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Establishment and activities of Lublin Eye Bank

The Lublin Eye Bank activity started in 1992 and was supported from the beginning by the Tadeusz Krwawicz Foundation. The Lublin Eye Bank was the very first eye bank established in Poland. From 1992 to 1993 corneo-scleral buttons (corneas with sceral rim) were stored in a medium Likorol or directly trephinated from whole eyeballs, which were kept in moist chambers. Serological tests of donors' blood for Hepatitis B (HBS), Hepatitis C (HBC), HIV, and syphilis, were performed in the Lublin Blood Bank.

In 1994 the Lublin Eye Bank was restructured and adapted to standards of the IFEB (International Federation of Eye Banks, Baltimore, USA) and became the full member of this Federation. At the same time the Lublin Eye Bank received accreditation certificate issued by the IFEB. Since 1995 the Lublin Eye Bank is also a member of the European Eye Bank Association.

The Lublin Eye Bank is located in the 1st Eye Hospital building in Lublin, Chmielna 1 Street, and occupies seven rooms of a total area of 80 sq m. The equipment includes laboratories designed to process tissues for transplantation purposes: corneal evaluation room with a slit-lamp and a specular microscope for tissue examination, tissue preparation laboratory with a laminar flowhood chamber, and an UV chamber, sterilization laboratory and rooms for technicians.

There are seven employees in the Lublin Eye Bank: eye bank manager, four technicians, and two medical supervisors (ophthalmologists). There is a system of a shift work in the Eye Bank. On national or university holidays technicians are on call.

The main tasks of the Lublin Eye Bank are: 1. Ocular tissue recovery, 2. Amniotic membrane recovery, 3. Preparation of harvested tissues for transplantation purposes, 4. Tissue storage and distribution.

OCULAR TISSUE RECOVERY AND PREPARATION

Ocular tissues harvested in the Lublin Eye Bank include corneo-scleral buttons (corneas with scleral rim) and whole eye balls, which are the source of sclera and cornea – both used for transplantation purposes.

The screening of potential ocular tissue donors is crucial. There are certain medical and social criteria qualifying a potential donor. The obligatory action is to check a donor's social security number (*pesel* – in Polish) and donor's name in the central register of opposition to tissue donation (*Centralny Rejestr Sprzeciwów – CRS* – in Polish), whether a potential donor did not object to tissue donation.

Then the detailed information concerning the cause of death, age, medical and social history, time of death of a potential donor are gathered and analysed.

There is a number of donor medical exclusion criteria to ocular tissue donation according to the IFETB standards (International Federation of Eye and Tissue Banks – the federation changed the name from IFEB to IFETB in 2002). These criteria are divided into two large groups: general and ocular contraindications. Ocular tissue from donors with the evidence of systemic infections or certain systemic diseases may be potentially health threatening for the recipients or it poses a risk to the success of surgery and should not be offered for surgical purposes. General contraindications include: sepsis, active viral hepatitis, AIDS, Creutzfeldt-Jacob disease, rabies, active tuberculosis, active viral encephalitis or encephalitis of unknown origin, progressive multifocal leucoencephalopathy, active rheumatic fever, congenital rubella, Reyes syndrome. Ocular (local) contraindications for ocular tissue donation include: malignant tumours of anterior and posterior segment of the eye, active periocular or intraocular inflammation, corneal scars and ulcers, keratoconus, keratoglobus, major pterygium, conditions following refractive corneal procedures (radial keratotomy, LASIK, LASEK).

The death to preservation time (placement of tissue in a storage medium) for donors up to 50 years old should be maximum 20 hours, whereas for donors aged from 51 to 75 it should not exceed 18 hours. According to the Polish transplantation law, prosecutor's agreement for ocular tissue recovery should be recorded in writing and attached to donor's files in all forensic medicine cases. Corneo-scleral buttons and (rarely) whole eyeballs are recovered in Pathology Departments and in Forensic Medicine Departments. The Lublin Eye Bank has two collecting centres: in the Forensic Medicine Department in Cracow and in the Pathology Department in Biała Podlaska.

Just before ocular tissue procurement, corneas are evaluated by a penlight in order to identify macroscopically ocular diseases, infections, or pathological large corneal blood vessels. Recovered corneo-scleral buttons (scleral rim measures about 3–4 mm of width) are placed in a storage medium – Eusol in the temperature of +4°C for maximum 14 days (Fig. 1). Whole eyeballs are placed in moist chambers and in 24 hours sclera and cornea are retrieved and processed. Sclera is stored in 100% ethanol in the room temperature and expires after one year.

Fig. 1. Corneo-scleral button in Eusol preservative medium

After ocular tissue recovery, all corneal layers are very carefully evaluated in a slit-lamp and then in a specular microscope. Specular microscopy examines and evaluates the quality of corneal endothelium and measures the density of corneal endothelial cells. The density of corneal endothelium is extremely important to successful surgery. Very frequently corneal tissue is not accepted for transplantation purposes due to insufficient density of endothelial cells.

Donor blood samples are collected in order to perform serological tests for Hepatitis B (HBS), Hepatitis C (HCV), HIV, and syphilis. Serological tests are performed in the Central Hospital Laboratory. Serological tests for HTLV 1 and 2 were ceased in 2000.

Few corneas are also kept periodically in a tissue culture. Unfortunately, the number of corneal transplants processed by this method is limited because of the higher costs.

AMNIOTIC MEMBRANE RECOVERY AND PROCESSING

Amniotic membrane is recovered from placenta of women who underwent delivery by planned caesarean section (Fig. 2). There is a necessity of obtaining a written agreement of placenta donors (newly delivered mothers) for blood sample collection in order to perform serological tests: Hepatitis B (HBS), Hepatitis C (HCV), HIV, and syphilis.

Amniotic membrane is stored in a special medium consisted of Dulbecco's Modified Eagle Medium and glycerol in the ratio of 1:1 in temperature –80°C. The usefulness of amniotic membrane is up to two years.

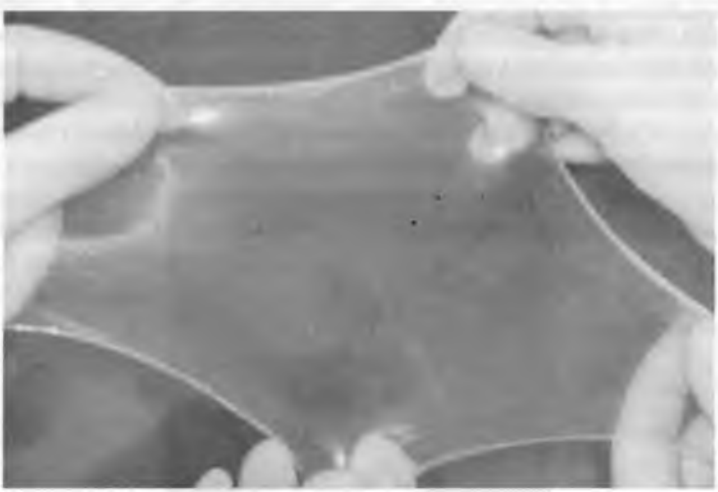

Fig. 2. Freshly prepared amniotic membrane

TISSUE DISTRIBUTION

The Lublin Eye Bank distributes ocular tissues and amniotic membrane to ophthalmology departments and hospitals all over Poland. According to the agreement between IFETB and Hospital SPSK 1 in Lublin, corneas, which are currently not needed in Poland, can be shipped abroad "for rescue" according to IFETB directions.

RESULTS

From 1992 to November 2006 in the Lublin Eye Bank 5,420 corneas and 91 whole eyeballs were recovered from 2,950 donors.

Table 1. The number of donors, procured corneas, and transplanted corneas during almost 14 years activity of the Lublin Eye Bank

Year	Number of donors	Number of procured corneas	Number of transplanted corneas
1992–1993	25	25	25
1994	96	159	113
1995	227	413	308
1996	296	545	412
1997	213	407	244
1998	259	478	308
1999	211	381	264
2000	232	442	331
2001	261	494	324
2002	252	475	352
2003	239	431	280
2004	252	469	324
2005	218	396	288
2006 (until November)	169	305	219

During almost 14 years of the Lublin Eye Bank activity, about 75% of recovered corneas were transplanted, and the rest of them were disqualified for transplantation purposes due to various reasons. Totally 1,425 corneas were not transplanted. The numbers and reasons of corneal tissue rejection for transplantation purposes is presented in Tables 2 and 3.

Table 2. Reasons and number of the corneal tissue rejection for transplantation purposes in the Lublin Eye Bank (1992 – Nov. 2006)

Reasons of corneal tissue rejection for transplantation purposes (1992 – November 2006)	Number of corneas
Insufficient or poor quality and low endothelial cell density	967
General contraindications	51
Ocular contraindications	1
Training recovery	41
Recovery for scientific purposes/investigations	54
Positive serological results	311

Table 3. Number of corneas procured from serological positive donors in the Lublin Eye Bank (1992 – Nov. 2006)

Serological test (positive results)	Number of corneas
Hepatitis B (HBV)	76
Hepatitis C (HCV)	101
HIV	18
Syphilis	41
HTLV	16

Until Nov. 2006 the Lublin Eye Bank prepared 1,907 pieces of amniotic membrane measuring 3 cm x 3 cm.

All Lublin Eye Bank employees underwent special eye banking training in the International Training Centre of the IFETB in Prague, Czech Republic.

The Lublin Eye Bank has accreditation certificate issued by the IFETB. The Lublin Eye Bank staff actively participates in annual conferences of the EEBA (European Eye Bank Association) and also in meetings, symposiums, and seminars organized by the IFETB, Baltimore, USA.

For nearly 14 years, the Lublin Eye Bank has been taking pride in being able to provide corneal tissue for transplant for patients all over Poland. Thanks to the Lublin Eye Bank every year hundreds of Polish people can receive an exceptional gift – sight.

SUMMARY

The Lublin Eye Bank activity started in 1992 and was supported from the beginning by the Tadeusz Krwawicz Foundation. The Lublin Eye Bank was the very first eye bank established in Poland. In 1994 the Lublin Eye Bank was restructured and adapted to standards of the IFEB (International Federation of Eye Banks, Baltimore, USA) and became the full member of this Federation. The Lublin Eye Bank is located in the 1st Eye Hospital building in Lublin, Chmielna 1 Street. The main tasks of the Lublin Eye Bank are: ocular tissue recovery, amniotic membrane recovery, preparation of harvested tissues for transplantation purposes, tissue storage and distribution. From 1992 to November 2006 in the Lublin Eye Bank 5,420 corneas and 91 whole eyeballs were recovered from 2,950 donors. During almost 14 years of the Lublin Eye Bank activity, about 75% of recovered corneas were transplanted, and the rest of them were disqualified for transplantation purposes due to various reasons: insufficient or poor quality and low endothelial cell density, general and ocular contraindications, positive serology results. Totally 1,425 corneas were not transplanted. Until November 2006 the Lublin Eye Bank prepared 1,907 pieces of amniotic membrane measuring 3 cm x 3 cm. The Lublin Eye Bank provides ocular tissue for transplant for hundreds of patients all over Poland.

Powstanie i działalność Lubelskiego Banku Tkanek Oka

Lubelski Bank Tkanek Oka rozpoczął swoją działalność w 1992 roku, wspierany od momentu swojego powstania przez Fundację im. Prof. Tadeusza Krwawicza i Państwowy Szpital Kliniczny nr 1 w Lublinie. W roku 1994 Lubelski Bank Tkanek Oka został dostosowany do standardów Międzynarodowej Federacji Banków Ocznych w Baltimore, USA (*IFEB – International Federation of Eye Banks*) i stał się członkiem tej federacji. Bank mieści się w budynku I Kliniki Okulistyki AM w

Lublinie przy ul. Chmielnej 1, na kondygnacji S2. Do zadań Lubelskiego Banku Tkanek Oka należy: pozyskiwanie tkanek oka od dawców, pozyskiwanie błony owodniowej, przygotowanie uzyskanych tkanek do celów transplantacyjnych, dystrybucja tkanek do przeszczepów. Od roku 1992 do listopada 2006 roku w Banku Tkanek Oka w Lublinie pozyskano 5420 rogówek z rąbkiem twardówki i 91 całych gałek ocznych od 2950 dawców. W przeciągu prawie czternastu lat działalności Banku przeszczepionych zostało około 75% wszystkich pozyskanych rogówek. Około 25% materiału nie zakwalifikowano do celów transplantacyjnych z różnych powodów, m.in.: niedostatecznej jakości i niskiej gęstości komórek śródbłonka rogówki, przeciwwskazań medycznych (ze względu na chorobę ogólną i chorobę narządu wzroku), pozytywnych wyników badań serologicznych. Ogółem nie przeszczepiono 1425 rogówek. Do listopada 2006 roku zespół Lubelskiego Banku Tkanek Oka przygotował 1907 preparatów błony owodniowej o wielkości 3 cm x 3 cm. Preparaty te wysyłane są do klinik i szpitali na terenie całego kraju. Lubelski Bank Tkanek Oka dostarcza co roku tkanki oczne do przeszczepu dla setek chorych w całej Polsce.