Radiofrequency Catheter Ablation of Wolff-Parkinson-White Syndrome

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Introduction

Wolff-Parkinson-White syndrome, also known as ventricular pre-excitation, is a premature activation of the ventricular myocardium by an impulse that travels by an extra pathway and bypasses the atrioventricular junction.[1] In simpler terms, Wolff-Parkinson-White syndrome is an arrhythmia of the heart caused by an uncommon electrical pathway. Wolff-Parkinson-White syndrome only affects .1%-.3% of the world's population, but seriously affects those who possess it.[2] Although very few people suffer from the congenital abnormality, it is important that medical professionals as well as the general public understand the disease. Several studies have been conducted, and written, regarding Wolff-Parkinson-White syndrome. The focus of these studies ranges from information on diagnosis to the best treatment options. Based on the risk factors and effectiveness of all the possible options, catheter ablation has been recognized as the most successful way to manage and/or treat the ailment. Catheter ablation takes place in a cardiac catheterization lab as seen in Figure 3. There are many sources of energy that can be used to ablate the accessory pathways, but radiofrequency is the safest and most practical option.

Symptoms and Diagnosis

The extra passageway associated with Wolff-Parkinson-White syndrome causes electrical impulses to travel through the heart at a quicker pace, which causes tachycardia, or increased heart rate. Other manifestations include dizziness, heart palpitations, shortness of breath, and syncope. Serious conditions, although uncommon, can result in cardiac arrest and sudden death.[2] Wolff-Parkinson-White syndrome is diagnosed based on the results of an electrocardiogram. Although most patients with Wolff-Parkinson-White Syndrome share the same signs and symptoms, a diagnoses can not be made without an electrocardiogram.[1]

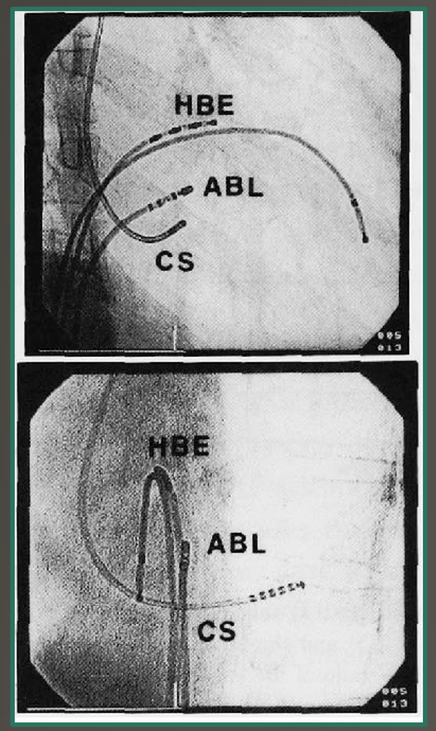

Figure 1. Above is a radiographic image taken during an ablation procedure. The most advantageous spot for ablation is marked ABL, and an ablation catheter is found in that spot.[3]

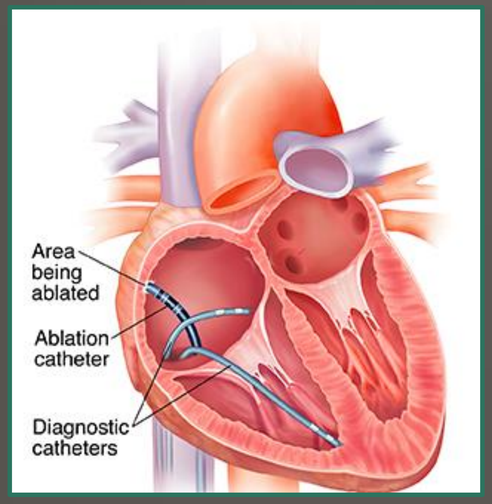

Figure 2. This illustration above demonstrates the positioning of the ablation catheter in comparison to the diagnostic catheters.[4]

Figure 3. To the left is an image depicting the equipment and personnel utilized during a cardiac catheterization exam. The C-arm used to obtain fluoroscopic images can be seen, as well as a cardiologist and catheterization lab technologist.[5]

Catheter Ablation

For the treatment of Wolff-Parkinson-White syndrome, doctors and patients have a variety of options to choose from. Management methods include nerve manipulation and medications. Open heart surgery can be used to treat Wolff-Parkinson-White syndrome, but comes with many risk factors. Because of these reasons, catheter ablation is the most productive treatment. The ablation process happens through cardiac catheterization, a less invasive procedure than heart surgery. A catheter is inserted through a vessel in the groin and extends to the heart. Once the accessory pathway is identified through fluoroscopic imaging using diagnostic catheters and imaging contrast, as seen in Figures 1 and 2, the ablation process begins. There are multiple ways the pathway can be destroyed. Cryoablation (extreme cold) and thermal ablation (extreme heat) can both be used to destroy the pathway, but pose the risk of damaging or causing infarction to tissues around the pathway. Radiofrequency waves have been proven to be the safest and most practical way to successful rid the patient of problem causing accessory pathways. Once the pathways are destroyed, the extra impulse does not reach the ventricle. Because radiofrequency can affect the heart rhythm, it is important for physicians to determine if the benefits of the exam outweigh the risks.[6]

References

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