

Neonatal and pediatric VAD including total artificial heart: state of the art

Amodeo A.

Heart failure is a complex pathophysiological syndrome that can occur in children from a variety of diseases. The number of children being hospitalized with heart failure is increasing and this condition is associated with a high rate of morbidity and mortality. While heart transplantation continues to be the mainstay for treatment of end-stage heart failure, this mode of therapy is severely limited by pediatric donor organ availability. Ventricular assist devices (VADs) have taken an increasingly important role in the management of advanced heart failure in children. The development of MCS in children has been slow compared with the development of devices for adults with heart failure and Berlin Heart (BH) EXCOR Pediatric ventricular assist device is the only available VAD for infants and small children. This has been a frustrating reality, particularly given the fact that the Berlin Heart device was developed over 20 years ago. The current generation of continuous-flow (CF) devices for adult has become popular in children in the last years with an overall outcome of pediatric patients supported on these devices is excellent with 92% favorable outcome at 6 months. In case of biventricular dysfunction the only option is Bi Vad BH for infants and small children. The Total artificial heart (Syncardia) has now developed a 50 cc pump which can be utilized for children (10-18 years). In the near future the Infant Jarvik 2015 probably will be adopted for infants from 8 to 20 kg with the clinical trial starting in Usa and Europe in 2018. There are also several other devices on the horizon, although it will be several more years before clinical trials are underway to evaluate the safety and efficacy of these devices.