Rheumatic heart disease: prevention techniques

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Rheumatic Heart Disease: Introduction

Considered by most in developed countries as a historical condition, rheumatic heart disease (RHD) still holds prevalence in modern day medicine, although now shifted in its community effect. R. Kumar and R. Tandon of Amrita Institute of Medical Sciences & Research explained RHD as a condition following an episode or repeated occurrence of rheumatic fever (RF) which is a manifestation of a prior infection with group A streptococcus bacteria (2013). RHD was once an illness associated worldwide with disability and mortality among young children, and it now predominantly occurs only in developing countries. Despite the improvements in rates of occurrence over time, RHD is still a surprisingly common reason of death amongst children, given that it is entirely preventable. The key to truly eradicating RHD includes better access to healthcare facilities, education for adults and families, and prevention of the initial illness (Liuzzo, Shin, & Lucariello, 2005). Different approaches exist to treating RHD or preventing it at either the initial stage of infection or when the patient has met criteria for a RF diagnosis, or when RHD is full blown. Prior to understanding treatment options and the effects of communities still battling RHD, it’s essential to understand the prior conditions needed to reach the point of heart damage.

The Steps toward Developing RHD

Before rheumatic heart disease can occur there needs to be a bout or multiple occurrences of rheumatic fever. Before rheumatic fever (RF) can occur, the patient would have had to have an infection caused by group A streptococcus bacteria (GAS) leading to what is commonly known as strep

throat (Liuzzo et al., 2005). This is the sole reason developing nations are ahead of others in regards to lowering incidence of rheumatic heart disease- they have easier access to antibiotics. Typically, an individual with suspected strep throat would showcase symptoms such as fatigue, throat pain, moderate to high fever, and possible white patches on the back of their throat. The test to confirm diagnosis involves a quick throat swab, and the resulting treatment is either penicillin, amoxicillin, or erythromycin in the case of a penicillin allergy (Talwar, Gupta, 2016). Injected penicillin, as pointed out by C. C. Mota (2005) carries a greater chance of preventing acute rheumatic fever, but presents obstacles on a community level for how to administer injections on a large scale. Antibiotics are given by mouth in most areas due to practicality.

The issue then for preventing rheumatic heart disease and its predecessor, rheumatic fever on a primary level lies is treating the strep infections before the immune response can harm body tissues. In developing countries, this looks like bettering access to healthcare and subsequent treatments. It also is necessary to prevent GAS infections at the community level by educating families about the contagiousness of strep throat. Schools, public meeting places, and childcare services should be especially aware of symptoms to look for and actions in breaking the chain of infection. Sanitary living conditions, education about preventing spread of infection, and providing treatment to GAS infections early on are the cornerstones of primary prevention of rheumatic heart disease (Kumar, Tandon, 2013). Education also comes in to play in more developed countries, as proper use of antibiotics remains an issue. Patients and their families should be educated

not to stop taking their prescribed antibiotic even after they feel healed. The basis of using antibiotics becomes negligible if the correct dose isn't administered as ordered. It should be noted that not all strep throat infections result in rheumatic fever-a very low percentage-and this alone motivates many even in highly developed, educated areas to forgo treatment and avoid antibiotics. The rate of occurrence of rheumatic fever following strep infection is altered by financial stability personally and communally, level of education of patient and family, and overall access to healthcare facilities (Talwar, Gupta, 2016). Patients and their families should be educated about the risks of not treating streptococcal infections. True prophylaxis, the preferred method to eradicate RF and RHD, is not yet possible in the absence of a vaccine for GAS infections. Ideally, the entire cascade reaction from GAS infection, to rheumatic fever, to heart disease could be avoided with prevention of the initial cause (Katzenellenbogen, et al., 2012). Until a vaccine is developed, proper treatment with antibiotics is the best prevention technique.

Rheumatic Fever: Disease Process and Treatment

Besides using antibiotics to treat the initial infection, they can also be used even after rheumatic fever has developed. Rheumatic fever is an inflammatory disease that can affect the cardiovascular, musculoskeletal, nervous, and integumentary systems. The exact causation is still under debate in worldwide medical communities, however the general consensus is that if an infection with group A streptococcus bacteria (GAS) takes prolonged effort from the patient's immune system in order to heal, the result is an overactive immune response toward normal tissues. This immune

response, in some clients, then becomes rheumatic fever. Beginning with that initial infection of streptococcus, rheumatic fever is then the next step toward developing RHD. RF generally occurs 2-4 weeks following an incidence of strep throat (Liuzzo, et al., 2005). Once an individual has rheumatic fever, the goal of care is to prevent it from recurring, and here lies the secondary treatment options like long term penicillin use and long term aspirin. According to K. Talwar and A. Gupta (2005) the more severe a bout of rheumatic fever or the more frequently a patient is exposed, the more likely to have permanent heart damage, causing rheumatic heart disease. Before RHD ever causes harm or can even be considered for diagnosis, there would first need to be incidence of rheumatic fever. Asymptomatic rheumatic fever is not unheard of, and the diagnosis, even with symptoms, can be missed and is considered a reason for RHD not being properly prevented despite modern achievements in treatment. In order for a diagnosis of rheumatic fever to be made, the suspected client must have a recent diagnosis of a GAS infection with confirmed culture. This culture is considered a major identifying factor and must be present. The other major identifiers of possible rheumatic fever include joint pain, erythema, subcutaneous nodules, chorea, and a newly present murmur (Katzenellenbogen, et al., 2012). Once a diagnosis is made, antibiotics and anti-inflammatory medications are typically prescribed for extended periods of time. There is a great deal of education at this point as well; patients need to be aware that they are at high risk for developing heart damage if they have further bouts of rheumatic fever. To prevent this, prophylactic antibiotics need to be administered prior to any surgery and dental work. Excellent dental hygiene is advised to decrease any opportunity for bacteria

to enter the bloodstream and travel to the heart. Regular echocardiograms, electrocardiograms, and other heart function tests may be done to evaluate for signs of rheumatic heart disease as the client ages (Kumar, Tandon, 2013).

Rheumatic heart disease: symptoms, diagnosis, treatment, and prognosis.

Any episode of rheumatic fever can result in rheumatic heart disease, but the greatest risk is posed to those with repeated episodes. Approximately half of all individuals who have rheumatic fever will develop rheumatic heart disease, typically 10-20 years following the initial event (Mota, 2005). Rheumatic heart disease is characterized by inflammation occurring in either the outside of the heart (pericarditis) inside (endocarditis) or the heart muscle itself (myocarditis). The most common inflammatory condition is endocarditis, and subsequent inflammation of the heart valves. Any of the heart valves can be affected in rheumatic heart disease but most frequently it is the mitral valve, with the aortic coming in second (Liuzzo, et al., 2005). Once valves have been inflamed the condition generally deteriorates as time goes on. Treatment involves maintaining heart function as best as is possible. This may include medications given for hypertension and congestive heart failure such as beta blockers, ace inhibitors, or digitalis therapy (Talwar, Gupta, 2016). In the presence of a relatively healthy, younger client with worsening heart function, valve replacement is an option as well. Long term use of anti-inflammatory medications is common in managing the damage to the heart. Risk for arrhythmias, particularly atrial fibrillation becomes more common, as does the chance of having a thrombolytic stroke, or a myocardial infarction. Rheumatic heart disease is

not considered curable, even with a valve replacement (Mota, 2005). For this reason prevention is the most important tool to use against RHD. Whether the prevention is at the primary level with treating strep infections and researching a strep vaccine, or secondary prevention through prophylactic antibiotics, both education and access to healthcare facilities is key to extinguishing RHD permanently.

Conclusion

In conclusion, the ideal prevention for rheumatic heart disease would be a vaccine to prevent initial development of a strep throat infection. Secondary to a vaccine that is still in development, there are antibiotics used to treat the strep infection to prevent development of rheumatic fever. If rheumatic fever is developed antibiotics can be used prophylactically to ensure RHD does not develop. All in all there are multiple ways to prevent heart disease itself from resulting after a streptococcus infection. Through education, prevention can become universal.

References

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