Liver Transplantation
- What Lessons Have We Learned?

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Since the first experimental attempts fifty years ago, liver transplantation has come of age, and evolved into the treatment of choice for end stage liver disease. Numerous scientific and clinical developments have contributed to this success, allowing many patients to survive life threatening diseases, and to improve their quality of life. Important personal, institutional and multi center lessons learned are as follows.

Lesson # 1 - Patient selection

One of the first hard lessons to be learned, was the assessment of an individual patient's severity of liver disease. Appropriate timing of the transplant procedure and detection of preoperative risk factors have become crucial to achieve good post transplant survival and full rehabilitation. Instruments to facilitate clinical staging are the Child classification, and more recently the MELD score which is also used for organ allocation. In tumor patients, accurate diagnosis and preoperative staging is still questionable, and outcome is often dependent on the efficacy of multi modality treatment protocols. With increasing experience and improvement of overall management, absolute contraindications for transplantation have become an exception in many centers.

Lesson # 2 - Organ preservation

Identification of suitable organ donors, and minimization of ischemia/reperfusion injury are essential prerequisites for primary graft function, which is a major determinant for uncomplicated patient recovery and survival. Standardized multi organ procurement procedures using either UW or HTK solution for perfusion and storage, have allowed to extend preservation times, in order to ameliorate logistics and to perform the recipient operation within fairly safe limits.
Lesson # 3 - Surgical technique

Standardization and refinements of surgical techniques have always played a major role along the evolution of liver transplantation, and transformation into an operation with calculated risks and outcomes. Over time, individual patient needs have initiated the further development of significant modifications, e.g. partial, split, domino and living related transplantation. Many of these innovative techniques were, in fact, introduced to alleviate donor organ shortage, and to allow transplantation of otherwise unsalvageable patients.

Lesson # 4 - Immunosuppression

The success of solid organ transplantation is dependent on effective prevention and treatment of alloimmune reactions affecting graft function. Based on the understanding of graft-recipient interactions as well as inter- and intracellular molecular mechanisms, numerous new immunosuppressive drugs could be developed and introduced into clinical practice. Most transplant centers use different combinations and regimens, including steroid free protocols. The major focus these days is the avoidance of overimmunosuppression and the reduction of individual drug toxicity and side effects. Attempts at tolerance induction are promising.

Lesson # 5 - Disease management

Improvement of early patient and graft survival has shifted recent interest to long term survival and quality of life. Prevention and treatment of recurrent liver disease, like hepatitis C or hepatocellular carcinoma, is thus of increasing importance. Interdisciplinary management of these patients as well as development of antiviral drugs and new antitumor concepts will be necessary to finally control these diseases. Of course, prevention of end stage liver disease would be the ideal approach to ultimately avoid liver replacement.

Despite all achievements, the learning curve of liver transplantation is not finished today. In addition to further improvements and fine tuning in all areas discussed, the major challenge in the future remains the gap between growing demands and limited resources. To transplant all potential candidates in the light of donor organ shortage, will require not only continued efforts within the medical community, but also major support from our societies.