Ammonia Heart PET-CT Scan

How do I schedule an appointment?
Call 612-626-6900

How did I get selected to have this scan?
This scan is commonly done on patients with
- Chest pain
- Abnormal EKG (Electrocardiogram)
- Known history of CAD (Coronary Artery Disease)
- Suspected heart wall motion abnormalities
- To prove or disprove a suspicion that some of your heart muscle may be temporarily or permanently damaged

What kind of information does the test give?
A myocardial perfusion scan is a super-scan of the heart. It is used to
- Determine the extent of heart disease in patients with known or suspected heart disease.
- Measure blood flow to the heart muscle and help evaluate signs of heart disease.
- Determine if some of your heart muscle is thought to be dead is just damaged
- Determine if your heart has improved in function, compared to a previous scan.
- This scan can help us to identify heart muscle that could benefit from a procedure to improve blood flow to the heart such as angioplasty or coronary artery bypass graft (CABG) surgery.

How do I prepare for the exam?
- For 24 hours before your exam, do not drink any products that have caffeine in them, or have been decaffeinated, coffee, tea (even herbal), cocoa, or any kind of soft drink. Do not eat chocolate.
- Do not eat or drink for 6 hours before your exam. It is OK to drink water. If you are scheduled for an afternoon appointment, you may have a very light breakfast before 7 a.m. on the day of your scan.
- Do not smoke cigarettes, or cigars, or chew tobacco for at least 4 hours before the study.
- If you have sleep apnea and use a CPAP, please bring the device with you.
- Wear comfortable clothing and dress warmly, as some scanner rooms may be cool. Do not wear clothes with metal (such as zippers or snaps) or jewelry on the day of the scan.
- Bring a CD-ROM of imaging films from other tests you have had done, such as PET, CT (or CAT), or MRI, if possible. Our physicians will compare your new scan with your images from previous tests.
- Make sure your appointment time is convenient for you. The exact timing of this scan is very important. If you are more than 15 minutes late, your exam may need to be rescheduled. The entire exam process takes about two hours.
Are there medication restrictions?

- It is very important that you discuss your medication use with your doctor in advance. Drugs that may interfere with this test include
  - Nitrites
  - Beta Blockers
  - Anticonvulsants
  - Theophylline (in asthma inhalers, for instance)

What can I expect?

- The entire exam takes about an hour.
- When you arrive, a technologist will prepare you for the exam. An intravenous (IV) line will be started in one arm.
- Electrocardiogram (ECG) electrodes will be placed on your chest to monitor your heart during the exam.
- The nuclear medicine technologist will inject a small amount of radioactive ammonia tracer that will travel through your veins and allow us to obtain pictures of your heart. There are no adverse or allergic reactions from the tracer.
- Pictures of your heart will be taken by the PET scanner. These images show us the blood supply to your heart when you are at rest. When these images are completed, you will then have the stress portion of the exam.
- A nurse practitioner or physician will monitor you during the stress portion of the exam. You will be given a medication that increases blood flow.
- You may feel some discomfort during the stress study. The most common symptoms are feeling flushed, fullness in the chest, and/or shortness of breath. A doctor or nurse practitioner will monitor you throughout the stress study. You will be allowed to leave only when you feel better.
- After you receive this medicine, a second small dose of radioactive tracer will be injected through your IV to allow us to take pictures of your heart when it is stressed (working hard). This part of the study takes about 30 minutes.

What is the ammonia?

Ammonia N 13 Injection is a positron emitting radiopharmaceutical that is used for diagnostic purposes in conjunction with positron emission tomography (PET) imaging.

Ammonia is a normal component of all body fluids. Excess ammonia is excreted as urea, which is synthesized in the liver. Sources of ammonia in the blood include bacterial hydrolysis of urea and other nitrogen-containing compounds in the intestine, the energy metabolism in skeletal muscle, and other metabolic processes in the kidneys and liver.

How much is used?

The dose of ammonia is very small compared to the normal range that is already in the blood. The typical dose is about 20mCi. Normal blood has up to 35 µmol/L of ammonia. Excess ammonia is converted into urea and excreted by the kidneys.

Is the ammonia toxic?

No, it is quickly metabolized into another compound and excreted by the kidneys.

What are the side effects?

No adverse reactions have been reported for Ammonia N 13 Injection based on a review of the published literature, publicly available reference sources, and adverse drug reaction reporting systems.
**How much discomfort is there with this test?**  
You will have an IV placed in one hand or arm. You will feel the “poke” for 2 to 3 seconds. During the scan procedure there are 3 doses of medication given. A dose of ammonia will be given when you are “resting”, a stimulant will be given to “stress” the heart, and a dose of ammonia will be given while you are “stressed”. When the stimulant is given, you may feel out of breath, like you have been exercising vigorously. Some people report that it feels like pressure on the chest.

**Will I be radioactive?**  
The radioactivity decays very quickly. The “half-life” of the ammonia is 9.8 minutes. In an hour, you have $1/64^{th}$ of the dose (1.5%) remaining in your body. You may resume your regular activities right after the study.

**When, how, and from whom, will I get my results?**  
PET scans are read by a nuclear medicine physician. This physician will also look at the other scans that you bring with you. The doctor who referred you for this test will get your results from the nuclear medicine physician who reads your scan within 3 days. Your doctor will give you your test results.

**Will my insurance cover the test?**  
In most cases, your insurance will cover this test, especially if you are having signs or symptoms of heart disease. Please call the customer service number on the back of your insurance card if you have questions.

**Is there a co-pay?**  
Most insurance companies have their subscribers pay a small percentage of the cost of this test. Again, please call the customer service number on the back of your insurance card if you have questions.

**Why is it done at a research center?**  
This test is done at the Center for Clinical Imaging Research at the Center for Magnetic Resonance Research because this facility has special imaging equipment set up to do this type of scan.

**Who will be with me?**  
A nuclear imaging technologist will give you both doses of ammonia, one during the rest phase of the scan, and one dose during the stress phase of the scan, and will also operate the PET-CT scanner to acquire the images of your heart.

A cardiology nurse will give you the medication to stress your heart. The nurse will also monitor your heart with continuous EKG during the stress portion of the scan. A doctor will be present in the Center for Clinical Research.

If you come with a friend or family member, they may wait in the lobby for you while you are being scanned.

**How do I get there?**  
CCIR/CMRR is located 2021 Sixth Street Southeast, Minneapolis MN 55455 across the street from the north side of the TCF stadium on the campus of the University of Minnesota. Maps are located at [http://www.cmrr.umn.edu/contacts/index.shtml](http://www.cmrr.umn.edu/contacts/index.shtml)
Park east of the CMRR – between CMRR and the Wallin Building. The CMRR/CCIR is located at 2021 6th Street SE; Minneapolis, MN 55455.

Please come inside the CMRR/CCIR to get a parking permit for your car dashboard.
**Can I drive myself?**
Yes, free on-street parking is available to patients. When you check in, a receptionist will give you a one-day parking permit for a patient parking spot adjacent to the facility.

**Is this experimental?**
No, this test is not experimental. It is somewhat uncommon because there are only a small number of specialty centers able to do this exam.

With the cyclotron facility located at the Center for Clinical Research we are now able to offer this to patients with known or suspected heart diseases. The cyclotron manufactures the $^{13}\text{N}$-ammonia used in the test. Because the ammonia is only radioactive for 9.96 minutes, it must be injected very quickly after it is manufactured. The cyclotron may soon be distributing the ammonia isotope to other local facilities with similar scanners.
Ammonia Heart PET-CT scan

**Explanation of test.** An Ammonia Heart PET –CT scan is being performed to detect the presence and/or extent of any heart disease that I may have. This test is a super scan of the heart. Since the medication is administered via an intravenous (IV) infusion, an IV line will be started in my hand or arm. Pictures of my heart will be taken before and after the infusion. Special radioactive materials will be administered through the IV line prior to each set of pictures. A trained observer will monitor my symptoms, pulse, blood pressure and electrocardiogram during the procedure.

**Possible risks and discomforts.** Symptoms associated with this infusion that may occur include a mild headache, nausea, a “flushing” sensation, or chest discomfort. In very rare instances, pharmacologic testing has been associated with a slow heart rhythm, heart attack, and death. Every effort will be made to minimize possible problems. In addition, the effects of the medication are rapidly reversible after stopping the infusion. The side effects can also be reversed by a medication called aminophylline. This drug may be administered at the end of the procedure and should improve any symptoms or prevent any serious complications. Finally, equipment and trained personnel will be available to deal with any unusual situation, should they arise. No adverse reactions have been reported from the radioactive materials.

**Possible benefits.** The results from this test may assist in better understanding and/or managing any heart disease that I may have.

**Right to Privacy.** The information obtained during this test will be treated as privileged and confidential and will not be released to any person without my written consent. The information obtained, however, may be used for a scientific purpose as long as my right to privacy is retained.

**Inquiries.** I understand that I am strongly encouraged to ask questions that I may have about the procedures to be used during the test.

I have read this form and have had the opportunity to discuss or question the information described above. Any questions that have occurred to me have been answered to my satisfaction. I understand the benefits and possible risks and consent to participate in this test.
# Ammonia Heart PET-CT Scan

## Pre-procedure checklist 1

### Medication checklist

Ask the subject/patient if they are taking any of these medications:

<table>
<thead>
<tr>
<th>yes</th>
<th>no</th>
<th>(if yes, complete the grid)</th>
<th>If yes, Most recent dose</th>
<th>route</th>
<th>Prescribed dosage</th>
<th>Prescribed frequency</th>
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<tbody>
<tr>
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<td>Date (mm/dd/yy)</td>
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<td>Time (hh:mm)</td>
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<thead>
<tr>
<th>Nitrates</th>
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<td>Sublingual NTG</td>
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<td>Imdur</td>
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<td>Isosorbide</td>
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<td>Isordil</td>
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<td>Isomo</td>
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<td>NTG patch</td>
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<tr>
<td>Nitrobid</td>
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<thead>
<tr>
<th>Beta Blockers</th>
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<tbody>
<tr>
<td>Atenolol</td>
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<td>Metoprolol</td>
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<td>Propanalol</td>
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<td>Carvedilol</td>
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<td>Nodalol</td>
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<td>Labetolol</td>
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</tbody>
</table>

| Theophylline (i.e.inhaler) |                      |                      |                      |       |                   |                     |

| Anticonvulsant |                      |                      |                      |       |                   |                     |
### Ammonia Heart PET-CT Scan
#### Pre-procedure checklist 2

<table>
<thead>
<tr>
<th>yes</th>
<th>no</th>
<th>Explain if necessary</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Fasting at least 4 hours</strong></td>
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<td></td>
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<td><strong>Abstain from caffeine for 12 hours</strong></td>
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<td><strong>Abstain from theophylline (bronchodilator) use</strong></td>
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<td></td>
<td><strong>History of diabetes?</strong></td>
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<td><strong>Known allergies to medication</strong></td>
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<td></td>
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<td><strong>Hypersensitivities to vasodilators</strong></td>
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<td></td>
<td><strong>Surgical history</strong></td>
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<td></td>
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<td><strong>Chemotherapy within 6 months?</strong></td>
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<td></td>
<td></td>
<td><strong>Radiation therapy</strong></td>
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<td></td>
<td></td>
<td><strong>Current pain or discomfort</strong></td>
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</tbody>
</table>

**Contraindications**

<table>
<thead>
<tr>
<th>yes</th>
<th>no</th>
<th>Explain if necessary</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Severe asthma or bronchospasm</strong></td>
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<td><strong>Sick sinus syndrome</strong></td>
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<td><strong>2\textsuperscript{nd} or 3\textsuperscript{rd} degree AV block</strong></td>
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<td><strong>Hypotension &lt;80 mm Hg</strong></td>
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<td><strong>Left bundle branch block</strong></td>
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</table>
Ammonia Heart PET-CT Scan

PATIENT/SUBJECT NAME: _______________________________________________________________

1) Please list your: Age: ___________ Height: _____________ Weight: ___________

2) Please check why your doctor ordered the test.
   - Chest Discomfort: at rest or with activity
   - Shortness of breath
   - Dizziness (light-headed or passing out)
   - Irregular heart rate (such as rapid heart rate)
   - Abnormal EKG
   - Other: _________________________________________________________________

3) Do you have any lung problems?  □ Yes  □ No
   - Asthma  □ COPD/Emphysema  □ Chronic Bronchitis
   - Pulmonary Fibrosis □ Lung Cancer  □ Lung Transplant

4) What is your cardiac history?
   - Heart Attack  □ Angioplasty/Stents  □ Open heart bypass surgery “CABG”
   - Heart Transplant  □ Cardiomyopathy/Heart Failure  □ Pacemaker/Defibrillator
   - Coronary Artery Disease (CAD)  □ Heart valve problems  □ Stroke/TIA
   - Peripheral Arterial Disease (PAD)  □ Congestive Heart Failure (CHF)

5) Previous IV contrast reaction?  □ Yes  □ No
   - Nausea
   - Rash
   - Breathing difficulty

6) Cardiac risk factors
   - High blood pressure (History?)
   - High cholesterol (History?)
   - Smoking (within the last 4 hours):  □ No  □ Yes  If yes, how many cigarettes per day:
   - Diabetes:  □ Type I  □ Type II
   - Stress (Increased level of stress in your life)
   - Sedentary Lifestyle (no regular exercise or regular daily activity)
   - Family history of heart disease:

7) CAFFEINE (caffeinated or decaffeinated coffee or tea, soda, chocolate, etc.) in the past 12 hours?  □ Yes  □ No
   If yes, what time? __________________________________ AM  □ PM
8) What time did you last eat? ___________________________  □ AM  □ PM

9) Are you currently taking a certain class of cardiac medication such as nitrates, beta blockers, or calcium channel blockers? Any anticonvulsants? Or theophylline? If yes, please complete the Medication Log.
 □ Yes  □ No

-Please review all of your medications with the Nuclear Medicine Technologist-