นิพนธ์ต้นฉบับ

Heart lung transplantation

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Heart and lung transplantation is an option for treatment of some end stage heart and/or lung diseases. We performed 7 heart lung transplantations. The indications for transplantation were Eisenmenger ASD in two patients, Eisenmenger VSD in one patient, primary pulmonary hypertension in three patients and Eisenmenger TGA and VSD in the last patient. Cold modifed Euro-Collin pulmonary flushing and intravenous prostaglandin E1 was used for lung preservation in all patients. Cardioplegia was used for heart preservation. The heart and lung were harvested in block. Procurement in other hospital was performed on 4 donors . The immediate postoperative lung functions were satisfactory in all patients. There was one perioperative death due to fungal peritonitis complicating peritoneal dialysis. Another death occurred 42 days postoperatively due to cytomegalovirus pneumonia. One late death at 5 months postoperative was due to cytomegalovirus pneumonia. The remaining four patients survived and had dramatic improvements in their exercise tolerance. The method of lung preservation we used is effective and reliable. With the present regimen for imunosuppression, an acute rejection

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episode is rare. We believe that heart lung transplantation is a good therapeutic option for patients with end stage heart and lung diseases. The improvement in cardiopulmonary reserve is great and the improvement is progessive. However, infection is still a major concer but if it can be controlled the survival rate of these patients will improve further.

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การผ่าตัดเปลี่ยนหัวใจและปอดเป็นการรักษามาตรฐานของโรคหัวใจ และ/หรือปอดขั้นสุดท้ายบางประเภท หน่วยศัลยศาสตร์ทรวงอก ภาควิชาศัลยศาสตร์ โรงพยาบาลจุฬาลงกรณ์ ได้ทำการผ่าตัดเปลี่ยนหัวใจและปอดสำเร็จรวม 7 ราย โรคของผู้รับการผ่าตัดได้แก่ Eisenmenger's syndrome 4 ราย และ Primary pulmonary hypertension 3 ราย เราได้ใช้ modified Euro Collin solution เข้าทาง pulmonary artery ร่วมกับการให้ prostaglandin E1 ทางหลอดโลหิตเป็นการรักษาปอด และใช้ cardioplegia รักษาหัวใจ การตัดหัวใจและปอดจากผู้บริจาคอวัยวะทำในโรงพยาบาล 3 ราย และทำในโรงพยาบาลอื่น 4 ราย หัวใจและปอดทำงานได้ดีในผู้ป่วยทุกราย ผู้ป่วย 1 ราย เสียชีวิตจากเยื่อบุช่องท้องอักเสบจากเชื้อรา ผู้ป่วยอีก 2 ราย เสียชีวิตจาก cytomegalovirus pneumonia ที่ 42 วัน และ 5 เดือน หลังการผ่าตัด ผู้ป่วยที่รอดชีวิตมีอาการดีขึ้นอย่างมากหลังการผ่าตัด สามารถออกกำลังกาย และทำงานได้โดยไม่มีอาการเขียวหรือเหนื่อยง่าย ผู้ป่วยรายแรกยังคงทำงานได้เป็นปกติหลังการผ่าตัดได้ 3 ปี ผลสรุปของการผ่าตัดเปลี่ยนหัวใจและปอดได้ผลดีพอสมควร ไม่มีปัญหาเรื่องการทำหน้าที่ของปอดในช่วงแรกหลังการผ่าตัด ปัญหาการติดเชื้อโดยเฉพาะเชื้อ cytomegalovinus เป็นสาเหตุการตายที่สำคัญ การใช้ Ganciclovir เพื่อป้องกันจะลดอัตราการติดเชื้อ และอัตราตายจากการติดเชื้อนี้ได้

End stage heart and lung disease in not uncommon. Previously there was no treatment for such conditions. These patients suffered and were a great burden to their relatives. Usually they would not survive longer than six months. Medical treatment was mostly symptomatic and did not improve their survival rate. Since the development of cyclosporin A in 1980, the growth of transplantations throughout the world has been rapid. First heart and lung transplantations were performed in Stanford, USA in 1981. the morbidity and mortality were much higher than for cardiac transplantation.[1] Different methods of lung preservation were investigated in many medical centers around the world. The survival rate has recently improved.[2] The indications for heart lung transplantation are today limited to Eisenmenger's syndrome and primary pulmonary hypertension. For most parenchymal lung diseases a single lung transplantation is performed, and for infective lung disorders such as cystic fibrosis or bronchiectasis sequential lung transplantation is the most accepted procedure.

Patients and method

Our heart lung transplantation program began in October, 1992. The receptients were endstage Eisenmenger's syndrome and primary pulmonary hypertension patients. Usually, they had very limited exercise tolerance, and some of them were home oxygen dependent. They were expected to live less than six months. The complete work up included echocardiogram, cardiac catheterization, lung function tests, serologic studies such as antiHIV, CMV titer, EBV titer, HBSAg, and arterial blood gas. A psychological evaluation for medical compliance was also conducted. The donors were brain dead patients with acceptable lung functions. The chest X-ray had to be clear. Even though most of our donors had purulent sputum, the gram stain could not reveal fungus. The size of donor had to be within 20% of the recepient. A broncoscopy was optional and could not reveal any foreign bodies in the tracheobronchial tree. Cold Eurocollin pulmonary arterial flushing and prostaglandin E1 were used for lung preservation and cold crystalloid cardioplegia for heart preservation. Enblock heart-lung harvest was our method of organ removal. The anastomoses were tracheal, right atrial and aortic. Immunosuppression included preoperative oral cyclosproin A and azathioprine. Intraoperative methylprednisolone was given intravenously just prior to aortic reperfusion. Postoperative steroids were omitted for the first 10 days and antithymocyte globulins was given instead. Cyclosporin and azathioprine were maintained into the postoperative period. Monitoring of whole blood cyclosporin levels. white blood cell counts and BUN and Cr was done every day. After discharge from the hospital, periodic spirometry and bronchoscopy with transbronchial biopsy were done as surveillance for acute lung rejection. Endomyocardial biopsy was not performed unless acute heart rejection was suspected.

Results

From October 1992 to March 1995, we performed 7 heart lung transplantations. The patients' details are shown in table 1.

No.	Age	Sex	Diagnosis	Date of Operation
1	30	F	Eisen. VSD	18/10/92
2	46	M	PPH	4/11/92
3	31	F	Eisen. ASD	30/03/93
4	56	F	Eisen. ASD	[illegible]
5	9	F	TGA,VSD, PH	[illegible]
6	43	F	PPH	[illegible]
7	40	F	PPH, SLE	[illegible]

Morbidity and Mortality

There was excessive bleeding in the first two patients which required resternotomy to stop it. Acute renal failure occured in the second patient. Peritoneal dialysis was required which was complicated by fungal peritonits and death resulted. Cytomegalovirus pneumonia developed in the 5th and 6th patients at 5 months and 2 months after tranplantation. Both resulted in mortality. There were no acute rejection episodes in any of the patients, and tracheal healing problem occurred in our series. Up to the present, there has been no incidence of chronic rejection in any of our patients. Periodic spirometry showed slow but progressively improvement in all patients' lung functions. All our patients are in functional class one and two are fully employed. One is a housewife who can exercise without dyspnea. One patient with SLE has marked improvement in her symptoms of dyspnea and joint pain.

Discussion

Heart lung transplantation is a good treatment for Eisenmenger's syndrome and primary pulmonary hypertension. Our lung preservation method has been is quite satisfactory. There has been no incidence of early pulmonary edema which is a sign of poor preservation and reperfusion injury.[1] Antithymocyte globulins may be responsible for the low incidence of acute lung rejection in our series. The same result was reported by a San Antonio group.[2] But it might also be responsible for a high incidence of cytomegaloviral pneumonia.[3] The mortality rate is quite high in lung transplant patients.[4] Even though there was no CMV mismatch in our group the infections were very virulent. Intravenous ganciclovir was not effective in our patients. The incidence of airway healing complications was low in heart lung transplants when compared to single lung transplantation.[5] This is explained by good collateral from the coronary arterial system to the bronchial arteries.[6] There is good evidence that right ventricle recovery is certain after single lung transplantation in primary pulmonary hypertension patients.[7] Hemodynamic instability in the postoperative period is frequent and the incidence of transplanted lung pulmonary edema is high.[8] We preferred heart lung transplantation for primary pulmonary hypertension rather than single lung transplantation. A pittsburg group suggested another approach.[9] Because the heart is usually

used for orthotopic transplantation, double lung transplantation is a choice for primary pulmonary hypertension. Right ventricle recovery is the rule. Heart lung transplantation is indicated only when LVEF is less than 35%. Eisenmenger's syndrome due to a correctable intracardiac defect should be treated by double lung transplantation with intracardiac repair. Heart lung transplantation should be reserved for incorrectable cardiac defects.

Conclusion

Our early experience in heart lung transplantation has been satisfactory. The method of lung preservation and harvest that we used is cost effective and reliable. The recovery of patients was rapid. Lung improvement was a long and progressive process. Perioperative bleeding can be lowered by improvement in surgical hemostasis. The most critical problem is infection, especially viral and fungal. The degree of immunosppression must be carefully adjusted to get a good balance between acute rejection and infection.

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