



Case Report

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Living with My Seventh Pacemaker

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Abstract

I am an octogenarian who was born with an undiagnosed aortic heart valve defect. I learned of the defect when I was a teenager undergoing a routine physical examination to play on my college basketball team. In this article, I describe how those in the field of biomedicine treated my condition and improved my life. I describe how my case was inadvertently reviewed by the world-famous Cardiologist, Paul Dudley White, and how Dr. White recommended against valve replacement when other Cardiologists were recommending surgery. I describe the importance of my learning about blood flow through the heart and how electrical signals stimulate my heart to beat. I am in my 40th year of using a pacemaker and in my third year with a heart valve replacement. I hope that my personal story of living with a heart defect will be illuminating to patients and physicians alike.

Keywords: Aortic valve defect, Affordable health insurance, Medical disability, Heart arrhythmias, Blood flow, Electrical heartbeat signals, Pacemaker, Implantable defibrillator, Pacemaker dependency, Ablation, AFib, TAVR, Cardio resynchronization therapy

Introduction

I was born in 1940 with an undiagnosed aortic valve defect. As a young child (age 5 to 7), I knew that something was wrong with my stamina. I considered myself to be a fairly good athlete, but I could not ride my bike up the hills in my neighborhood without stopping to rest. All my playmates rode their bikes up the hills without much effort, but I had to dismount my bike and push it up the hills. Despite my lack of stamina, I later played on my high school basketball team when I was a teenager.

When I was 17 years old and a freshman in college, I wanted to play on the San Diego State College (now San Diego State University) boys freshman basketball team. I flunked the routine physical and was referred to a Cardiologist for further evaluation. The Cardiologist told me that I had a loud murmur coming from my aortic valve, and he recommended that I not play basketball. He told me that I might damage my heart in a way that could cause trouble as I got older. However, he cleared me to play if I felt strongly about playing. I played for one semester. I had stamina issues, and I re-

member on occasion going from the court into the locker room to vomit and then return to the court. After one semester, I abandoned my aspirations to play Division One Basketball at the college level.

When I was 19, a General Practitioner (GP) told me that I might have a bicuspid valve and that I was unlikely to live past the age of 43, based on his experience with similar heart patients. He told me to live my life with that shortened longevity in mind. When I was 21, a different GP suggested that I might soon need a valve replacement. I was referred by the GP to a Cardiologist who nixed any thought of valve surgery and suggested I just wait and see what develops in the future.

These warnings from different physicians and visits to Cardiologists caused me to think seriously about my future and how I should live my life. For example, upon graduating from college, I found an organization to work for that offered disability retirement. That same organization had a good and affordable health insurance plan for me and later my wife and children. Additionally, the orga-



nization had an early medical retirement plan (if needed), and a health plan for spouse and children and a full retirement plan with spousal benefits. I held various jobs with that organization for 35 years. I stayed with the job for a whole career in part because my heart condition could require use of the medical benefits offered by my employer – benefits I had not found available from any other employer. Health insurance provided by my employer has been invaluable to me. Fortunately, I never needed to use my disability retirement, and I feel grateful for that fact.

Discussion

When I was in my late 20s, I became the patient of an Internist specializing in heart health. He was to be my primary physician for more than 30 years. When I was 30 years old, my Internist sent me to see a Cardiologist at a major hospital in the area where I was living on the East Coast of the United States. The Cardiologist at that hospital performed a heart catheterization and recommended immediate aortic valve replacement. By chance, the famous heart specialist, Paul Dudley White [1] reviewed my case and recommended no surgery. He said during rounds, “This patient may surprise us all.” I followed White’s advice.

From age 30 on, however, I was thinking of my life in terms of pre and post valve replacement. I felt certain from all the medical opinions I had received that one day (more likely sooner than later) I would need a replacement valve. I continued making major life decisions about such things as my job, health insurance, and life insurance, based on my assumption I would be having a valve replacement. I can’t say I thought about needing a valve replacement on a daily basis, but the subject mediated and informed my thoughts and life decisions.

When I was 43 years old, I began having heart rhythm issues. My heart rate would sometimes slow into the low 40 Beats Per Minute (BPM) range. I would sometimes get what seemed to me like double beats, and often I felt like my heart was skipping beats. When my heart felt out of rhythm, I did not feel like eating. My digestive system would start to act up, and I felt generally crummy. I had a feeling of dread. I knew something was wrong, and I could not stop myself from thinking about how poorly I was feeling during those times when my heart was out of rhythm. For me, there could not be a more direct connection between the rhythm of my heart and how I felt both physically and psychologically.

My Internist placed me on a halter monitor for 24 hours and discovered I was having bouts of intermittent left bundle branch block. To understand the full impact of this condition, I needed to learn more about how blood flows through my heart and throughout my body, and how the “electrical system” and nerve fibers work to facilitate blood flow.

Blood Flow

I learned that the normal human heart has four chambers, and that the blood flow is regulated by four valves. The two lower chambers are called the ventricles, and they provide for squeezing the blood through the arteries and veins. Blood moving out of the left

ventricle moves through arteries throughout the body and returns to the right atrium via veins [2]. While scientists differ about exactly how many cells are in the human body, there is some consensus that the number is in the 30 trillion range [3]. It is estimated that the average adult male has 36 trillion cells, and the average adult female has 28 trillion cells. All cells are nourished by blood pumped from the heart.

The blood that returns through the veins is stored temporarily in the right atrium. As the heart squeezes, called its systolic phase, blood in the right atrium moves into the right ventricle where it is squeezed into the lungs to be oxygenated. During this systolic phase, blood from the lungs moves into the left atrium and from there into the left ventricle to again be squeezed back into the arteries.

Notice that I talk more about the heart squeezing the blood along the arteries and veins rather than a beating heart. The heart keeps the blood moving as opposed to beating in a fashion that pushes blood rather than having blood stop and then be moved in a repetitive thump, thump motion.

Blood flowing out of the left ventricle flows into a large artery called the aorta. The valve through which the blood flows is called the aortic valve. In my case, I was born with a significantly defective aortic valve.

Electrical Signals for the Heart to Beat

The heart has two sinus nodes that control the heart beats or squeezes. The top part of the heart, the atrium, is controlled by the Sinoatrial Node (SA node), and the bottom of the heart, the ventricles, is controlled by atrioventricular (AV node) [4].

The SA node signals through a network of nerves for the top part of the heart to begin squeezing. At the same time, a nerve runs from the SA node directly to the AV node to cause a “squeezing” in the lower part of the heart. However, the AV node has a built-in fraction of a beat delay that facilitates the squeezing motion.

For healthy people, these nerves in the heart generally work fine. For some people, however, one or more nerves in the heart can become problematic and cause all kinds of problems with the heart’s rhythm. Sometimes, a nerve in the upper part of the heart picks up a stray or rogue signal from a nerve that is not supposed to be firing. This can cause the upper portion of the heart to beat faster and can be the cause of a condition called Atrial Fibrillation (AFib or AF) [5].

In my case, the aortic valve had become calcified, and the extra calcification was pressing on the AV node and disrupting the signal for the lower chambers of my heart to beat. This is why I felt so lousy when the left ventricle was not getting a signal to squeeze blood through the aortic valve.

I had just turned 44 years old when I received my first pacemaker [6]. This pacemaker was designed to “sense” whether or not a signal had come through the AV node for the left side of my lower heart to squeeze [1]. If the signal came through correctly, then the

pacemaker did nothing. If the signal did not come through correctly, then the pacemaker would send an electrical pulse to the right ventricle to squeeze. Nerves then carried the signal to beat from the right ventricle to the left ventricle. Remember, signal detection and pacemaker firing if needed was happening in a fraction of a second. My first pacemaker did not have a dual chamber pacing mode, meaning that it only sensed the nerve firing in the lower portion of my heart. It did not sense as to whether the SA node was firing properly. Since my heart nerve issues were intermittent, my pacemaker did not need to send a consistent electrical signal to the right ventricle to squeeze. For that reason, the battery of my pacemaker was needed on a limited basis. My first pacemaker lasted about 16 years.

Shortly after I received my first pacemaker, someone asked how I could “stand to live knowing that if the pacemaker failed that I would likely die on the spot?” I did not appreciate the question, even though it was a question I had given considerable thought to. I reasoned that if the pacemaker failed, I would feel crummy but not be at great risk for death, because I had lived for many months with left bundle branch block before I got the pacemaker, and it did not kill me. My greater worry was that the pacemaker might malfunction and send signals for my heart to beat at a rapid rate for example. With time, I came to live my life without too much worry about the safety of the pacemaker. However, I am regularly reminded that I have a pacemaker in my daily life when I touch it or bump it against something (e.g., car seat belt), see it in a mirror (e.g., shower), or just bend over and feel it move, or when I give someone a hug.

Pacemakers contain a battery that powers the electrical signal sent to the heart as needed. Battery life is monitored, and the entire pacemaker is replaced when the battery life is low but not exhausted. As you can imagine, tensions get a little strong when the battery life is getting low, but the physician says it is not yet time to replace the pacemaker. “See you in four months” are words from a physician that remind a pacemaker recipient of just how dependent we are on a small device sewed into our chest.

My second and third pacemakers each lasted about five years. When I received my fourth pacemaker at 69 years of age, new wires were also inserted into my heart. The electrodes on the original wires were deteriorating. Also, I was told that I had become pacemaker dependent. That is, my ventricles were signaled to beat by the pacemaker all the time. I no longer had intermittent bundle branch block. I had complete bundle branch block.

Shortly after I received my fourth pacemaker, someone asked me a similar question to one I had been asked years before: “How can you stand to live with a device in your chest that should it fail, you will be dead immediately?” First of all, I have no choice. Without the pacemaker I would be unable to live. The risk of it failing is practically nonexistent as long as I maintain my regular physician visits. Also, it is monitored daily by a device at my home that receives a signal from the pacemaker and sends the signal to a pacemaker monitoring organization that would get in touch with my physician should any problems develop. Finally, I have developed an attitude

about risk. There are risks in all aspects of daily life. I could get hit by a car driving to the grocery store for example. However, I don't stop shopping because I might get in an auto accident. I walk in my neighborhood on a daily basis for exercise. There is a small risk that a car could jump the curb and strike me while I walk, but the risk is low, and I don't stop walking because of some small risk. There are many activities in life that have risks, but we don't lock ourselves up in some dark room in order to avoid every small risk in life that could come our way. A pacemaker has such a minimal risk of failure that I don't worry about it malfunctioning.

I received my fifth pacemaker when I was 75 years old and my sixth when I was 79 years old. My sixth pacemaker is a combination pacemaker and defibrillator [7]. Also, when I was 79 years old, I underwent a heart ablation [8]. The ablation was performed to eliminate an extra beat that was originating in my right atrium and also to eliminate a condition referred to as atrial flutter.

When I was 80 years old, I received a replacement aortic valve using the “Trans Artery Valve Replacement” (TAVR) procedure. I received this valve 50 years after one surgeon was recommending it be replaced and Paul Dudley White said not to operate and added, “This patient may surprise you.” I have corresponded with a number of heart valve recipients, and there seems to be a common question among all of us: “How long will the replacement valve last?” Of course, this is a concern for younger patients, but I really have not let my brain focus on the question. I'm already 83 years old, and the valves typically last ten years or longer in patients my age. The valves are well made and quite durable, and that is quite satisfactory for me [9].

When I was 82 years old, my cardiologists determined that I might benefit from a procedure known as Cardio Resynchronization Therapy (also known as Biventricular Pacing?) I was having some stamina issues caused by the way the pacemaker was causing my heart to beat. When the signal to beat comes from the pacemaker to the right ventricle and then is passed on to the left ventricle through the heart's nervous system, it causes the heart to rock. My heart was now in its fortieth year of rocking. My cardiologist was able to pass a lead through the center of my heart and connect that lead to a new pacemaker (my seventh pacemaker) in order that both the right and left ventricles beat at the exact same time. Hence the name, biventricular pacing. I felt better almost immediately.

I'm most grateful for the extra years that modern biomedicine has provided me. I'm thankful for the physicians and staffs working in various medical fields that supported my needs over my lifetime. Starting as a teenager, I was advised by medical personnel regarding my heart health. From my teen years on, I was mindful of the potential problems my aortic heart valve issue might cause. I made life-forming decisions based on the best biomedical advice I was given by my physicians. I was not constantly thinking about my heart, but my major life decisions were informed by my knowledge of my heart's condition. As I look back on my life, I believe I made the right “heart felt” decisions and continue to do so as I learn more about heart functions and how to care for my heart.

Conclusion

I have written this personal article for a number of reasons. First, I want to assure patients that they can live a long and healthy life with heart abnormalities. Second, I want to assure patients that they can live a long and healthy life after receiving a pacemaker. Third, I want to assure patients that they can live a long and healthy life after receiving a heart valve replacement. Finally, I want physicians to appreciate how scary it is to have heart arrhythmias and how crummy the patient feels during episodes of heart arrhythmias. The brain's reaction and fear in response to heart arrhythmias is something that physicians may not be able to fully understand not having actually been through the disease themselves, but it will be beneficial for the patient if appreciated by the physician during the patient's treatment.

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Conflict of Interest

None.

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