A ventricular assist device—short term or long term use, an electromechanical device for assisting cardiac circulation. The device takes over 90% of what the heart should be doing.

I. INTRODUCTION

This device partially and/or completely replaces the function of the heart. Since 1990, the ventricular device has been available for implantation. The critical role in this process is to successfully assist the heart that is either at the point of congestive heart failure, or recovering from cardiac surgery or a heart condition. However, just like anything else, the procedure is not perfect. Unfortunately, there are many limitations. Some limitations involve clotting, infection, bleeding, and non-reversible lung, liver, and kidney damage. Although there are many improvements to be considered, with time, these limitations will be conquered due to the ongoing development of solutions.

II. METHODS

The device is designed to assist the left ventricle (LAV), the right ventricle (RAV), or both (BiVAD). The LVAD is the most common, sometimes applied as a destination therapy or a bridge to recovery. The RVAD is necessary when arterial-resistance is high. Today, we have three generations of VADs. The first generation has an electrically driven membrane in which pumps a generating pulsatile flow with artificial valves as an inlet and outlet. The second generation VAD contains continuous flow centrifugal pump devices and a propeller surround by a metal case. It’s designed only for intrathoracic implantation. Lastly, the third generation VAD contains a radial pump with magnetic and hydraulic positioning in which takes over complete circulatory support.

III. RESULTS

Indications for a ventricular assist device include end stage of heart failure, fatal cardiac arrhythmia, and patients recovering from a heart attack or cardiac surgery. Although this device has the capability of being very successful, it comes with many complications and risks. Often we see bleeding in the early hours after implantation, clotting due to blood flowing over a non-biologic surface, infection due to reduction of leukocytes, and severe right heart failure. Successful long-term results are highly dependent on the timing of implantation.

IV. DISCUSSION

With decreasing of heart transplants due to the limited amount of organ donors, the importance of these devices is continuously increasing. It has many advantages for those awaiting a heart transplant or for those who are too old or not suitable for transplantations due to other medical conditions. However, it is still has its drawbacks. One of its most common issues is bleeding shortly after implantation. Monitoring the bleeding is very important in order to prevent need for reoperation to wash out the clot that could compress device features. Although there are many limitations and set backs, many promising solutions are on their way.

In conclusion, despite the limited diagnostic and beneficial capabilities, ventricular assist devices still remain successful. Multiple improvements are possible and occurring each day as new concepts are continuously developing.

REFERENCES