

Cardiac Catheterization Procedure Description

By

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Mr. Jackson came to my office for a heart check-up. After a thorough examination and review of his tests, I said, "Mr. Jackson, we need to perform a cardiac catheterization on you to determine the extent of your heart problem."

What is cardiac catheterization, anyway?" A wave of worry and anxiety blanketed Jackson's face.

"Cardiac catheterization is a procedure where we pass catheters into your heart to determine the extent of the blockages in the blood vessels supplying your heart muscle." My attempt to clarify his doubt did not help him much.

"What in the world is a catheter?"

"It's a long, thin, hollow, and flexible plastic tube about 2 mm in diameter and 100 to 150 cm long. We advance that tube from your groin through the main arteries into your heart blood vessels," I said.

"How does my groin come into the picture?" His worry was rapidly transforming into an escalating curiosity.

"We choose the groin because it's a straight and easy route to your heart's blood vessels." "The groin-straight route to my heart or a shortcut to my wallet?" A smile on his face temporarily restrained his anxiety.

"First we will numb your groin with a local anesthetic."

"Ouch! Is that going to hurt me?"

"Well, when we stick the needle to inject the local anesthetic you may feel a little twinge."

"May? Little? Twinge? Doc, did you ever have this procedure done to you?" "O.K. It may feel like a mosquito bite."

"You mean a Texas-size mosquito?"

"Well, it's not that bad. Once we numb the skin you shouldn't feel much pain."

"There you go with that pain again. What do you mean by not much pain?"

"You may experience some pushing or pressure in your groin, but you won't feel the catheter traveling up and down the blood vessels. Occasionally you may feel some irregular heart beats when the catheter is in your heart chamber."

"Doc, how would I recognize those irregular heartbeats?"

"If you haven't experienced irregular

heartbeats then don't worry about them."

"Don't worry about them? You are pushing a tube in my heart chamber and you say don't worry about them?" His anxiety level inched up a notch.

"I meant to say the irregular beats are common and they are not dangerous. They usually disappear with repositioning or removal of the catheter from the heart chamber."

"What else do you do in the lab, besides poking around in my groin?"

"We measure pressures from the heart chambers."

"You mean blood pressure?"

"I guess you could say that. We measure pressures from your heart chambers, which are similar to the blood pressure recorded in your arms with some minor variations. Then-"

"Whatever happened to the heart blood vessels you were talking about?"

"I was just getting around to telling you."

"Dr. Nik, forget about this getting-around business. Give it to me straight. I can handle it." His eyebrows moved up an inch as he leaned back in the chair.

"Well, if you let me do the talk."

"Let me set the record straight. I never like to interfere in the middle. You can continue, please."

"Thank you. Where was I? Yes, the blood vessels. We advance different types of catheters into the blood vessels supplying your heart."

"Different catheters? How often are you going to stick me in the groin?"

"Only once. Initially, we use a hollow needle to puncture your artery. . ."

"Am I going to bleed until I turn pale?"

"The bigger the fountain-of-blood the better we feel. Then we know for certain the needle is inside the artery. The bleeding lasts only a couple of seconds. Let me assure you that we are not looking for blood donors to start a new blood bank. Immediately, we pass a flexible, smooth, and gentle wire through the needle hole into your artery. We remove the needle and over the wire, we pass a six-inch sheath (a self-sealing hollow tube) into your artery. Then we remove the wire. Now, we have an open access to your artery through which we can exchange as many tubes as necessary."

"Doc, how many tubes are you talking about?"

"Three or four. Maybe five. Anyway, your heart is supplied by two major arteries, the right

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and left coronary arteries. We place the tip of the catheter into each of these blood vessels and inject dye while simultaneously recording the pictures on film and videotape. We also monitor it on a TV hanging from the ceiling. If you like, we."

"Wait a minute Doc, you lost me there. Dye, movie, video, and TV? I can only handle one at a time. Be considerate and do it my way. Explain to me one by one."

"I don't know whether it is your nervousness or your curiosity that baffles me the most. Let's talk about the dye."

"You do the talking and I will supply the ears."

"Are you familiar with the dye?"

"When I was young I had tried a few different colors-blond, dusty-whatever. That's when I had a head full of hair."

"Therefore, you have experimented with the hair dye before. However, the dye I am referring to is of a different nature. It is a radio-opaque material that contains Iodine that makes your arteries appear dark on the TV or film. That gives the contrast and helps us to outline the blood vessels and identify any blockages."

"Hey Doc! I heard that this stuff could make people sick. Is that true?"

"Not always. Some people-"

"Anytime you say some people you might as well count me in. A cousin of mine had a severe reaction to this stuff when he had his kidney X-rayed. Sorry, I didn't mean to interrupt you, go ahead."

"What reaction?"

"You know, he was yelling and screaming Hot! Hot! My menopausal symptoms are coming back."

"That is a reaction all right, but it is not an allergic reaction. An allergic reaction is associated with rashes, drop in blood pressure. Wheezing, and an occasional collapse. Rarely we may encounter a severe reaction. The reaction your cousin experienced was something everyone is going to experience, maybe not with that dramatic taste. The dye makes people feel hot all over especially in the groin. "There you go with the groin business again. Why does everything gravitate toward the groin?"

"I had one patient who said, 'Doc my testicles are on fire.' I reassured him that it would only last for a few seconds. One woman told me that her hot flashes were back, because she did not take her hormone pills that morning. Another

patient of mine said that it felt like a taking a hot chili mixture. Yet another screamed 'Doc, I think my pants are wet.' However, with the newer dye containing a lot less Iodine, the burning sensation is far less compared to what we use to see just five to ten years ago."

"Dr. Nik, maybe if we wait a couple of years, they may have a substitute dye that's not going to put my groin on fire. What do you do if someone gets a severe reaction?"

"Do you have any history of allergy to the dye?"

"I've never had that stuff before."

"O.K. Are you allergic to seafood or shellfish?"

"Only when I eat them with my wife. She does not like seafood. Whatever she does not like, I'm allergic to the same. It is easier that way. Don't laugh. That one simple approach has saved our marriage on many occasions."

"You are a good example of a mutual adaptation. People who are in search of marriage secrets should consult you. Let's say you had a history of allergy to the dye and we had to perform this test. We would use antihistamines and steroids in advance to prevent any serious reactions."

"So you do have something to counteract the allergy?"

"Yes, but it is not 100% foolproof. Even a 95% chance of avoiding a severe reaction is better than nothing."

"Will I be asleep?"

"Doc, let me ask you another question. Are you going to put me to sleep?"

"Nobody in the cath lab is allowed to sleep, especially the patient. You will be awake during the procedure. However, we will give you a mild sedative and perhaps a tranquilizer . . ."

"Doc! Mild sedation will not work for me. I need a heavy-duty sedation like the one they use for the horses or elephants. Otherwise, be ready for a fistfight. I just want you to be aware of that."

"Continuing with my uninterrupted speech, just before you come to the catheterization lab, we give you a sedative to take the edge off. If you are still anxious, we give you more tranquilizers. However, we do not put you to sleep with general anesthetic. We need you to be awake during the entire procedure." "Doc! Are you just trying to scare me or give me an opportunity to watch you sweat under that surgical gown?"

"Both of the above and much more. We need your cooperation during the procedures. There

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are times when we may require you to take a deep breath or cough or hold still."

"Why would I need to do all those acrobatics?"

"When we are taking pictures, we would like to avoid structures such as the diaphragm that can overlap the arterial images. Therefore, we may ask you to take a deep breath. After taking a picture we may ask you to cough. That will help clear the dye from the coronary circulation. When the heart muscle does not get enough blood supply for a few seconds, it may get irritable like the rest of us. It may go into a chaotic rhythm. You don't like to be shocked, do you?"

"I guess I need to hold still at times?"

"Especially, when we are poking the needle in your groin."

"Yes the groin. The infamous groin. By this time I should know that."

"Doc, is this test done in an operating room?"

"Where did you get that idea about the surgery? It is done in a High-Tech Heart Garage called cardiac catheterization lab. Most of what we do is not considered surgery."

"Except the charges, I suppose."

"First, they are going to roll you into this special room with X-ray equipment, computers, and a bunch of catheters. They are going to help you to get on the cath table. Once you lie flat on the table the nurses will strip you from the waist down. Do not worry-they have a bikini towel to cover your privates-a folded towel. They scrub your groin with a fresh betadine brush, after they shave the hair in both groins."

"Wait a minute, no one shaves my groin."

"Do you want to shave it yourself?"

"I don't need that betadine bath either."

"You don't mind if you get an infection?"

"What infection?"

"Well, if we don't shave the groin and clean it with betadine there is increased risk of infection. Infection takes a longer time to heal and it can interfere with walking, jogging, and even standing among many other important manly activities. Compared to that, a shave and a shampoo with betadine takes only a few minutes. Besides, it is difficult to stick a dressing to an area covered with hair. The dressing may stick all right-to your hair. Now, imagine someone pulling the dressing that is stuck to your groin hair. How many hair roots will you have to sacrifice before they are through? How many security guards will be needed to rescue the nurse?"

"All right, all right, Shut up and get on with the shave and shampoo. But, why do you need to prepare both groins?"

"If we are unable to get to your artery on one side, then we can go to the other side that is ready."

"If you have no luck on one side, how could you be confident that you are going to be successful on the other side? I am still the same patient. Wouldn't it be easier to change hands and see if someone else has better-luck fingers?"

"Sometimes your arteries on one side may be blocked while the other side may be wide open." "I guess you have a ready-made excuse for every conceivable question."

"Then we cover your groin area with a sterile dressing with a towel-a paper towel that extends from your neck to your toe. From that point on we would like you to keep your hands-off the sterile field."

"Doc, what if I have to sneeze or scratch my nose?"

"We have a special person assigned just to scratch your nose. You just tell that person how many degrees north and how many degrees to the east or west, and you will get your nose scratched free. It's on the house."

"In other words you don't need my finger-help in getting that artery?"

"That's very good. You are a fast learner. Thanks for your offer, but I have to go by the union rules-Union of Texas. The nurses will setup the tubes for monitoring your blood pressure, injection of dye, and for saline infusion. You may be placed on oxygen through a nasal canula. The nurse also may attach a little plastic clip to your fingertip that can help us monitor the oxygen saturation in your blood. An intravenous line is set up in your left arm for administration of medicines. A blood pressure cuff attached to your left arm, automatically gets tight around your arm periodically. Do not get scared. It's just recording your blood pressure."

"Hey Doc! I heard you keep those operating rooms cold, like a freezer ."

"Generally, the temperature in the lab is cooler compared to the other parts of the hospital. However, the person who gave that chilling information must have had a cold experience. In addition, you need to understand we are dealing with high-tech equipment that radiate a lot of heat. A hot sensation from the dye, high-pressure, or an heightening temper tends to

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change the room temperature that can rapidly overshadow any cool-atmosphere in a few milliseconds."

"I wasn't asking for that critical melting point."

"If you feel cold we can help you with a couple of warm hospital blankets."

"That's a deal."

"Hey Doc, who keeps track of all these things?"

"There will be a couple of people behind the glass windows, who may seem like they are having a family session or a feud. They are indeed monitoring your heart function from minute to minute just like the control tower operators at the JFK airport. They may not land any planes, but they will certainly make sure that your heart lands safely. If you hear them say one, two-in-a-row, run, they are talking about your irregular heartbeats. Don't get any ideas that it's a clearance for your take-off."

"Is there anyone else involved in this operation?"

"There will be a circulating nurse. As the name suggests, that nurse will be circulating in the room providing us with any necessary supplies. Sometimes that person may have to go to another room to get a particular catheter or a tubing. No, she is not going around the different rooms selling the Houston Chronicle."

"Nik, what about my family members?"

"Let me warn you about this cardiac catheterization. I say this from eighteen years of experience working in the cardiac cath lab. I am talking about something that annoys everyone, including myself despite everyone is trying to avoid the same. However, no one seems to have a handle on it, though everyone is shy of pointing the finger at the other person. Therefore, I want to be the first one to let you know this so that your family or you will not lose any sleep over it. It called the 'little waiting game.' Once I asked a pilot patient of mine who flew 747s from coast-to-coast, 'what is the worst part of your job?' Rightfully he told me, 'It's waiting at the terminal to get a clearance for take off.' Terminal is a bad term in medicine and we do not like to use that word. Nevertheless, waiting--it is the most popular term among the medical circles. You, certainly, are going to get a taste of it."

While the nurse is waiting for you to come down for the test, you are waiting for me to come and explain everything that I plan to do. I cannot tell you what we are going to do until we get the

preliminary pictures that will help us in deciding what you precisely need. Therefore, I usually tell my patients that there are three options left: medical treatment, balloon therapy, or surgery.

Getting back to the waiting business, after the escort service elbows her way through the elevator pushing your stretcher, you will arrive at the holding area. It is a place similar to the end of the runway. There you wait again, 'cause the person ahead of you who went for a procedure three hours ago is still in the room. Therefore, you get to know the life story of another nurse who waits at you. When the first patient is ready to leave the room, it is time for lunch--I mean the nurses' lunch.

You thought it was your lunch. Once you get in the room, you notice an air of urgency. It is like watching a video on fast forward or reverse. You will be surrounded by three or four people telling you that you are a great patient with a ton of patience. They also mean what they say. At this moment in your life, they are the next best thing to the almighty power. I have a great deal of respect and admiration for what they do. Now comes the biggest waiting of all--waiting for your doctor to show-up. (You will be lucky if your doctor is in town that day).

Once the doctor arrives on the scene, it is like the plane racing toward the runway and lifting off the ground. One time, I remember, it took us less than ten minutes to determine the patient under the drapes had a normal heart. Another time we were only nine minutes into the procedure when we decided the patient would be best served by emergency open heart surgery. His main arteries were critically blocked."

"Really?"

"After the procedure is over, they will bring you back into the holding area, where the nurse will pull the sheaths from your groin and apply a pressure clamp to control the bleeding. We do not use any stitches. The clamp stays on your groin for 20-30 minutes during which time you will have plenty of opportunity to learn a lot about the hospital, the doctors, the nurse's hobbies, the NBA scores or whatever you want to know."

"Doc, I am more worried about my heart."

"Meanwhile, your doctor will be waiting in the doctors' lounge munching on half of a sandwich waiting for the films to be developed. You wait for the transport service to take you back to your room. I have already mentioned the transportation and I don't want to drill on the same topic twice in one day."

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"Go ahead. I am not holding you."

When you get back to your room, you will be hoping the breakfast, lunch, and midafternoon snack will be waiting for you. No, you have to wait until the nurse can get a special tray for you from the kitchen. After taking a few bites of the food, which does not taste like anything, you wait again for your doctor to come back with the verdict. The long awaited verdict."

"You mean the final verdict?"

"The part of the waiting that I haven't even touched upon is the daily morning and afternoon show that illuminates the waiting room where your family members wait while you undergo the test. It is a different experience. You think they are sitting and waiting for you. No, in ten minutes, they would have read all the magazines in that room. They will have had four cups of decaffeinated coffee after realizing that they already had three cups of caffeinated coffee." "Are you going to cut that coffee from my life, too?"

"When their mind is on something else it's hard to read those letters on the coffee jug. Besides, no one is checking on them to see how many cups of coffee they consumed. They will have made several trips to the receptionist desk for an update on your welfare. Finally, they take the matter into their own hands. They start pacing the hallway that leads to the cardiac catheterization lab, Looking for any soul wearing greens and a white coat. When they see something moving, they close in on that person like a heat seeking missile. One family member says, 'There is the doctor.' The other one says, 'No, that cannot be him. He looks a little depressed. Besides our doctor is tall.' And again, the pacing parade resumes."

"Wait until they read this part."

So, do not think for a moment they will be sitting and waiting for you. I have seen people eat their lunch. I have seen reunions of family members who have not seen one another for decades. Somehow, sickness brings family members and ex-family members together from all corners of the country. I have seen people turn pale and numb at times and at other times pray, cry, smile, or joke. They do everything to keep themselves occupied rather than wait.

"Dr. Nik, is there any risk involved in this procedure?"

"I figured that eventually you were going to ask this question. There is a risk in doing anything. There is risk in driving on the

freeway."

"Doc, I am not driving on the freeway. Besides there is a big difference between driving on the freeway and someone poking tubes into my heart. Give it to me straight. I can handle it like a man."

"Let me start with your groin."

"I thought that's what you have been telling me about all this time."

"You must be wondering why everything somehow leads to the groin. There is a chance of bleeding from your groin at the site of the arterial puncture. This could show up as a small knot or as a large swelling. Most of the bleeding problems in the groin do not need any special treatment other than careful monitoring. Sometimes there may be a bluish-black discoloration of the skin around the groin areas where they put the tapes. This temporary tattoo may last for two to three weeks. You can go to the beach and lie on the sand. This temporary discoloration may add a different kind of attraction."

"Any other risk, Dr. Nik?"

"Rarely a blood clot can form that can block any segment of the arterial circulation. If it blocks the heart blood vessels, it can lead to a heart attack. If it involves the brain blood vessel, it can result in a stroke. However, the chances of getting a stroke are very slim-maybe one in two thousand cases. Similarly, the chances of getting a heart attack are one in two thousand cases. Rarely someone may experience an erratic heart rhythm that may need a shock treatment. Most people who undergo these procedures don't experience such problems."

"What if I get nervous during the test?"

"If you are not nervous be sure to tell me. It is normal for most people to feel nervous during the procedure. We give you tranquilizers before you come for the procedure. While you are undergoing the procedure, we can give you an intravenous tranquilizer that should enable you to relax, but not sleep. Remember, no one sleeps in the lab, especially the patient."

"Doc, when can I move?"

"Oh! I did not get a chance to talk to you about what you need to do after the procedure. As I mentioned earlier, we do not use any stitches where we make the puncture in your artery. We put a ten-pound sandbag over your groin for six to eight hours to prevent any bleeding. You need to follow strict bed rest for six to eight hours after the procedure." "Doc, what about the rest room?"

"We want you to drink plenty of fluids so your

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kidneys can flush the dye we gave you. If you do need to use the rest room the nurse can give you a urinal."

"Wait a minute; the last time I passed urine while lying down was when I was three years old. I cannot pass urine that way. Besides you want me to drink plenty of fluids."

"Well, it will just be for a few hours. You'll be all right."

"Doc, what about my medicines?"

"You can take your morning dose of medicines with a sip of water. Bring your medicines with you when you come to the hospital, so the nurse can make a note of the type and the dosage of all your medicines. Do not bring any expensive items such as watches, jewelry, or a checkbook, just your spouse or a friend. Make sure you leave your belongings with a family member, because you may be going to a different room after the procedure is over. I have seen people who are in a hurry who have lost their dentures or eyeglasses among others."

"Periodically, we may turn the lights down so we can focus on the X-ray image of your heart. "

"That's it?"

"Sometimes patients may experience a fainting sensation. This may be related to slow heart rate or a drop in blood pressure. We counteract that with medicines and IV fluids."

"What is my job in the lab?"

"We expect you to be awake during the procedure. We may ask you to take a deep breath, hold your breath, or move your neck from one side to the other. No, we are not practicing YOGA treatments on your mind and body. We just need your help in getting good quality pictures so we can make meaningful treatment decisions."

"Doc, when can I go home?"

"After the test is over, we diligently review the 35-mm movie film or digital CD that was recorded while we were performing your test. Then, we record pertinent findings are a piece of paper. We will show you on the diagram where the real problem is, if any. Then we will tell you what treatment would be best suited for you. If you do not need any interventional procedures such as a balloon or a stent placement, then you get to go home the same day or the next morning. Make sure there is someone to take you home. We do not advise you to drive the same day because you will be under sedation. Be sure to call me if you have any questions or concerns.

First take an aspirin if you are having chest pain."