



European Liver Transplant Registry

A service of the European Liver and Intestine Transplant Association (E.L.I.T.A) www.elita.org

A section of the European Society of Transplantation (E.S.O.T) www.esot.org

In collaboration with:

The Liver Intensive Care Group of Europe (LICAGE). www.licage.org

The European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) www.espghan.med.up.pt

History and Aim

The idea of a European Liver Transplant Registry (ELTR) was brought up at the meeting of the European Society for Organ Transplantation (ESOT) www.esot.org in Munich, 1985. Further to the proposition of Prof. Henri Bismuth, a group including the main liver transplant Centers (Henri Bismuth - Villejuif, Roy Calne - Cambridge and Rudolf Pichlmayr - Hannover) decided to create the ELTR with the following objectives:

- Registry of all adult and pediatric liver transplantation (LT) procedures in Europe
- Link between European LT Centers
- Scientific use and publications.



Roy Calne
U.K.



Henri Bismuth
France



Rudolph Pichlmayr
Germany

Paul Brousse Hospital (Villejuif, France) was designated to manage and analyze the data of ELTR since its creation in 1985. Two years later, ELTR had collected information on all LT recipients from 32 European centres (Lancet, 2: 674, 1987) and since 1991 from 67 centres (Transplant Proc, 21: 2383, 1991). In 1993, the ELTR has become a service of the European Liver and Intestine Transplant Association (ELITA) www.elita.org. Between 1968 and December 2015, the ELTR has collected data regarding 130,441 LTs performed in 168 centres from 33 European countries. The ELTR have a truly global representation of European countries with clear prerequisites for contribution to ensure quality, validity, and reliability.



Coordinating Committee

A standardized and computerized method for data entry has been developed by the ELTR coordination Committee (ELTR-CC) to collect accurate and uniform data in all liver transplants across the European participating centres. Each Centre participates by collecting the requested data of all the LTs and the follow-up of the recipients and living donors.

The ELTR-CC is responsible for maintaining the data collection system, monitoring the quality of the data, and for statistical data analysis. Data Analysis with adult and pediatric figures are then published and transmitted to all the participating centers. A set of updated PP slides is put in the website at the disposal of the authorized users (cf. "Data communication and Publication"). Periodical meetings are organized by the ELTR-CC to review the data and to discuss topics of scientific and clinical interest. The ELTR Coordinating Committee is composed of:



René Adam
Custodian



Vincent H. Karam
Data Manager



Valérie Delvart
Biostatistician



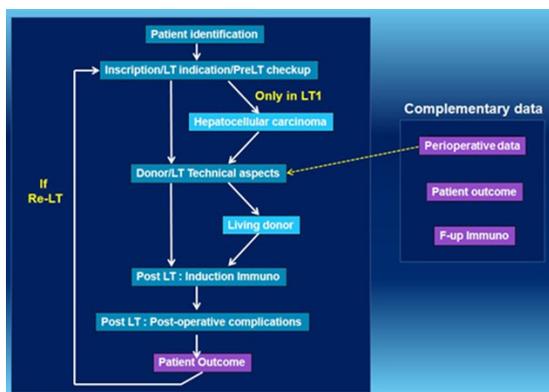
Anne-Marie Lamerant
Secretary



Data Management and quality Control

1. Questionnaire, Database and Data transfer

The questionnaire includes data on LT indication, donor and recipient, technical aspects of LT (live donation, split liver, domino transplant, Non heart beating donors,...), immunosuppression, patient follow-up and contains questions on the cause of death or graft failure. The ELTR has developed an online application (Electronic Data Capture – EDC) for collecting data according to the cycle below.



To encourage completion, the questionnaire was intentionally limited to the main items. The ELTR Web-based module “ELTRweb platform” was developed to allow for real-time data capture. Software, questionnaires, validation routines and statistics are located on a central server, which can be accessed from participating transplant centers with a standard internet browser.

This web-based approach enhances participation, and avoids time-consuming installation of software in many different centres. The ELTRweb platform was built by a SAS®-Programmer with innovative techniques of SAS technology for collection and analysis of electronic clinical data. It was tailored to meet the needs of LT centres looking to run registry studies.

2. Data validation

The data-entry process is dynamically controlled. A logic control procedure has been developed. The data are subjected to checks for completeness, consistency, and range. Comprehensive logical intra- and inter-updates are performed. A list of the queries is communicated to the Centre's personnel in charge of data management each time a new update comparison is performed. The Centre performs the corrections before the data validation for analysis.



In addition, the ELTR has established a data sharing collaboration with the key European Organizations:

NHS Blood and Transplant United Kingdom Blood and Transplant Authority (NHSBT) www.nhsbt.nhs.uk

Spanish "Organización Nacional de Transplantes" (ONT) www.ont.es

French "Agence de la Biomédecine" (ABM) www.agence-biomedecine.fr

Deutch "Nederlandse Transplantatie Stichting" (NTS) www.transplantatiestichting.nl

Scanditransplant (Denmark, Finland, Norway and Sweden) www.scanditransplant.org

Eurotransplant Foundation (Austria, Belgium, Croatia, Germany, Luxembourg, Netherlands and Slovenia) www.eurotransplant.org

The purpose of these agreements was to exchange and cross-check data collected from European Centres. The harmonization of questionnaires and classifications, essential step, was conducted prior to the start of collaboration.

The ELTR established also collaboration with the Liver Intensive Care Group of Europe (LICAGE). Main perioperative variables were added to the ELTR questionnaire. The aim of this scientific collaboration is to bring together from throughout Europe specialists of all disciplines involved in the perioperative and long-term care of liver transplant recipients.

3. Data analysis

Data are analyzed with Statistical Analysis System (SAS). The dynamics of data control are continued during the statistical analyzes.



Editing and referral to clinical records are used when necessary to resolve any inconsistencies that are detected during the analysis. Most of the studies in which ELTR data is analyzed require calculation of graft and patient survival rates. These are determined by actuarial methods and the statistical significance is determined by the logrank test to compare survival curves. Regression methods are also used to identify risk factors associated with LT.

The ELTR is also a pediatric database and a specific routine data analysis concerns this population of patients.

4. Experts Scientific Committee, Workshops and Congresses

Periodic meetings are organized by the ELTR Expert Committee to review the questionnaire and to discuss topics of scientific and clinical interest. The expert Committee is composed of hepatologists and surgeons, which discuss each item of the questionnaire and validate the data entry masks and the instruction handbook. Periodic workshops are also organized each two years and all of the persons in charge of the updating of ELTR data (Transplant Coordinators, Data Managers, OSO representatives) who are invited to give their comments and to report problems.



The ELTR-EC and the workshops permit to adapt the questionnaire and the data management procedures to the evolution of LT, in order to provide an updated evaluation of LT results.

Traditionally, ELITA/ELTR organizes a Specialty Update Symposium at each ESOT Congresses. Moreover, The ELITA/ELTR organizes frequently joint meetings with other societies and registries with topics of common interest:

 the European Society of Transplantation (E.S.O.T)
www.esot.org

 the International Liver Transplantation Society (ILTS)
www.ilts.org

 The European Association for the Study of the Liver (AASLD) www.aasld.org

 The Liver Intensive Care Group of Europe (LICAGE)
www.licage.org

 Familial Amyloidotic Polyneuropathy World Transplant Registry and Domino Liver Transplant Registry (FAPWTR) www.fapwtr.org

 The International Liver Cancer Association (ILCA)
www.ilca-online.org

 The European Acute Liver Failure Registry (EUROALF) www.medscinet.net

5. Audit visits

To compare information contained in the report with original source documents or database, additional measures have been taken and include site visits to the Centres. In 1997, the ELTR coordinating team appointed an independent committee:

- Vincent KARAM, France
- Bridget GUNSON, UK
- Chantal DE REYCK, Belgium
- Wolfgang WANNOFF, Germany
- Baltasar PEREZ SOBREDO, Spain



to perform the audits according to a predetermined standard methodology. Five randomly selected centres are visited per year. The audit visits also allow resolution of any centre-specific problems that may have arisen and define guidelines to prevent further errors. A confidential audit report is sent to the head of the Centre with the list of inconsistencies.



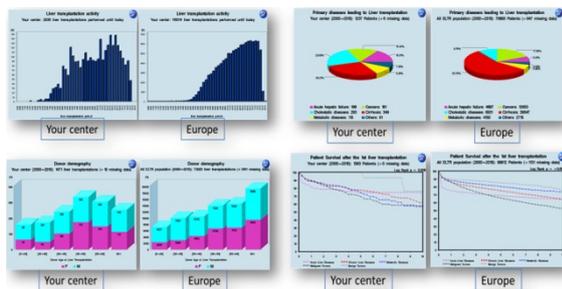
TRANSPLANTATION has published a forum with our manuscript describing the ELTR auditing procedure as the lead article (cf. Publications).

Data Communication and Publications

The ELTR is increasingly present in scientific congresses with more than 10 communications per year (lectures and abstracts). The ELTR has also published 45 peer-reviewed papers in the main scientific journals. The list of publications is available in the appendix.



The ELTR Centers have access to their real-time center's specific and European data analysis.



ELTR created in 1997 a website www.eltr.org that is continuously updated. The ELTR website contains the following information:

- News (Audit visits, ongoing studies, ELTR events...)
- ELTR purpose and description of the procedures
- Updated list of contributing centres
- Data analysis results (52 figures and slides)
- Biannual center Specific analysis (protected pdf)
- ELTR conventional slides (pw protected)
- Online data request form
- List of publications
- Links



Home Page of www.eltr.org

Once a year, ELTR send a Newsletter to all the contributing centers and ELITA members. Purpose of the newsletter is to inform members about new developments within the Registry, such as enrolment of new centers, updated numbers, collaborations, future meetings and publications of ELTR-studies. In addition, it contains an overview of activities during the previous year.

Funding

From its inception the ELTR has been funded by money raised by individuals in the liver transplant community channeled through ELITA and the Paul Brousse University Hospital. Biomedical companies also participate with unrestricted educational and yearly grants.

The size, completeness and continuous validation of the database, now warrant an improved financial structure. Both ELTR and ELITA officers with the backing of ESOT council are seeking funding structures to maintain, continue and expand the ELTR – the only pan European database on liver transplantation in Europe. It is a European resource of very great importance for scientific research, patient safety, professional audit, and for information on results of donation.

...The randomized registry trial represents a disruptive technology, a technology that transforms existing standards, procedures, and cost structures. Will it be given serious consideration as a way to resolve the recognized limitations of current clinical-trial design? Theodore Roosevelt once said, "Do what you can, with what you have, where you are." Today we can no longer afford to undertake randomized effectiveness trials that cost tens or hundreds of millions of dollars. But today we also have registries and other powerful digital platforms...

Michael S. Lauer, M.D., and Ralph B. D'Agostino, Sr., Ph.D.
N Engl J Med 369;17 October 24, 2013



APPENDIX

Publications

- 1- Hepatic transplantation in Europe: first report of the European Liver Transplant Registry. Bismuth H et al. [Lancet 1987](#)
- 2- Liver Transplant Registry Report. Gordon RD, Bismuth H. [Transplant Proc 1991](#)
- 3- Normalised intrinsic mortality risk in liver transplantation: European Liver Transplant Registry Study. Adam R. et al. [Lancet 2000](#)
- 4- Quality control of the European Liver Transplant Registry: results of audit visits. Karam V et al. [Transplantation 2003](#)
- 5- Quality control of transplant registries. Morris P, Monaco A. [Transplantation 2003](#)
- 6- Assessing the quality of data in a transplant registry: The European Liver Transplant Registry. Van der Meulen J et al. [Transplantation 2003](#)
- 7- Evolution of liver transplantation in Europe: report of the European Liver Transplant Registry. Adam R et al. [Liver Transplantation 2003](#)
- 8- Liver transplantation in Europe: is there a room for improvement? Adam R, Luccidi V., Karam V. et al. [J Hepatology 2005](#)
- 9- Liver transplantation for Budd-Chiari syndrome: A European study on 248 patients from 51 centres. Mentha G et al. [J Hepatology 2006](#)
- 10- Liver Transplantation for Hereditary Hemorrhagic Telangiectasia: Report of the European Liver Transplant Registry. Lerut J et al. [Annals of Surgery 2006](#)
- 11- Impact of donor age and year of transplantation on graft and patient survival following liver transplantation for hepatitis C virus. Mutimer DJ et al. [Transplantation 2006](#)
- 12- 3-month and 12-month mortality after first liver transplant in adults in Europe: predictive models for outcome. Burroughs A et al. [Lancet 2006](#)
- 13- The place of liver transplantation in Caroli's disease and syndrome. De Kerckhove L et al. [Transplant International 2006](#)
- 14- Liver transplant in cystic fibrosis: a poll among European centers. A study from the European Liver Transplant Registry. Melzi ML et al. [Transplant International 2006](#)
- 15- Living liver donor mortality: where do we stand? Bramstedt KA et al. [Am J Gastroenterology 2006](#)
- 16- Documented deaths of hepatic lobe donors for living donor liver transplantation. Trotter JF et al. [Liver Transplantation 2006](#)
- 17- The place of liver transplantation in the treatment of hepatic epitheloid hemangioendothelioma: report of the European liver transplant registry. Lerut J et al. [Annals of Surgery 2007](#)
- 18- Towards a better liver transplant allocation system. Burroughs AK et al. [Liver Transplantation 2007](#)
- 19- Liver transplantation for primary and metastatic liver cancers. Hoti E and Adam R. [Transplant International 2008](#)
- 20- Liver transplantation: the current situation. Adam R and Hoti E. [Seminars in Liver Disease 2009](#)
- 21- Primary liver transplantation for autoimmune hepatitis: a comparative analysis of the European Liver Transplant Registry. Schramm C et al. [Liver Transpl. 2010](#)
- 22- Liver transplantation for alcoholic liver disease in Europe: a study from the ELTR (European Liver Transplant Registry). Burra P et al. [Am J Transplant. 2010](#)
- 23- Liver transplantation for unresectable hepatocellular carcinoma in patients without liver cirrhosis. Mergental H, Porte RJ. [Transplant International 2010](#)
- 24- Liver transplantation for colorectal liver metastases: revisiting the concept. Foss A, Adam R, Dueland S. [Transplant International 2010](#)
- 25- Liver transplantation and vascular tumours. Bonaccorsi-Riani E, Lerut JP. [Transplant International 2010](#)
- 26- Excellent survival after liver transplantation for isolated polycystic liver disease: A European Liver Transplant Registry study. van Keimpema L et al. [Transplant International 2010](#)
- 27- Validation of the donor risk index in orthotopic liver transplantation within the Eurotransplant region. Blok JJ et al. [Liver Transpl. 2012](#)
- 28- Liver transplantation for acute liver failure in Europe: outcomes over 20 years from the ELTR database. Germani G et al. [J Hepatol. 2012](#)



29- Evolution of indications and results of liver transplantation in Europe. A report from the ELTR. Adam R et al. [J Hepatol. 2012](#)

30- The Eurotransplant donor risk index in liver transplantation: ET-DRI. Braat AE et al. [Am J Transplant. 2012](#)

31- The use of fatty liver grafts in modern allocation systems: risk assessment by the balance of risk (BAR) score. Dutkowski P et al. [Ann Surg. 2012](#)

32- Liver transplantation for unresectable hepatocellular carcinoma in normal livers. Mergental H et al. [J Hepatol. 2012](#)

33- Hepatic hemangiosarcoma: an absolute contraindication to liver transplantation—the ELTR experience. Orlando G et al. [Transplantation. 2013](#)

34- Liver transplantation for HBV-related cirrhosis in Europe: an ELTR study on evolution and outcomes. Burra P et al. [J Hepatol. 2013](#)

35- Incorporation of donor risk into liver allocation algorithms. Braat AE et al. [Am J Transplant. 2013](#)

36- Liver transplantation for neuroendocrine tumors in Europe—results and trends in patient selection: a 213-case European liver transplant registry study. Le Treut YP et al. [Ann Surg. 2013](#)

37- The difficulty in defining extended donor criteria for liver grafts: the Eurotransplant experience. Silberhumer GR et al. [Transpl Int. 2013](#)

38- A preliminary European Liver and Intestine Transplant Association-European Liver Transplant Registry study on informed recipient consent and extended criteria liver donation. Bruzzone P et al. [Transplant Proc. 2013](#)

39- Is liver transplantation justified in septuagenarians? Karam V, Delvart V and Adam R. [le Courier de la Transplantation 2013](#)

40- Compared efficacy of preservation solutions in liver transplantation: a long-term graft outcome study from the European Liver Transplant Registry. Adam R et al. [Am J Transplant. 2015](#)

41- Reply to Letter Regarding "Compared Efficacy of Preservation Solutions in Liver Transplantation: A Long-Term Graft Outcome Study From the European Liver Transplant Registry". Adam et al. [2015](#)

42- Improved survival in liver transplant recipients receiving prolonged-release tacrolimus in the European Liver Transplant Registry. Adam R et al. [Am J Transplant. 2015](#)

43- Liver transplantation for adenomatosis: European experience. Chiche L et al. [Liver Transplantation 2016](#)

44- Comparison of Two Questionnaires on Informed Consent in "Marginal" Donor Liver. [Transplant Proc. 2016](#)

45- Strict Selection Alone of Patients Undergoing Liver Transplantation for Hilar Cholangiocarcinoma Is Associated with Improved Survival. Hendrik T et al. [PLOS ONE 2016](#).

