MECHANICAL AND TISSUE REPLACEMENT VALVES:
QUESTIONS AND ANSWERS

What are the options in heart valve replacement?

When a patient requires a heart valve replacement, two types are available – a mechanical heart valve or a valve made of animal or human tissue.

What are mechanical valves made of? How do they work?

Mechanical valves are manufactured from a biocompatible metal, plastic or ceramic-like material. The valve itself consists of a ring, with one or two moveable discs inside that open and close to control the flow of blood, much like a natural heart valve.

What are the advantages of mechanical valves? What are the disadvantages?

Mechanical valves perform well and are very durable. They usually last throughout the patient’s lifetime and do not require replacement.

On the other hand, because mechanical valves are made from metal or plastic, patients are required to take anticoagulation medication (blood thinners) throughout their lifetime to prevent the formation of blood clots. These clots could result in strokes or other serious medical problems.

Anticoagulation therapy also becomes a lifestyle issue for many patients. They must be regularly tested to ensure that the proper dosage is being administered – if it is too high, bleeding complications can result, especially bleeding into joints or internal organs. If the level is too low, the risk of stroke increases. In addition, patients must remember to take anticoagulants daily.

And because of the need for anticoagulant therapy, many patients who receive mechanical valves must maintain a special diet and refrain from physical activities that could result in injury.

What are tissue valves? How do they work?

Tissue valves are made of porcine (pig), bovine (cow) or human tissue and more closely resemble the body’s natural valves.

Tissue valves can either be “stented” or “stentless.” Much like the heart’s natural valves, tissue valves contain leaflets that control the flow of blood. A stented valve includes a frame on which the valve is mounted to provide support for the leaflets. A stentless valve is most often an actual heart valve obtained from either a human donor (homograft) or a pig (bioprosthesis) – this type of valve incorporates the “natural” leaflets found in an original heart valve.

What are the advantages of tissue valves? What are the disadvantages?

Because of their origins, tissue valves more closely mimic natural valves than mechanical valves do. As such, tissue valves typically do not require the prolonged use of anticoagulation medication and therefore may provide a better quality of life.
One key disadvantage is that because tissue valves so closely mimic the heart’s natural valves, they are also prone to the same “wearing out” and calcification that we see as heart valve disease develops. This calcification can build up on a tissue valve and result in stiffened leaflets and impaired valve function.

What is the preferred replacement valve option among physicians? Patients?

Each replacement valve is preferred for different attributes. Mechanical valves have long been the first choice for those patients that are expected to live for several years beyond the replacement of their valve, given the mechanical valve’s established track record for durability.

Historically, tissue valves have been selected primarily for more elderly patients, given that until recently, data did not exist supporting the long-term durability and functionality of these valves.

In the last five to ten years, physicians and patients are increasingly selecting tissue valves for a number of reasons:

- The worldwide population is aging, thus enlarging the pool of patients that have historically been ideal candidates for tissue valves.
- Data in support of the long-term performance and durability of tissue valves has been established and is beginning to be presented and published.
- Patients are increasingly looking for treatment options that enhance their lives, not limit it. Many see a lifelong commitment to anticoagulation therapy and monitoring as limiting.

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