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GUEST EDITORIAL
Cardiac transplantation: an evolving practice

Alexander Manche

Correspondence: Mr. A. Manche, Cardiothoracic Division, Department of Surgery, St. Luke's Hospital, Gwardamangia, Malta.

"The dream of the ancients has been the junction of portions of different individuals, not only to counteract disease, but also to combine the potentials of different species" [from a paper entitled "The Operation" by Christiaan Barnard following the first successful human cardiac transplant on December 3, 1967 [1]]

When Barnard performed the first orthotopic transplant he became an instant celebrity. By today's standards the method of retrieval was daring and fraught with risk. The donor was placed on bypass five minutes after cessation of cardiac electrical activity and the heart was cooled, removed and transplanted using the technique described by Lower and Shumway [2]. Louis Washkansky recovered but died 18 days later of Pseudomonas pneumonia. Barnard performed his second transplant on January 2, 1968. This time the recipient, Philip Blaiberg, enjoyed a spectacular recovery. Barnard's widely acclaimed success encouraged several surgeons worldwide to attempt the procedure. That year, 102 transplants were carried out at 17 centres worldwide but with such disastrous results that further clinical transplantation all but ceased during the 1970s [3,4]. The discovery of cyclosporine A by Borel et al [5] in 1970 together with laboratory and clinical investigation, performed principally at Stanford University, resulted in the emergence of cardiac transplantation as an accepted treatment modality for end-stage heart disease. Larsson [6] later showed that cyclosporine A, a fungal metabolite, selectively inhibited the production of interleukin 2, and at low doses, the induction of its receptors. Today it is the mainstay of immunosuppressive therapy, in combination with steroids and azathioprine.

Another milestone in transplantation was achieved when in 1972, Judge Compton acquitted Dr. Richard Lower of "wrongful death" following the removal of a beating heart. The judge instructed the jury that they were permitted to accept the diagnosis of brain death for the purpose of organ retrieval. In 1981 the report of the Medical Consultants on the Diagnosis of Death to the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioural Research [7] was published. This document defined criteria for death and clarified guidelines to enable doctors to declare a potential donor as brain dead. Long distance procurement coordinated by national transplant centres made heart transplantation possible on a wider scale [8,9].

In 1980, fewer than 360 heart transplants had been performed. By 1993, the Registry of the International Society for Heart Transplantation reported 229 active centres and 22,400 heart transplants [10]. Thirty years on, clinical human transplantation has carved an important niche in an array of therapeutic options for end-stage heart failure. The more thorough investigation and utilisation of alternative treatments stems from a shortage of donor organs [11], that has led to a plateau in the number of transplants worldwide. In 1990, 30% of patients awaiting transplantation died before an organ became available, a mortality risk exceeding that of having the procedure [12].

Other surgical options include the latissimus dorsi cardiomyoplasty described by Carpentier [13] and more recently the cardiac remodeling procedure by Batista [14]. Patients with evidence of active ischaemia should be considered for revascularisation even in the presence of a left ventricular ejection fraction (LVEF) under 25% [15]. Cardiac assist devices, such as the Heartmate, originally employed for bridging to transplantation, are now being implanted as permanent devices [16,17]. Xenotransplantation, utilising the heart of a genetically engineered pig, is currently on hold because of fears of epizootic disease [18]. Exciting advances in medical treatment with ACE-inhibitors [19,20,21], betablockers [22] and pacing [23] promises improved quality and length of life for heart failure sufferers. Patients with sustained ventricular arrhythmias and a reduced LVEF should be considered for implantation of a defibrillator [24].

Heart transplantation still provides the best outcome and 5 year survival in established centres now approximates 65% [25]. The immediate success of surgery is directly related to the correct choice of the ideal donor and recipient. In larger centres with a vast waiting list such a match is more likely. Smaller centres are handicapped by a paucity of donors and a lack of effective bridging cardiac assist devices. This increases the likelihood of a prospective recipient dying while waiting. In these circumstances pressure to transplant encourages a less than ideal match. The presence of pulmonary hypertension remains the single most important risk factor for early death after transplant [26]. Our position in Malta is typical of a small isolated unit. A 19 year old male patient died last year awaiting transplantation, and our third transplantee who underwent bypass surgery one year previously, died of acute pulmonary hypertension having received the heart of an older donor. A good match yields gratifying results as evidenced by our first two recipients who are likely to continue to enjoy a good quality of life for years to come.

Transplantation remains a fascinating concept. There are some who believe that certain character traits of the donor may live on in the recipient. Recipients have occasionally been overcome by a strong urge to trace their donor and make contact with surviving relatives. Other recipients experience a depressive phase, feeling they are undeserving of a new lease of life brought about by another individual's tragic demise. The prospect of a permanent implantable device may solve these as well as other issues complicating transplantation. However, for the foreseeable future, transplantation is here to stay.

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