

## Biopsies, lab work and testing

Performing a heart biopsy is the best way of monitoring rejection and planning anti-rejection therapy in patients with heart transplants. It also provides early detection of rejection before the clinical symptoms occur.

***Heart biopsies are performed post transplant typically on the following schedule:***

- *Weekly for the first three to four weeks*
- *Every two weeks during the second month*
- *At 12 weeks*
- *Whenever Allomap testing indicates a higher probability of rejection or antibody mediated rejection is suspected by the physician*

This schedule will change based on each patient's rejection history.

Repeat biopsies following episodes of rejection are to be performed within one week and depend on the severity of rejection and clinical condition. Heart biopsies are performed on an inpatient and outpatient basis in the Cardiac Catheterization Lab on the fourth floor Clarkson Tower.

Your first biopsy will be done while you are recovering from your surgery and still in the hospital.

After you have been discharged from the hospital you will come in as an outpatient. You will be admitted through ACCESS Services each time to confirm insurance information.

Your physician does not want you to eat or drink after midnight the day prior to the procedure. If your blood sugar is low we would expect you to treat this by drinking some juice, just as you normally would.

The staff will assist you into a hospital gown and onto a cart. After review of your patient admission information you will be taken to the procedure room in the Cardiac Cath Lab.

Usually the biopsy will be performed using a vein called the right internal jugular vein which is located on the right side of your neck just above the clavicle bone (collar bone, see diagram).



## Testing, continued

Lidocaine, which is a local anesthetic, will be used to numb this area – providing minimal discomfort while your biopsy is being done.

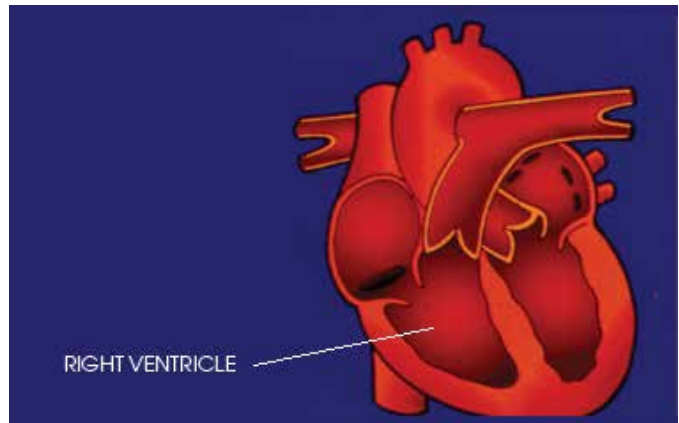


Your physician will then place a tube called a sheath (refer to picture) into the vein that leads back to your heart.



Above: Biotome guided by echo

The chamber of the heart that we obtain biopsies from is the right ventricle.



We will be using a device called a biotome (see diagram below) which has cutting pincers allowing us to obtain small portions of heart tissue from the right ventricle.



## Testing, continued

Since your blood vessels have no ability to sense pain or discomfort, you will not feel the device as it is used for the biopsy. Some movement of the device as it enters the heart can cause palpitations, which you might feel and describe as “a couple of fast heart beats”.

We will retrieve three to five samples during this procedure. Generally this can be completed within 15 minutes. After that, the sheath will be removed and mild pressure will be applied to the area for two to three minutes to allow bleeding to stop. A clear dressing will be applied and may be removed the following day. After your heart biopsy is completed you will be able to join your family and return home if no other tests have been scheduled for you.



Heart biopsies are evaluated by a pathologist. The pathologist will classify (grade) results according to a scale that has been developed by The International Society of Heart and Lung Transplantation.

Class	Interpretation	Treatment
0	No Rejection	No Treatment
1R	Mild Rejection	Usually No Treatment
2R	Moderate Rejection	Treatment Given
3R	Severe Rejection	Usually in Hospital

Your transplant coordinator will notify you with the results of your blood work and biopsy within one to two days. Treatment may or may not be needed, depending upon the results.

## Testing, continued

### Allomap Testing

Allomap testing measures the expression levels of specific genes found in your blood **related to rejection**. Used together with clinical assessment, AlloMap can help inform your doctor whether you are at low probability of rejecting your heart. It is a simple, non-invasive method of blood sample collection. It does require you to have your blood drawn at the hospital or a special laboratory designated by your caregivers. **Allomap is reported as a score. If the score is outside the range or your clinical situation suggests rejection you will be scheduled for a biopsy even if you already had an allomap. Allomap is good at telling you if there is no rejection; but, it is not so good at telling you if there is rejection. Allomap does not test for antibody mediated rejection and if this is suspected by the physician you will be asked to have a biopsy.**

Allomap testing may be used after two months post transplant if your prednisone dose is less than 20 mg daily. If you receive extra prednisone either because of rejection episodes or for other medical treatment, Allomap testing is not accurate.

Allomap testing is not reliable if within four weeks of testing you have been treated with more than 20 mg daily of prednisone, had blood transfusions or received certain medications to enhance the production of your blood cells. In this case you will be asked to have a biopsy to rule out rejection. Also allomap has not been studied in patients younger than 15 years.

Allomap testing can decrease the frequency of biopsies and, used with biopsies helps your

transplant team manage your immunosuppression.

### Usual laboratory work after heart transplantation

Your lab work will be obtained prior to biopsies and more frequently as needed based on how you are feeling/doing.

#### Routine lab that is collected is:

- 1) **CBC:** *measures number of white blood cells and red blood cells in the blood.*
- 2) **Complete Metabolic Panel:** *evaluates liver function, kidney function and potassium.*
- 3) **Lipid Panel:**
  - **Cholesterol:** *Excess amounts tend to deposit in the walls of major blood vessels and impede the flow of blood. Values greater than 200 place you at risk to develop heart disease.*
  - **Triglycerides:** *Blood fats that represent the body's major reserve of chemical energy.*
  - **HDL Cholesterol (High-Density Lipoprotein):** *This is "good" cholesterol. HDL should be greater than 35 in women and greater than 45 in men to protect you from developing heart disease.*
  - **LDL (Low-Density Lipoprotein):** *This is the "bad" cholesterol. Elevation of LDL is associated with an increased risk for heart disease. LDL should be less than 100 if you do not have diabetes and less than 70 if you have diabetes.*

## Testing, continued

- 4) *TSH Ultrasensitive (Thyroid Stimulating Hormone): TSH is a measure of thyroid function. Low or high levels may indicate thyroid disease.*
- 5) *Magnesium: Is an electrolyte necessary for normal functioning of muscles and for blood clotting.*
- 6) *CMV: To check for the antibody for presence of the CMV virus.*
- 7) *Drug levels are taken for the following medications: Prograf® (tacrolimus), Neoral® (cyclosporine) and Rapamune® (sirolimus).*
- 8) *Chest X-Ray*
- 9) *Echo (ultrasound of the heart)*

On a day when your medication level is to be measured, do not take your morning dose until AFTER your blood has been drawn. Your last dose should have been taken exactly 12 hours before your blood draw. For example, if you normally take your dose at 8 a.m. and 8 p.m., but your blood draw is scheduled for 10 a.m., take your medication the night before the biopsy at 10 p.m. instead. After your blood is drawn, take your prescribed dose. Once the lab has processed the blood level, your doctor will evaluate the results and decide if dosage changes are needed.

\*Remember to bring Cyclosporine and Prograf with you to take after blood is drawn. Bring a list of your current medications and your log of blood pressure, weight and blood sugars with you. Any changes in medications will be called to you later in the day. If you do not receive a phone call, you should continue with the same medications.

Any questions or problems, don't hesitate to call the heart transplant coordinator.