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Lung transplantation - current status

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In the past 20 years lung transplantation has evolved from a clinical experiment to an accepted treatment option for terminal pulmonary disease. Marked progress has been achieved in pulmonary preservation, and ischemic times of up to 10 hours are part of the current practice with good clinical results.

Two key problems remain that deserve further attention, the shortage of donor organs and chronic rejection. It has become increasingly evident that “marginal donors”, as judged by traditional donor criteria, may still have preserved pulmonary structure with good graft function after transplantation. It is currently unclear, how many of marginal or unacceptable lungs may indeed be improved by preconditioning, such as administration of surfactant or use of prostaglandins. Living-related organ donation has been used in some centers and has become increasingly accepted. The use of non-beating heart donors for pulmonary transplantation has primarily been the subject of experimental research, but may in the future increase the donor pool drastically.

The treatment of acute rejection has been effective and reproducible since the early days of lung transplantation. Chronic rejection, however, remains as the most important long-term problem in lung transplantation. With increasing experience, the occurrence of reperfusion injury, multiple acute rejection episodes and viral infections have been identified as risk factors for obliterative bronchiolitis. Further risk factors may be identified in the future. It is as yet unclear whether tacrolimus- and mycophenolat mofetil-based immunosuppression can prevent the development of OB, and it is even more unclear, whether sirolimus or everolimus or other new immunosuppressants may be effective. Once chronic rejection has been detected by pulmonary function testing, modified immunosuppression is currently the only effective means of stabilizing this otherwise progressive phenomenon.

In the past 20 years, lung transplantation has become a realistic treatment option for many patients with pulmonary disease. The limitations in the donor pool may be overcome in the future by new approaches, such as using lungs from non-beating heart donors. Once the pathologic process of chronic graft dysfunction is fully illustrated, gene transfection may become a new tool to increase the long-term results of pulmonary transplantation.