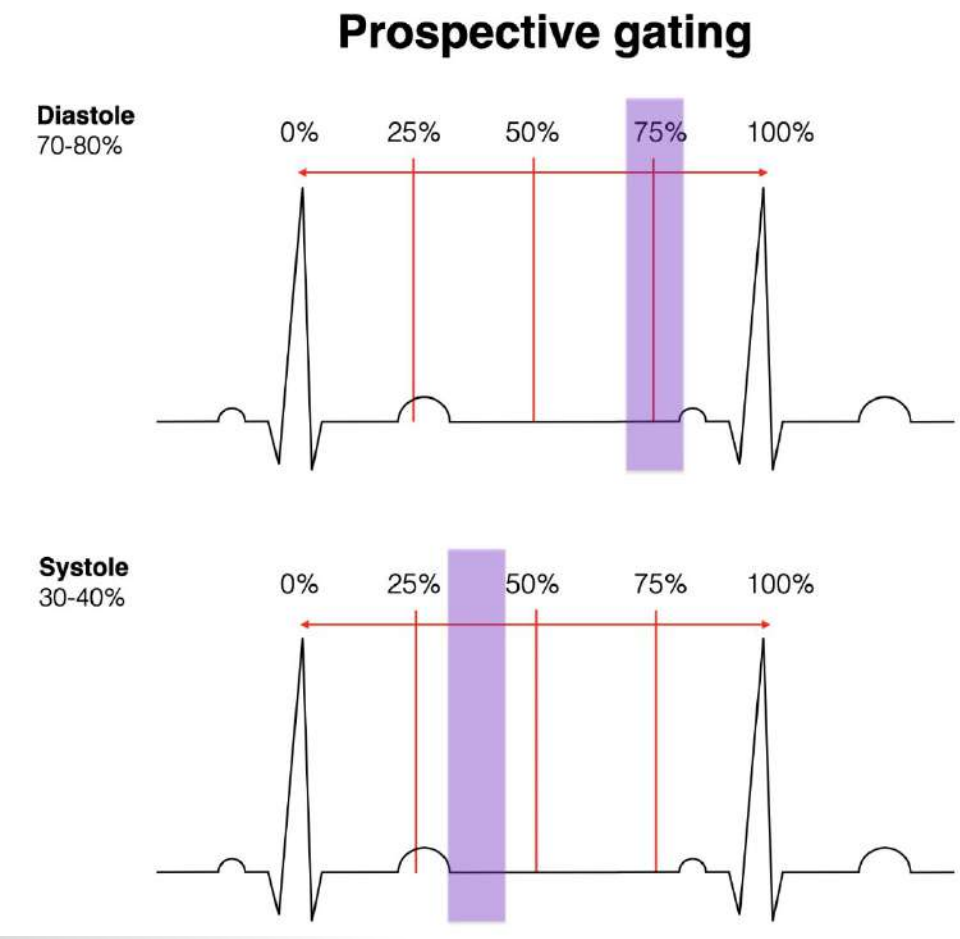
how is the ECG work with getting images ?

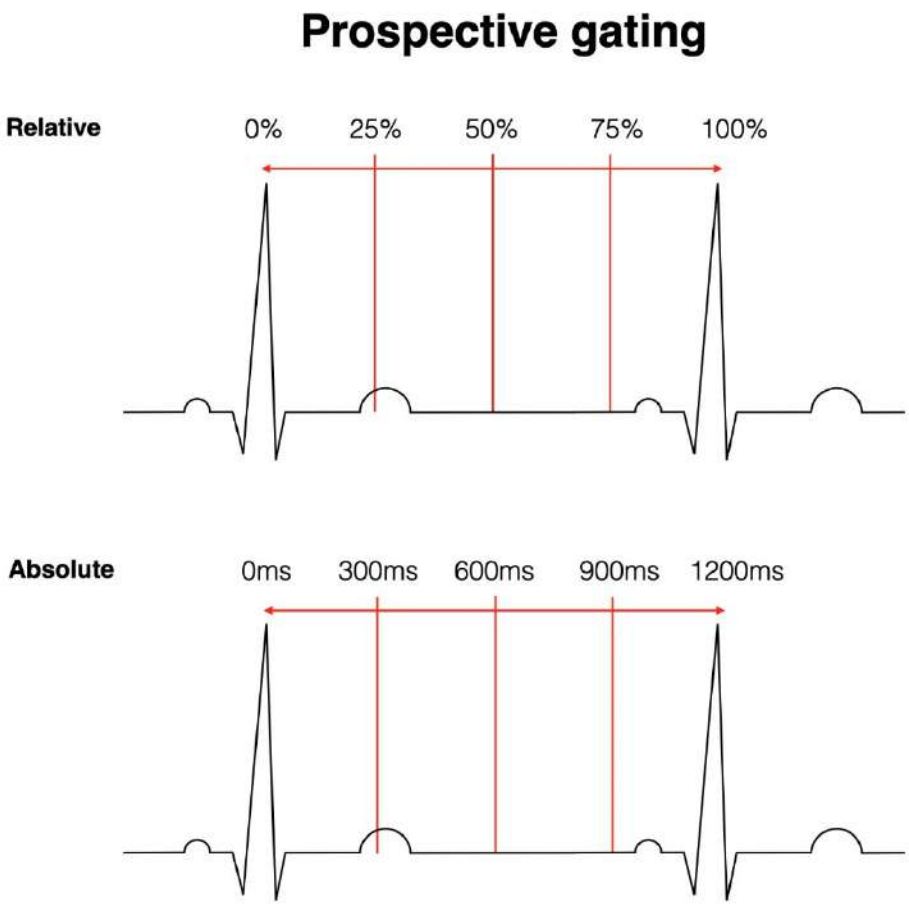






Reconstruction





Contraindication:

- **It is not indicated in some situations:**
- **if the patient is having an acute myocardial infarction (heart attack)**
- **screening of asymptomatic patients with low CAD (coronary artery disease)**
- **evaluation of coronary artery stents <3 mm**
- **evaluation of asymptomatic patients post CABG (<5 years old) and post stent (<2 years old)**
- **Allergic patients to C.M**

Patient may rescheduled :

* if his heart rate above 70
* Or if he experienced a low blood pressure


The
End