Introduction to transplantology

lecture
IV year
Medical Faculty

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Head of the Transplantology and General Surgery Department

PART I – general considerations


HORYZONT 5KM

„Tis is only a dream – will never be applied in real medicine”

„Such experiments should be banned – nobody will be saved from unevitable death”

„there is no place for such experiments in this country”

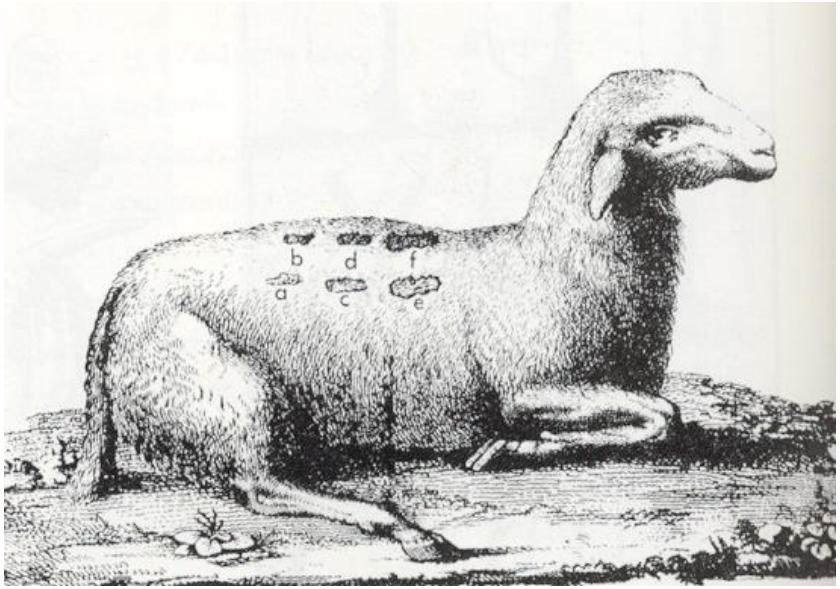
„this method is efficient in the treatment of several conditions”

„ Such excellent results have never been achieved with any other treatment modality”

800 BC – nose reconstruction, India

300 AC - St. Kosma and Damian

1804 - G. Boronio, Italy

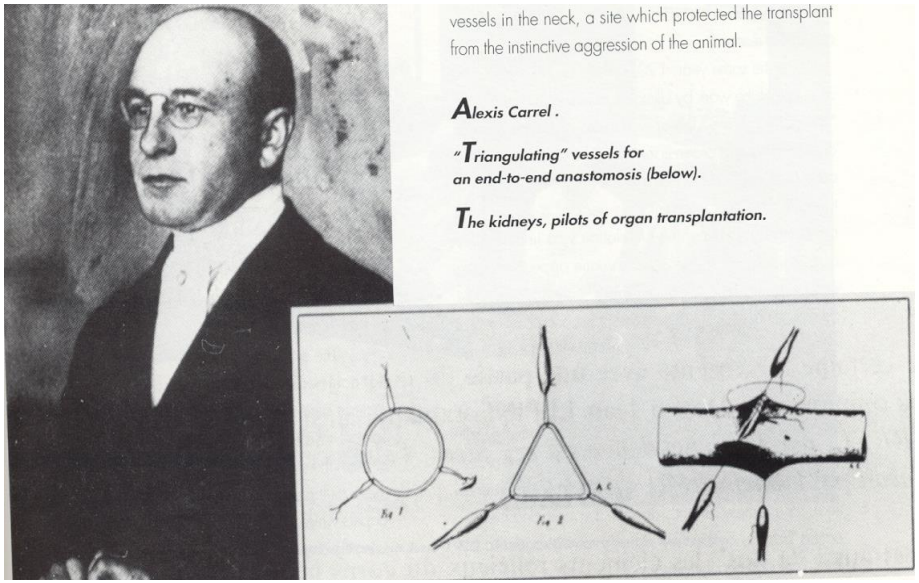


1880 – corneal transplantation

1906 – experimental kidney Tx, Jaboulay

1908 - Carrel – kidney Tx

1933 - Voronoy – kidney Tx in human

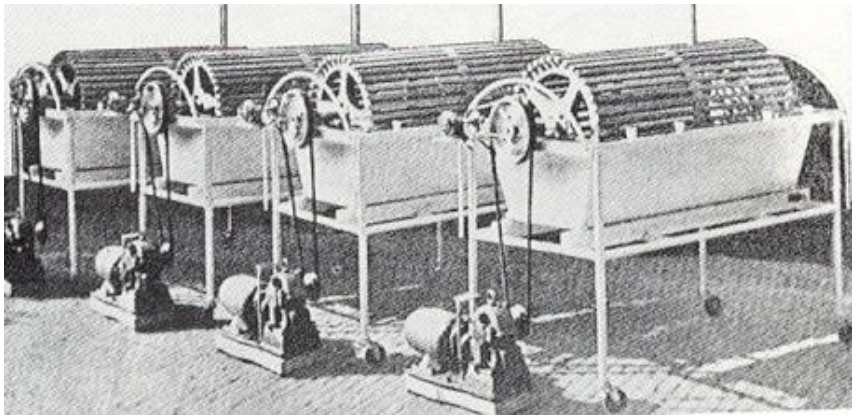


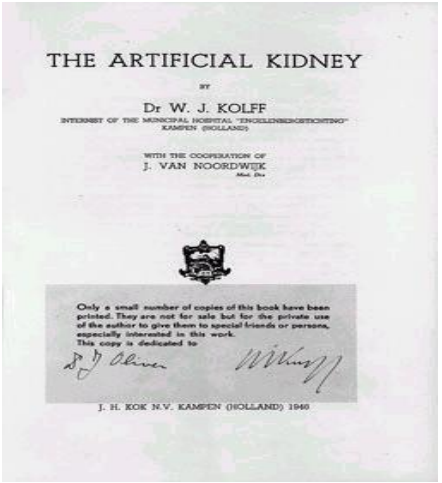
vessels in the neck, a site which protected the transplant from the instinctive aggression of the animal.

Alexis Carrel .

"Triangulating" vessels for an end-to-end anastomosis (below).

The kidneys, pilots of organ transplantation.

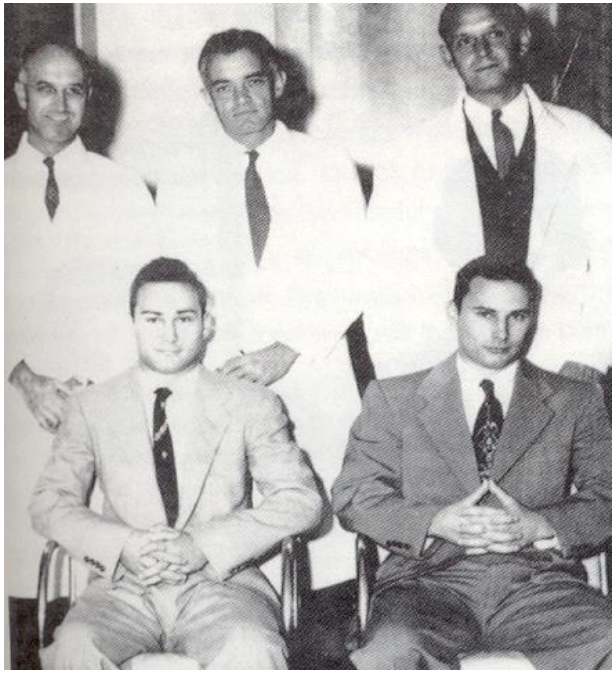




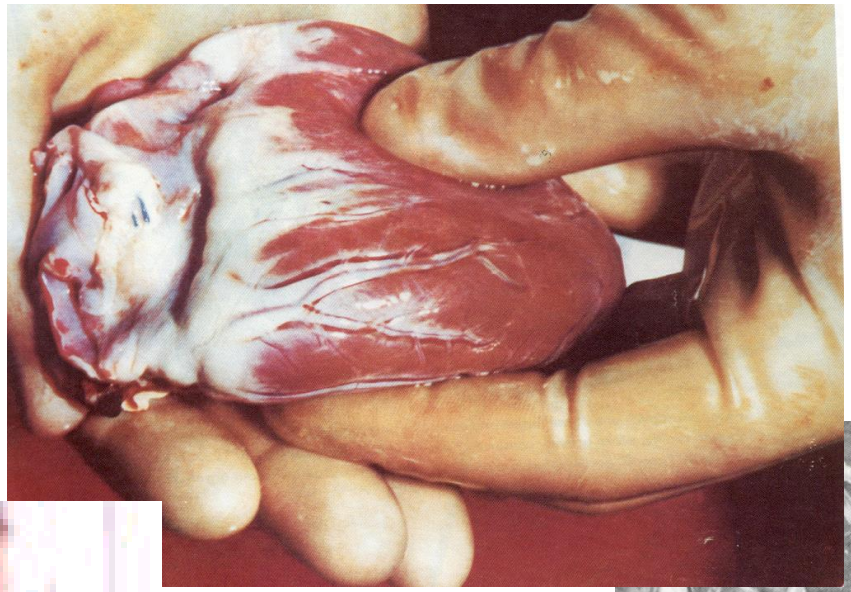
1944 – first hemodialysis

1950’ – first kidney living donations

1954 - Merril, Murray, Harrison – first succesful kidney transplantation



1967 – first heart transplantation



1969-1972 – development of cyclosporine

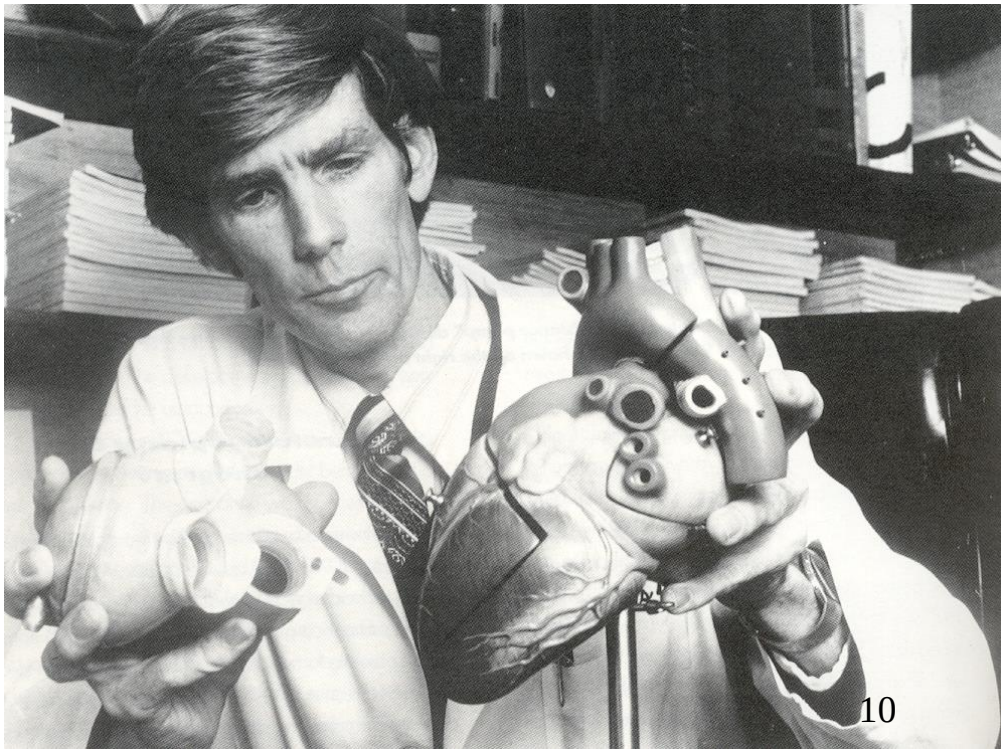
1981 – heart-lung combined Tx

1982 – artificial heart(Barney Clark)

1984 – heart xenotransplantation in child

1987 - first heart-lung „domino” Tx

1992 – liver xenotransplantation



1996 – first split liver Tx

1990’ – new immunosupressans: FK 506, sirolimus, CellCept, monoclonal antibodies

Organ Tx (2008) worldwide:

Kidneys: 69400 (46% living donors)

Livers: 20 00 (14,6% living donors)

Hearts: 5400

Lungs: 3400

Pancreas: 2400

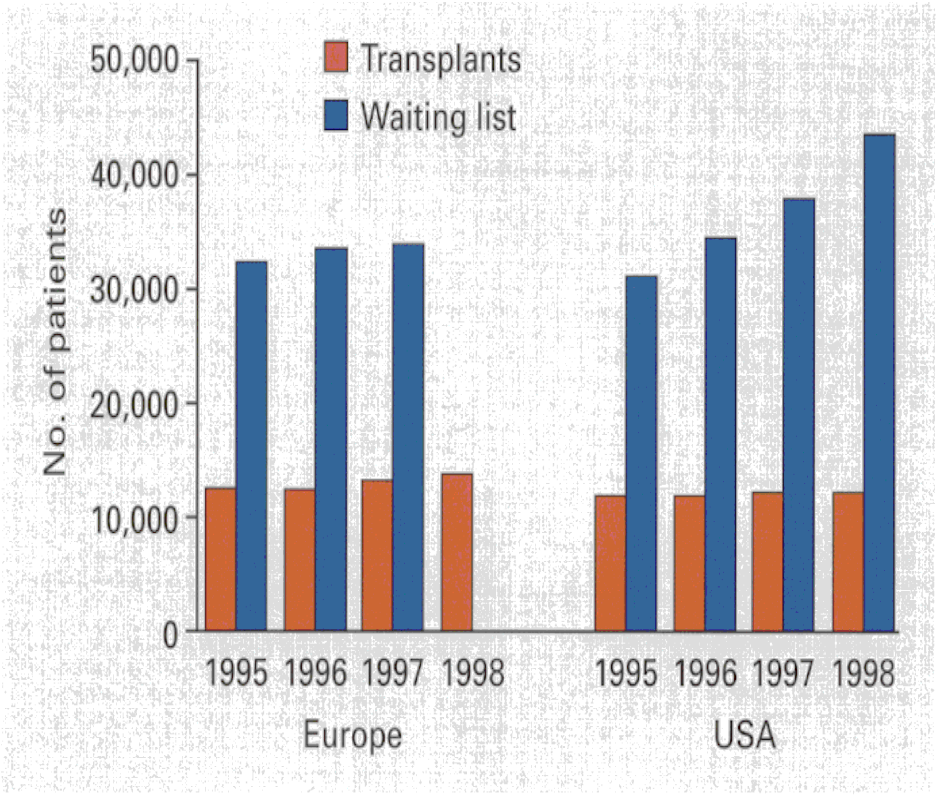
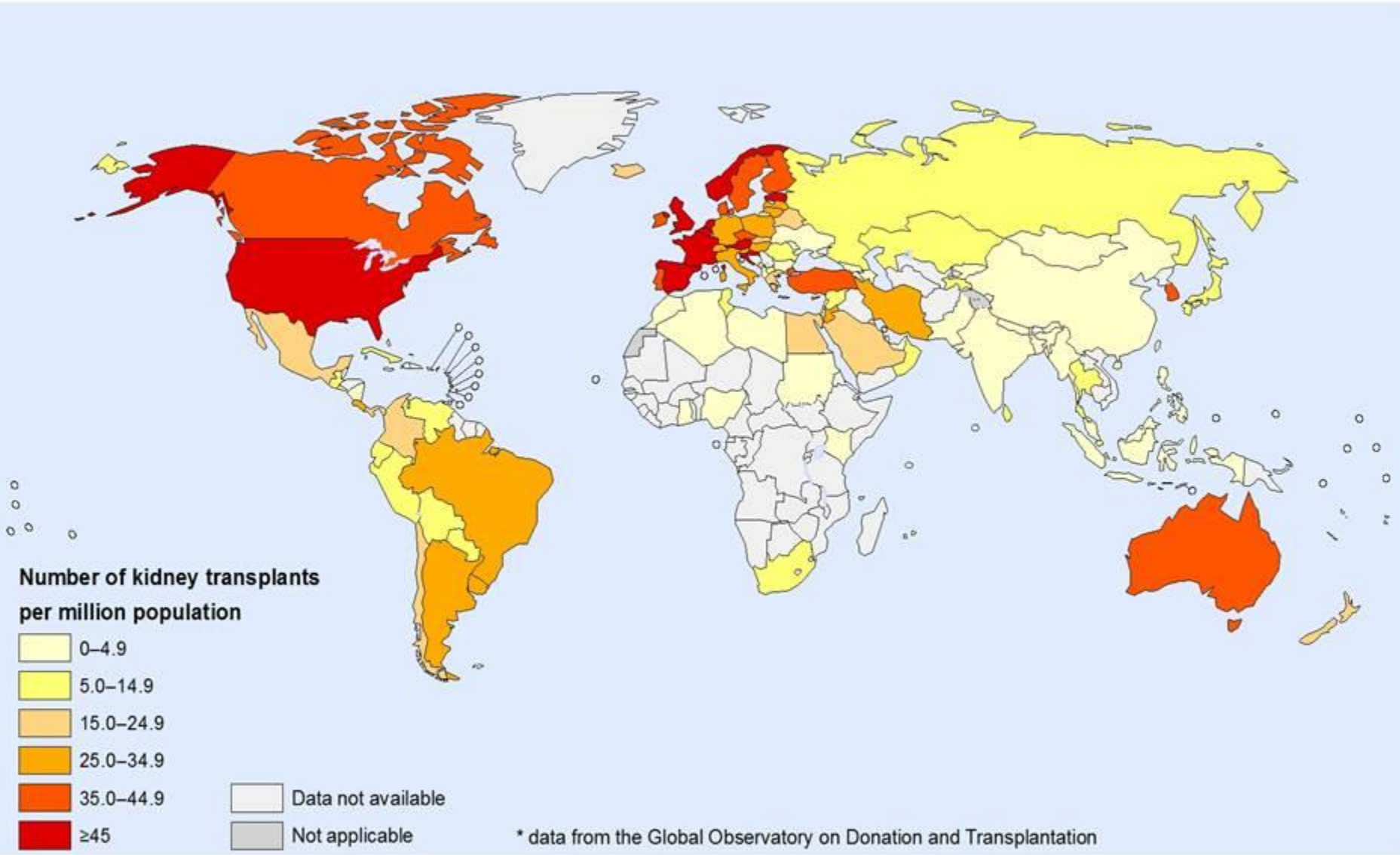


Figure 4.10. *Number of kidney transplants undertaken and number of patients remaining on the transplant waiting list.*[7,14]

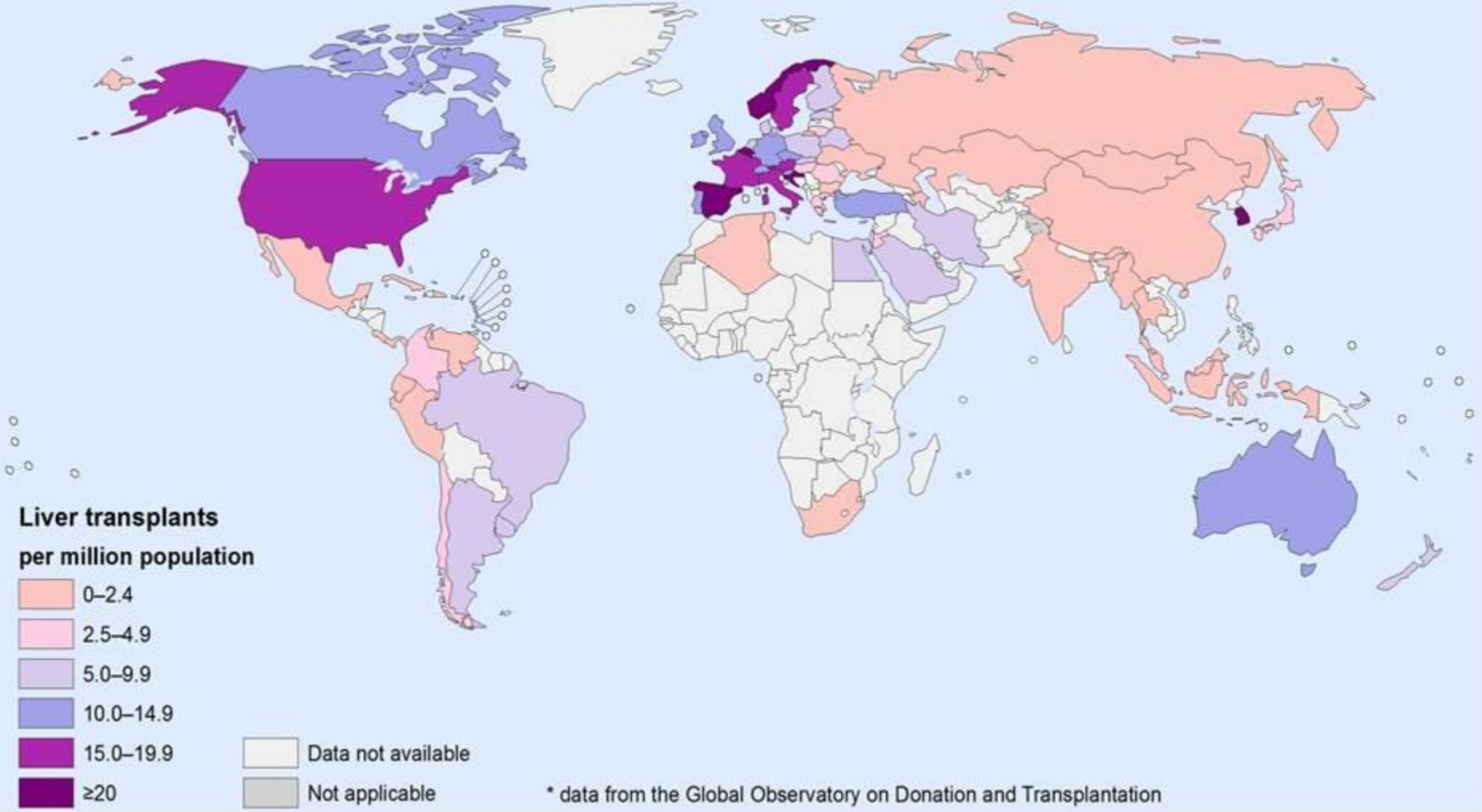
Kidney transplantation activities, 2012*



Data Source: Global Observatory on Donation & Transplantation. Map Production: Health Statistics and Information Systems (HSI), World Health Organization

World Health Organization

Liver transplantation activities, 2012*



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: Global Observatory on Donation & Transplantation. Map Production: Health Statistics and Information Systems (HSI), World Health Organization

World Health Organization

Composit tissue transplants:

Limbs (arms or forearms) - Equador 1964,

Lyon 1998, China 1999, Lyon 2000 (x2), Austria 2000 (x2).....

Face

Uterus

Brain???

Limitations of the human organ donations

Deceased donors:

***less trauma cases**

***lower truma mortality**

***effective treatment of the intracranial hemorrhage**

***sci-fi: brain structure reconstuction/replacement???**

Living donors:

***aeging population**

***ethical dilemmas**

Tissue engineering techniques

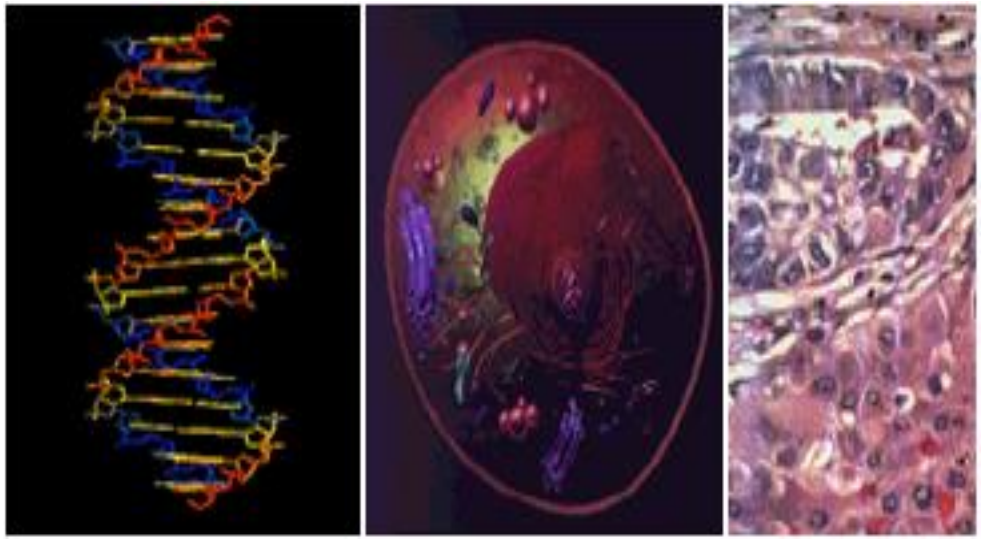
*** embrio cells**

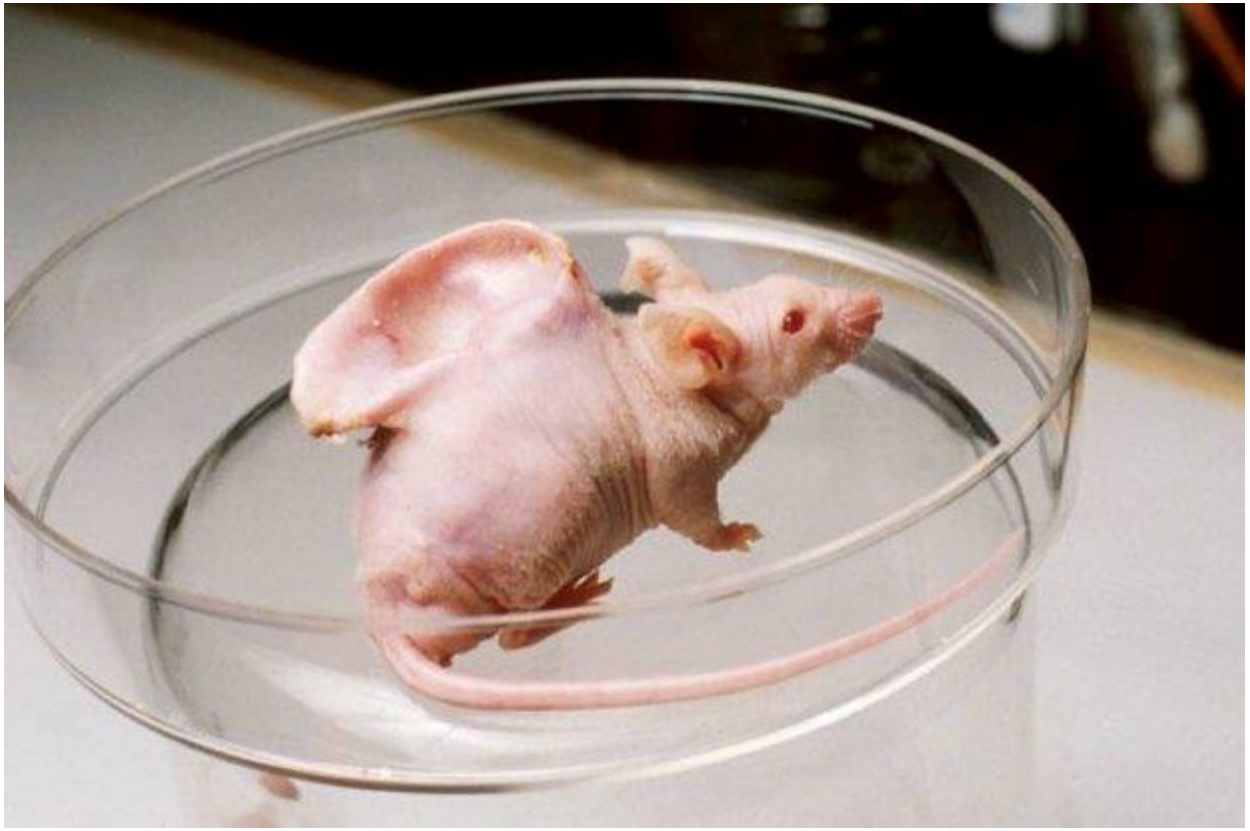
*** stem cells**

*** umbilical blood cells**

*** de-differentiated cells**

*** human clones**





April 14, 2013, Massachusetts General Hospital

Bioengineered rat kidneys successfully produced urine both in a laboratory apparatus and after being transplanted into living animals. The research team built functional replacement kidneys on the structure of donor organs from which living cells had been stripped, an approach previously used to create bioartificial hearts, lungs and livers.

ARTIFICIAL ORGANS

pros:

***immunologically idle**

***fully sterile**

***immidiate access („of shelf)**

cons:

***cost**

***power supply**

KIDNEY

***water and electrolite balance – yes**

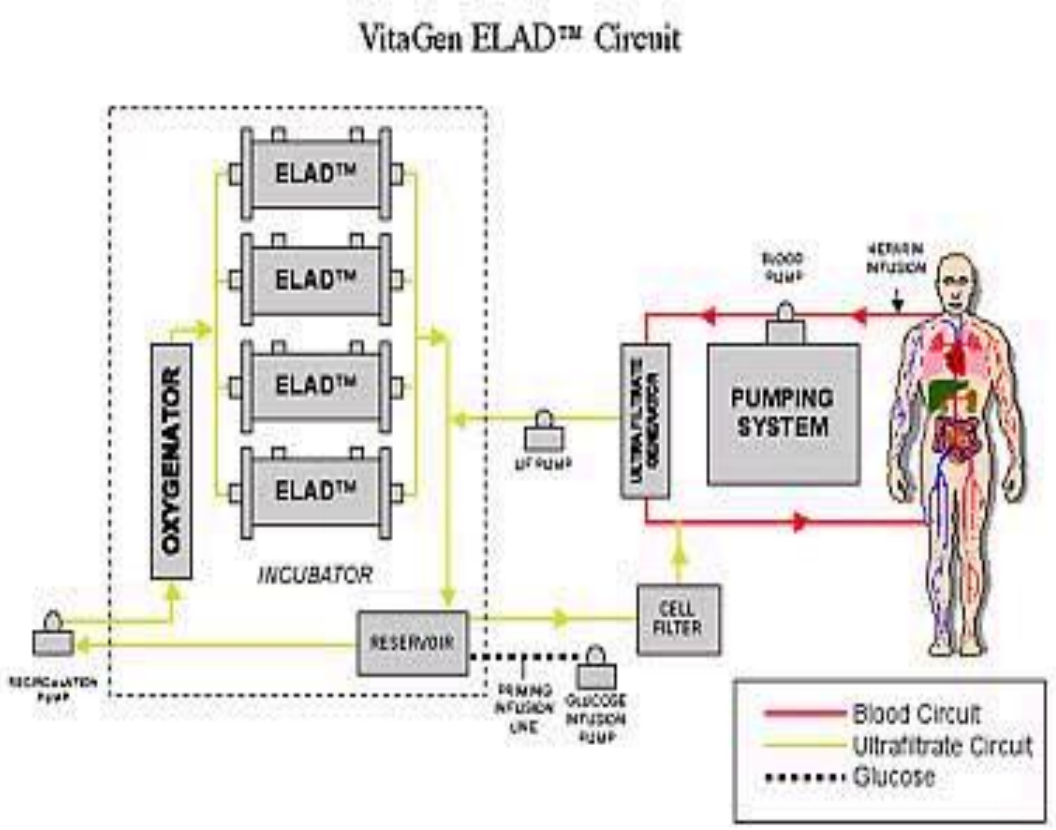
***endocrine function - no**

HEART

* power supply
* coagulation
* wear and tear
* growth

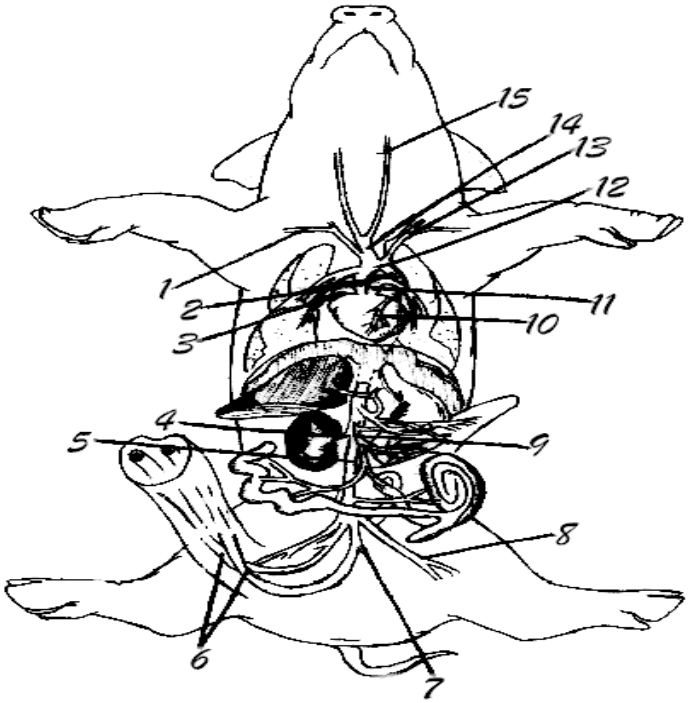
LIVER

* complexity of the enzymatic production
* power supply
* size



XENOTRANSPLANTS

PRIMATES



PIGS

XENOTRANSPLANTS

Expected drawbacks:

*** Immunological barrier**

*** danger of the genetic engeneering**

*** genomic viruses**

*** functional differencies**

*** growth differencies**

*** protests of animal welfare organizations**

*** ethical dillemmas**

TYPES OF GRAFTS

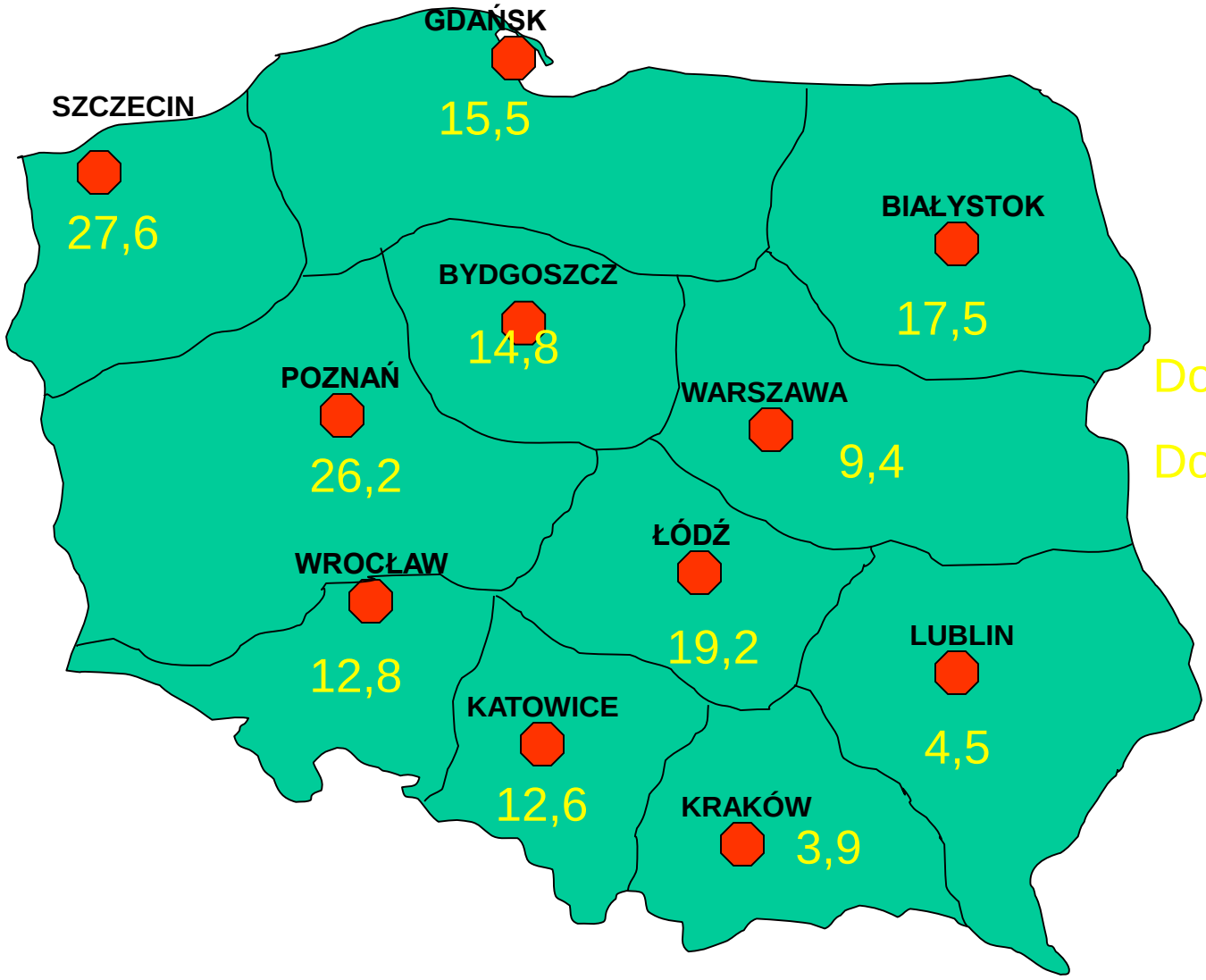
* **autograft:** transplantation between the same organism

* **isograft:** transplantation between identical twins

* **allograft**: transplantation between different beings, but of the same spacies

* **xenograft**: transplantation between different beings of different species

ORGAN TRANSPLANT CENTERS IN POLAND

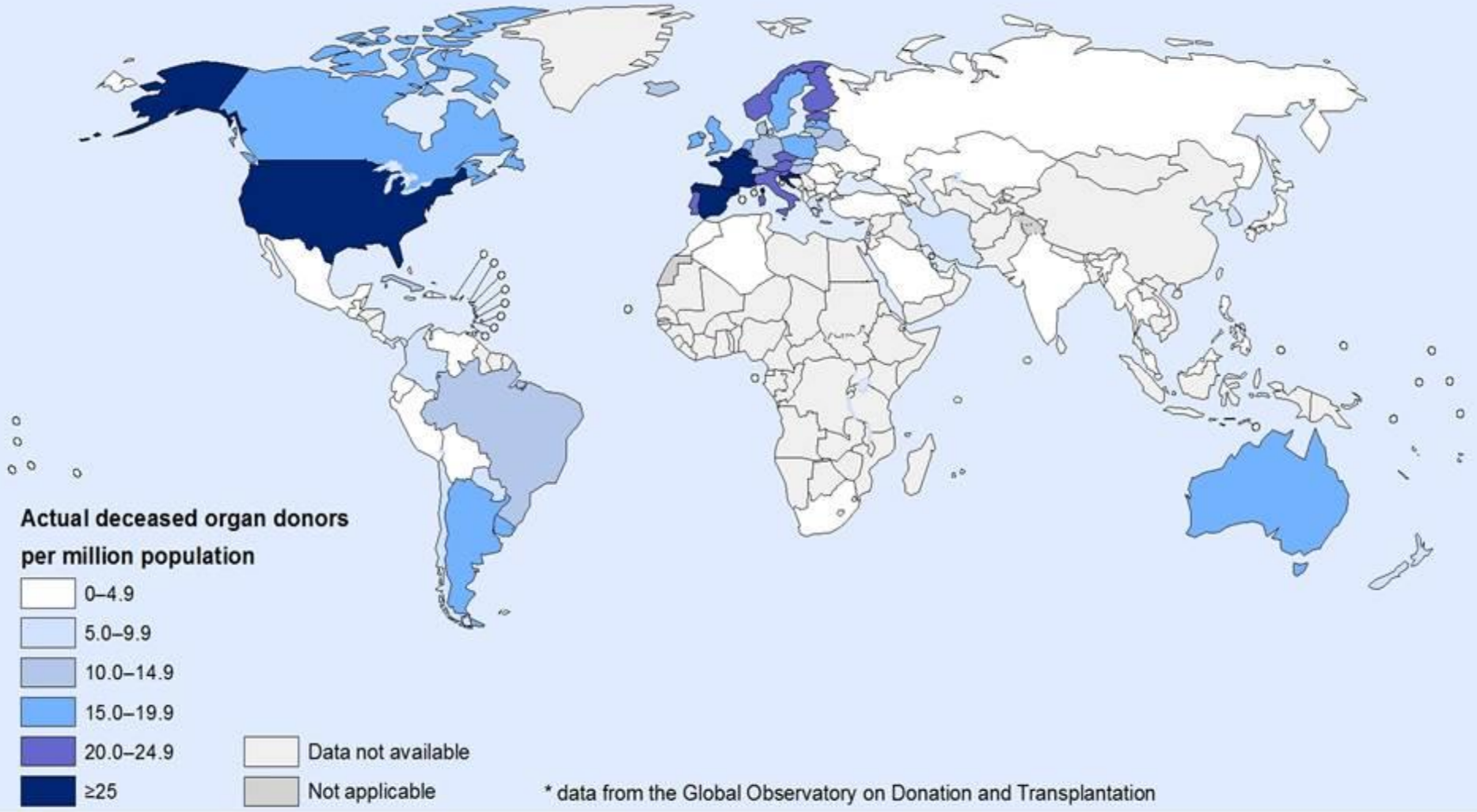


Donors:509

Donors pmp:13,3

2010

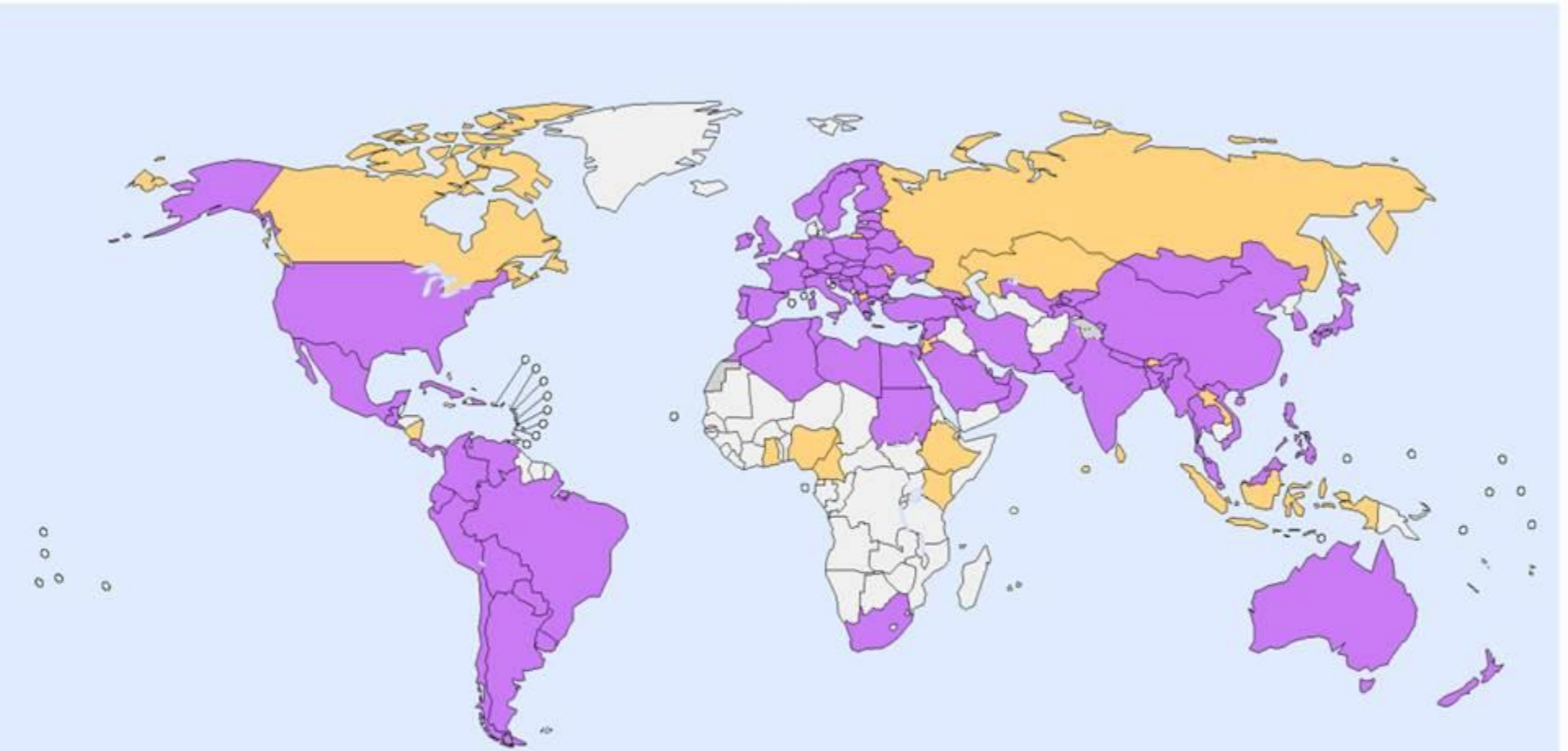
Actual donors from deceased persons, 2012*



Data Source: Global Observatory on Donation & Transplantation. Map Production: Health Statistics and Information Systems (HSI), World Health Organization

World Health Organization

Global distribution of countries with national organizational systems for transplantation *



Countries with a government authority and/or a specific organization, institution or agency, overseeing organ donation and/or transplantation at national level

Countries without any national organizational structure responsible for organ donation and/or transplantation (neither a government authority nor a specific body)

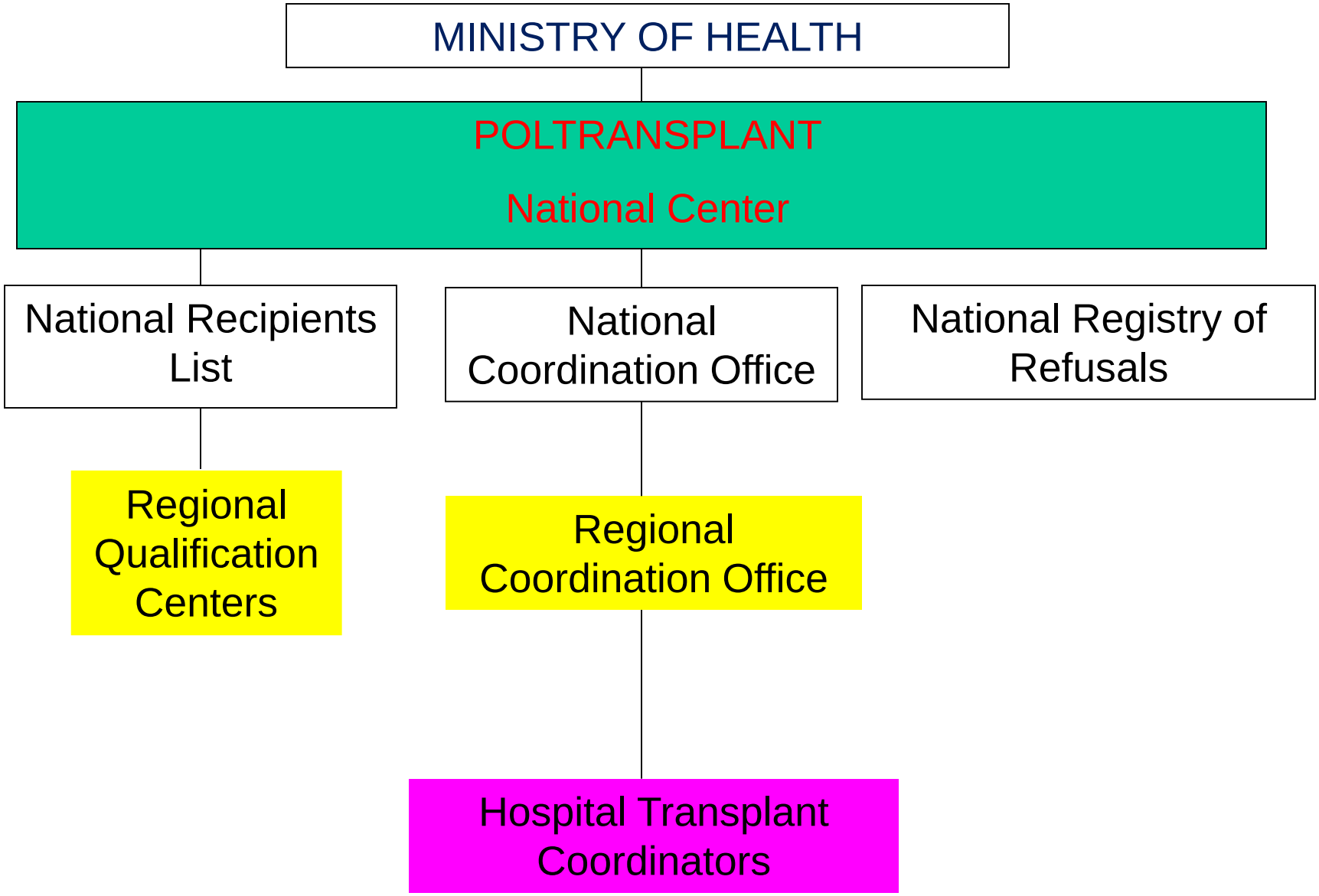
Data not available

Not applicable

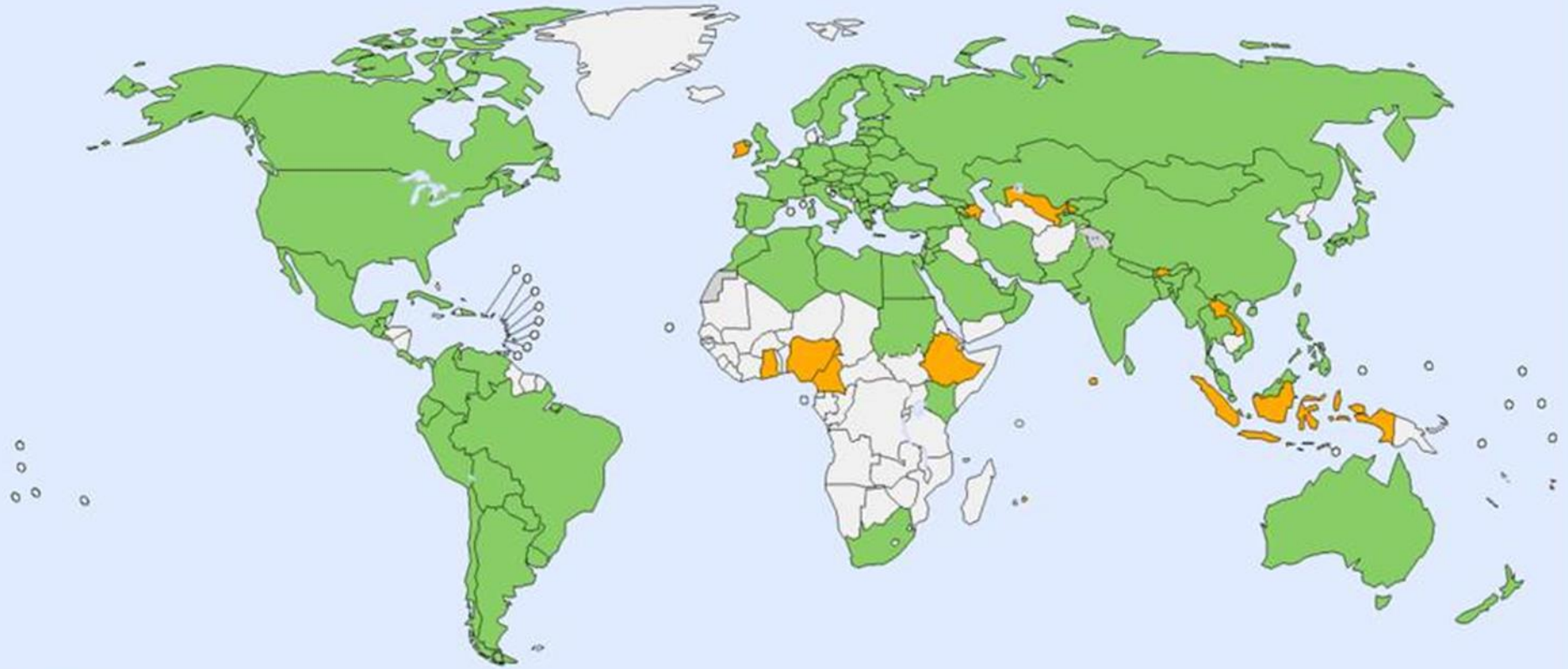
* data from the Global Observatory on Donation and Transplantation

Data Source: Global Observatory on Donation & Transplantation. Map Production: Public Health Information and Geographic Information Systems (GIS), World Health Organization

World Health Organization


MINISTRY OF HEALTH
POLTRANSPLANT
National Center
National Recipients List
National Coordination Office
National Registry of Refusals
Regional Qualification Centers
Regional Coordination Office
Hospital Transplant Coordinators

Global distribution of countries with legal frameworks for organ donation and/or transplantation *



Countries with any legal requirement covering the organ donation and/or transplantation (donation of live and/or deceased persons)

Countries with no legal requirements in place

Data not available

Not applicable

* data from the Global Observatory on Donation and Transplantation

Data Source: Global Observatory on Donation & Transplantation. Map Production: Public Health Information and Geographic Information Systems (GIS), World Health Organization

World Health Organization

Polish legal frameworks for organ transplantation

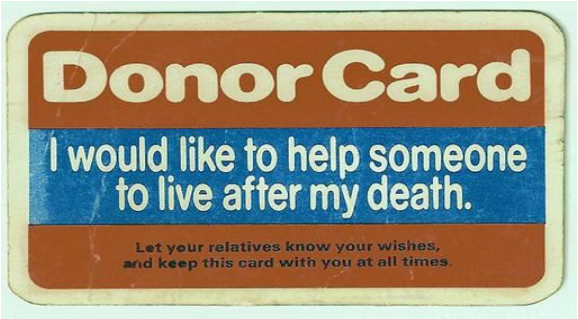
- 3 EU Directives

- Polish Transplantation Act of 2006
  - accepts organ retrieval from deceased donors
  - describes legal forms of opposition to the organ donation (opt-out rule)
  - accepts organ donation by living donor, with certain limitations
  - penalizes human organ trafficking

- 40 directives of Minister of Health and Minister of Justice

Legislation

- **Opting-Out Policy or Presumed Consent:**
  - a deceased individual is classified as a potential donor, in absence of explicit opposition to donation
- **Opting-In Policy or Required Consent:**
  - a person expresses her/his will to donate
    - Donor Card
    - National Registries



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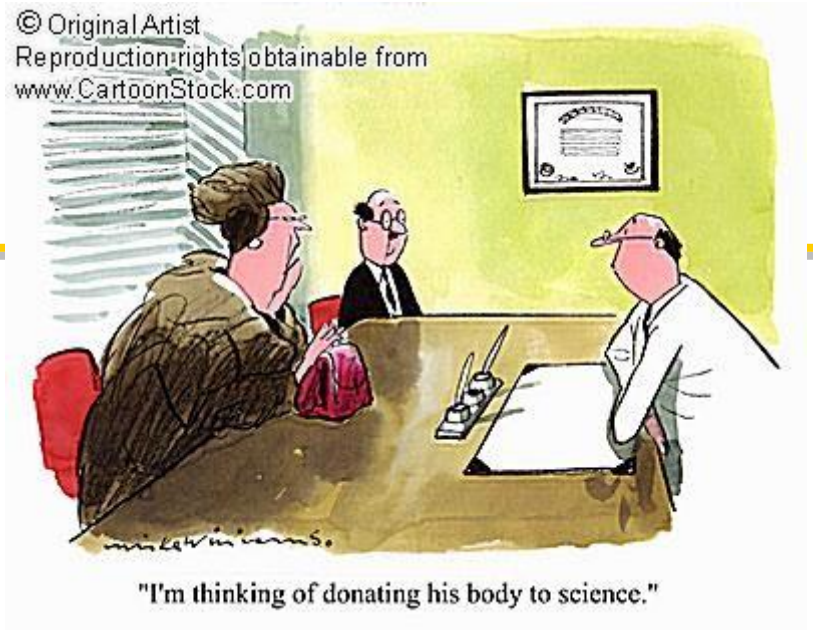
Legislation



- **Informed/Required Consent:**
  - Gives priority to the deceased will
  - Basis in personal autonomy
  - Presumed consent countries have higher donation rates than required consent countries

Legislation

Presumed Consent:

- Gives priority to the recipient
- Basis of altruism
- Positive-solidarity in front of silence of deceased
- Efficient
- Harms no one and benefits many

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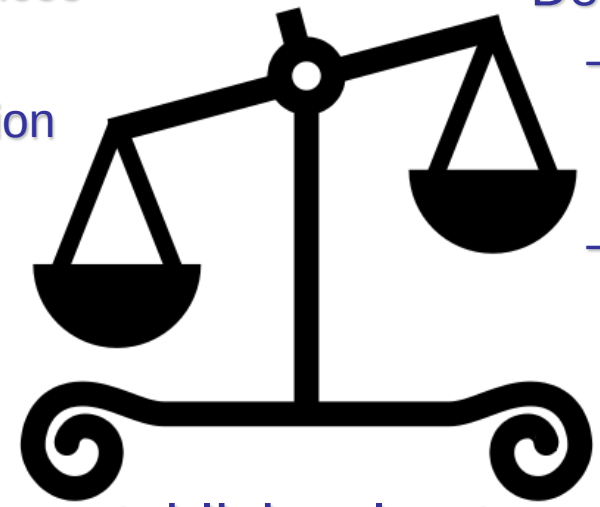
Organ Allocation: Why ?

- Disproportion between organ donation and organ demand for transplantation

- Always-increasing demand
  - Medical advances
  - Better results
  - Aging population



- Scarcity of Organs → Waiting lists
- Decreasing offer
  - Decreasing incidence of brain trauma and brain hemorrhage: decreasing Brain-Death
  - Aging and morbidity of donors: less organs per donor

- Necessary to establish rules to match the supply and the demand

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Organ Allocation Criteria

- **Medical**
  - Severity of organ failure - Urgency
  - ABO
  - HLA matching
  - Primary disease
  - Expected post-transplant outcome
  - Organ-specific scores (i.e. MELD)

- **Non-Medical**
  - Geography and distance between Donor Hospital and Transplant Center
  - Logistics: surgical teams, transport …

- **Mixed**
  - Cold ischemia time
  - Time on waiting list

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Organ Allocation Considerations

- Who gets the organ ?
  - Preference to individual benefit
  - Preference to the sickest

- When?

  Too early: increased mortality if transplanted

  Too late: high mortality

  Window of opportunity

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Organ Allocation Rules

- **Medical, Social and Ethical considerations**
  - Justice
  - Efficacy
  - Practicability
  - Quality of post-transplant results
  - Technical constraints related to organ retrieval and preservation
- **Dynamic: evolves with**
  - Medical knowledge
  - Organ availability
  - Must be revised and updated regularly
- **Transparent**
  - For society
  - For medical transplant community

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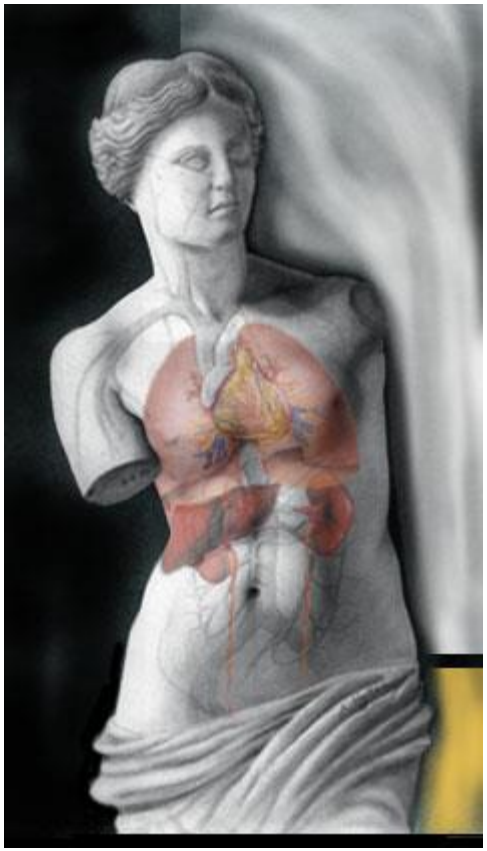
Allocation criteria

Every organ has a set of unique characteristics thus making it unique

- Blood type
- Tissue type
- Organ size
- Organ condition
- Geographic location



Organ sharing policies forbid favoritism based on political influence, race, gender, religion or financial & social status

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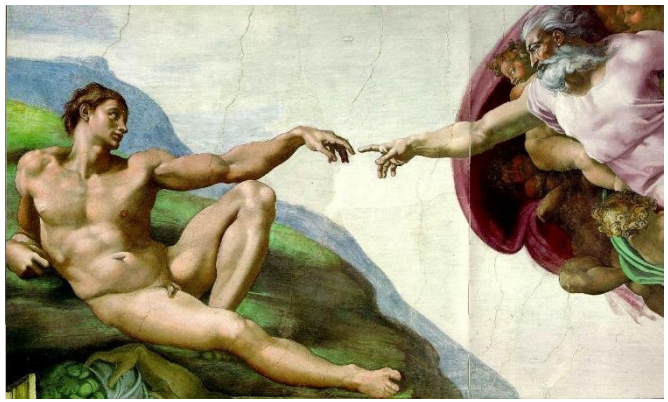
Organ Sharing

- **The bigger the population that shares**
  - better opportunities for the Urgent cases
  - better matching of donor and recipient

- **Constrains**
  - Geographical and distance considerations

- **Organ Sharing Office**
  - 24 h / 365 d
  - Regional / National / International



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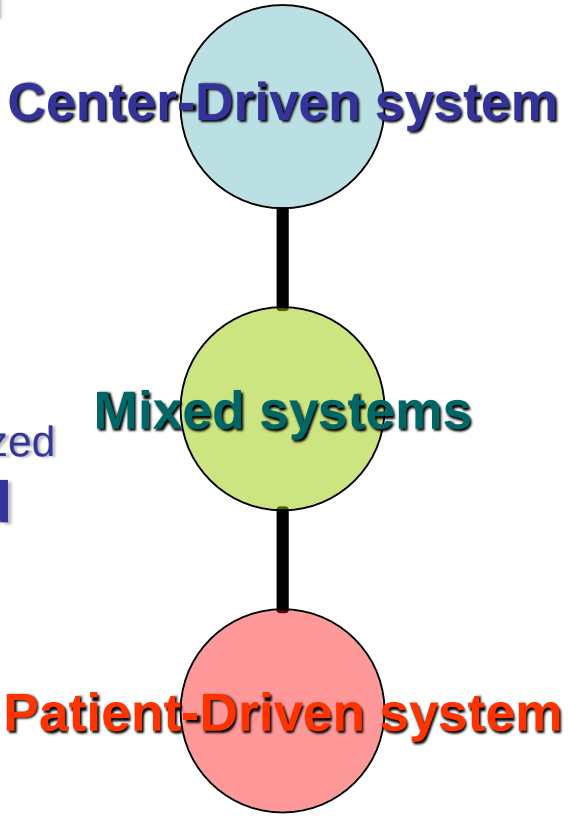
Allocation Systems

- **Center-Driven system: Organ assigned to a Center**
  - Local priority
  - Preserves medical decision
  - Links transplantation activity to donation rate in the area
  - But
    - Short waiting list / short offer: Lottery
    - No good solution for Urgent cases, Hypersensitized
- **Patient-Driven system: Organ assigned to a Patient**
  - Optimization of organ allocation
    - Big community to share
    - Best opportunities to get the best-match organ
    - In time
  - No medical decision but “computer decision”
- **Mixed systems**
  - In most countries



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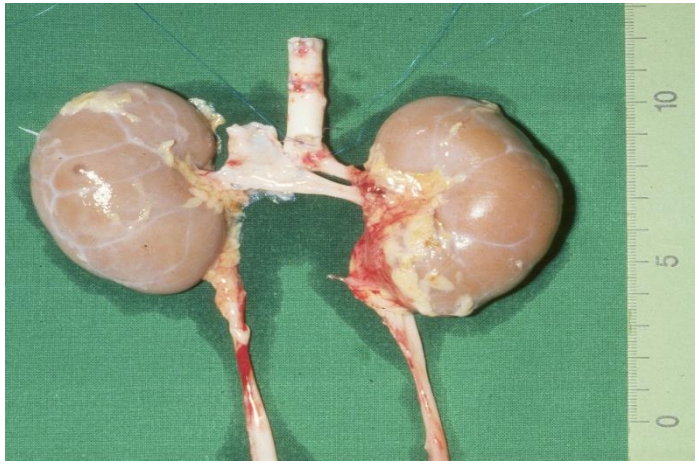
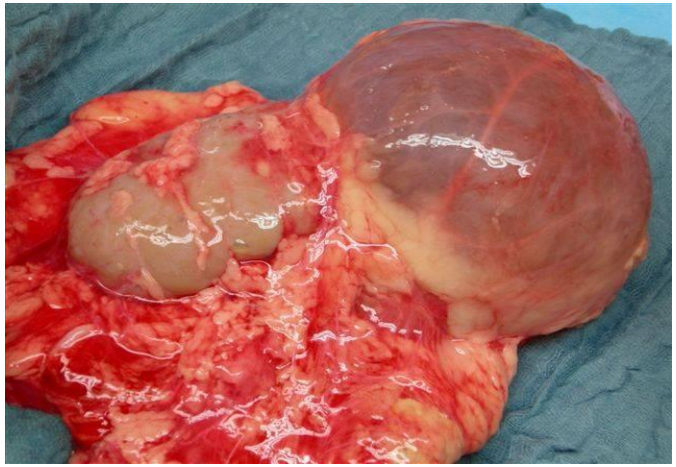
Kidney allocation criteria

- **HLA**
  - Cross-match, hyper-immunized
- **Urgency**
  - Difficulties for dialysis (vascular access, contra-indication to peritoneal dialysis)
- **Age**
  - Priority to young patients
  - Age matching: older kidneys for older recipients
- **Waiting Time / Time on dialysis**
- **Multivariate Kidney Allocation**
  - Calculated probability of obtaining the organ
  - Predicted survival of patient and graft





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Eurotransplant Allocation List

009289 Donor Center: GNMOR Date donor report: 25.05.2002

Age: 45 years Sex: M HBsAg: Neg HCV Ab: Neg HLA Match Level: DR Split
ABO blood group: A Rhesus: Pos
HLA full typing: A2 A9 A24 B18 B40 B60 DR2 DR15
HLA match typing: A2 A9 B18 B40 DR2 DR15 Typing material:

Ctr	Name	Ctr	Age	Sex	Urg	Cri	ABO	PRA % Cur	PRA % Auto	PRA % High	Waiting since	Mism	Mmp	Wait	Nat Bal	Dist	HU + Paed	Total
137070	VERS	NNY	72	M	T	000	A	0		7	29.12.1998	400.00	6.80	113.46	0.00	0	0	520.26
164713	HYBR	GMN	45	M	T	121	AB	0	NT	0	17.06.1982	133.33	40.25	996.85	40.00	200	0	1410.43
164669	SORG	GMZ	59	M	T	121	A	0	DNT	0	12.02.1991	133.33	91.05	564.00	40.00	100	0	928.38
173025	SCHN	GDU	70	F	T	111	A	0	NT	0	01.12.1993	200.00	62.36	423.96	40.00	200	0	926.32
097768	PAUL	GKM	50	F	T	110	A	0	NT	3	06.07.1994	266.67	15.33	394.25	40.00	200	0	916.25
172791	ROSM	GBC	46	M	T	021	A	0	NT	0	01.01.1992	200.00	54.60	519.78	40.00	100	0	914.38
19368	KOSL	GBS	42	F	T	111	A	0	NT	0	12.10.2001	200.00	41.29	431.62	40.00	200	0	912.91
105250	ASHO	GDU	59	M	T	110	A	0	DNT	2	09.12.1994	266.67	18.15	372.90	40.00	200	0	897.72
1001.1	WEST	GBS	63	F	HI	120	A	95	Neg	95	19.06.1995	200.00	95.89	346.61	40.00	200	0	882.49
047723	RENE	GDU	43	F	I	110	A	14	DNT	47	03.08.1995	266.67	33.31	340.45	40.00	200	0	880.43
097731	SCHO	GKM	41	M	T	120	A	0	NT	4	04.03.1994	200.00	23.60	411.23	40.00	200	0	874.83
082778	MISC	GUB	42	F	T	110	A	0	NT	2	01.06.1993	266.67	10.11	449.01	40.00	100	0	865.79
097143	OEZC	GGI	57	M	T	101	A	0	NT	5	05.06.1995	266.67	97.88	348.53	40.00	100	0	853.08
029433	AHMA	GMN	45	M	T	110	A	0	NT	19	01.09.1995	266.67	9.44	336.48	40.00	200	0	852.59
107106	BUCK	GBB	37	F	T	111	A	0	NT	0	01.11.1995	200.00	83.78	328.13	40.00	200	0	851.91

to donor center:

nal to donor center:
1 GNN GAK GBO GDU GBS

National Balance		Waiting points per day	
Germany	11	Germany	0.14
Netherlands	15	Netherlands	0.09
Belgium/Luxembourg	-7	Belgium/Luxembourg	0.09
Austria	-6	Austria	0.09
Slovenia	-5	Slovenia	0.09

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Liver allocation criteria

- **Morphological donor-recipient matching**
  - Split
- **Type of Liver disease**
  - Acute life-threatening liver failure - Urgent
- **Severity of disease**
  - Child score, MELD
- **Time on the waiting list**
  - Cancer?
- **Age of the recipient**
  - Pediatric priority

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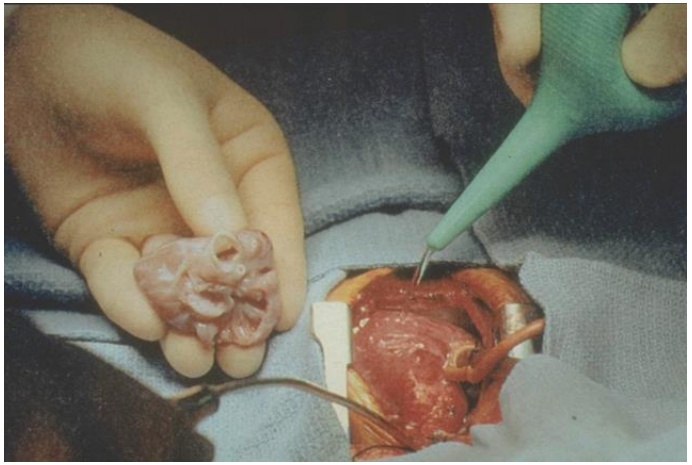
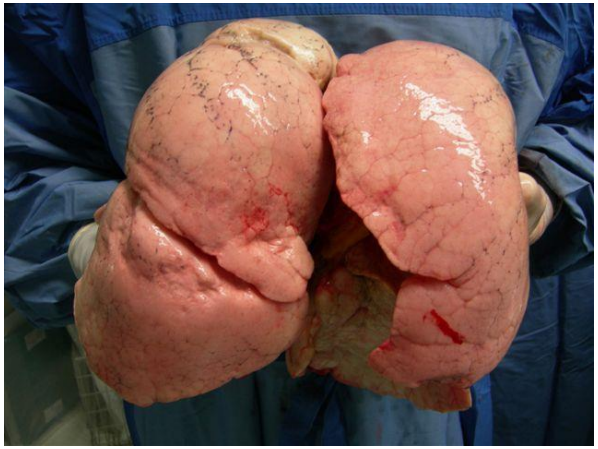
Thoracic organs allocation criteria

- ABO
- Morphological donor-recipient matching
- Severity of the disease
  - Priority to very short life expectancy
  - Definition of Urgency not uniform



Hearth

Vital status, mechanical ventilation, Inotropic support, artificial devices



Lung

Time on non-invasive ventilation, pulmonary hypertension

- **Objective criteria needed**

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Organ Sharing Offices International

- **Eurotransplant (the Netherlands)**

Supranational organization (7 countries).
Maintains data of all potential recipients in central computer database.
Geographical criteria are not primary.

- **UK Transplant (UK)**

NHS
UK Transplant

Distribution between UK and Ireland.
A database produces allocation rotas for hearts, lungs, livers and kidneys
Exchange of organs between European countries

- **BaltTransplant**

Distribution between Estonia, Latvia, Lithuania.
Distribution based on geografical criteria - every country has their own waiting-list, if there is no recipient for organ, it will be sent to other country. Waiting-list for all Baltic countries consists of ca 450 patients.

Organ Sharing Offices National

- **ONT – OCATT (Spain)**

17 autonomous communities divided in 6 areas. 2 offices in charge for allocation of all organs. ONT responsible for National distribution (except Cataluña) and OCATT for Cataluña and International cooperation.

Distribution based on geographical criteria (Generating hospital-city-area-country-international) first and then medical.

- **EOM (Greece)**

National office in charge of allocation and logistics.
Allocation of kidney by EOM based on computer software.
Transplant centres allocate Liver, Heart & Lungs
Distribution based on medical and geographical criteria

Organ Sharing - Results

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Organ Sharing - Results

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Social Aspects

- **Religion**
  - Most major religions encourage donation
- **Other aspects**
  - Age, educational level, economical status
- **BUT**
  - the most important predictor of consent is whether a discussion about donation had taken place before
  - Families who know the patient's wishes, are more likely to donate organs

Education and Organization

Transplants require the involvement of the whole society

- **School Programs**
  - Create and reinforce positive attitudes towards donation
- **Adults**
  - Campaigns, Donor Cards, Driver License
  - “Share your life, share your decision”
- **Health Workers**
  - Create positive attitude regarding donation
  - Understand the whole process
  - Understand brain death
  - Their opinion will be influential to general public
- **Mass Media**
  - Positive news about donation
  - Benefits of transplantation
  - Improving understanding of medical, ethical and legal aspects of the process

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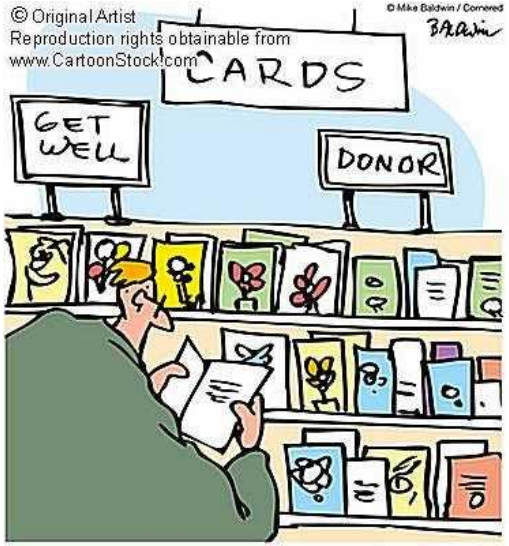
Opposition to Donation

- **First cause of Loss of Donors in many countries**
- **First correctable cause**
  - Less than 10% opposition can be achieved
- **Influenced by**
  - Legislation
  - Education and Organization
  - Social Aspects
  - Family Interview



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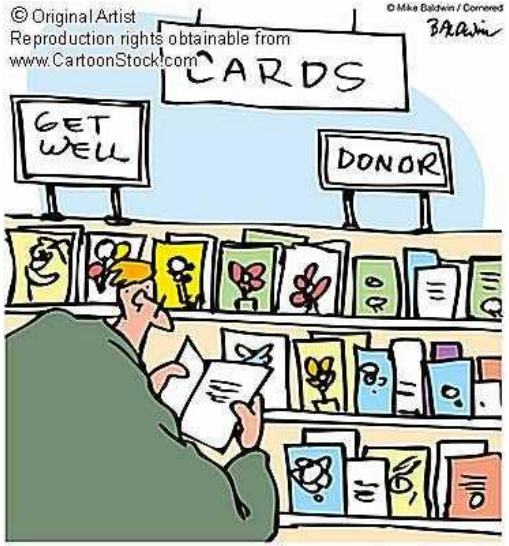

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Introduction to transplantology

lecture
IV year
Medical Faculty

Lecturer: Prof. Zbigniew Włodarczyk
Head of the Transplantology and General Surgery Department

PART II – clinical considerations

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BRAIN DEATH DIAGNOSIS

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PAPAL TEACHING ON ORGAN DONATION

The death of a person is a single event, consisting in the total disintegration of that unitary and integrated whole that is the personal self. It results from the separation of the life-principle (or soul) from the corporal reality of the person. The death of the person, understood in this primary sense, is an event which no scientific technique or empirical method can identify directly.

Yet human experience shows that once death occurs certain biological signs inevitably follow, which medicine has learnt to recognize with increasing precision. In this sense, the "criteria" for ascertaining death used by medicine today should not be understood as the technical-scientific determination of the exact moment of a person's death, but as a scientifically secure means of identifying the biological signs that a person has indeed died.

ADDRESS OF JOHN PAUL II
TO THE 18th INTERNATIONAL CONGRESS
OF THE TRANSPLANTATION SOCIETY

Tuesday 29 August 2000

PAPAL TEACHING ON ORGAN DONATION

Here it can be said that the criterion adopted in more recent times for ascertaining the fact of death, namely the complete and irreversible cessation of all brain activity, if rigorously applied, does not seem to conflict with the essential elements of a sound anthropology. Therefore a health-worker professionally responsible for ascertaining death can use these criteria in each individual case as the basis for arriving at that degree of assurance in ethical judgment which moral teaching describes as "moral certainty". This moral certainty is considered the necessary and sufficient basis for an ethically correct course of action. Only where such certainty exists, and where informed consent has already been given by the donor or the donor's legitimate representatives, is it morally right to initiate the technical procedures required for the removal of organs for transplant.

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ISLAM TEACHING ON ORGAN DONATION

The human body, whether living or dead, enjoys a special honour and is inviolable and, fundamentally, Islamic law emphasises the preservation of human life.

The general rule that 'necessities permit the prohibited' (*al-darurat tubih al-mahzurat*), has been used to support human organ donation with regards to saving or significantly enhancing a life of another providing that the benefit outweighs the personal cost that has to be borne.

The following are some statements or verses which have been used to support organ donation:

"Whosoever saves the life of one person it would be as if he saved the life of all mankind.„ Holy Qur'an, chapter 5 vs. 32

"Whosoever helps another will be granted help from Allah. "Prophet Muhammed (pbuh)

"If you happened to be ill and in need of a transplant, you certainly would wish that someone would help you by providing the needed organ."
Sheikh Dr MA Zaki Badawi, Principal, Muslim College, London

In 1995, the UK based Muslim Law (Shariah) Council resolved that:

- the medical profession is the proper authority to define signs of death
- current medical knowledge considers brain stem death to be a proper definition of death
- the Council accepts brain stem death as constituting the end of life for the purpose of organ transplantation
- the Council supports organ transplantation as a means of alleviating pain or saving life on the basis of the rules of the Shariah
- Muslims may carry donor cards
- the next of kin of a dead person, in the absence of a donor card or an expressed wish to donate their organs, may give permission to obtain organs from the body to save other people's lives
- organ donation must be given freely without reward, trading in organs is prohibited.

An alternative view clearly states that:

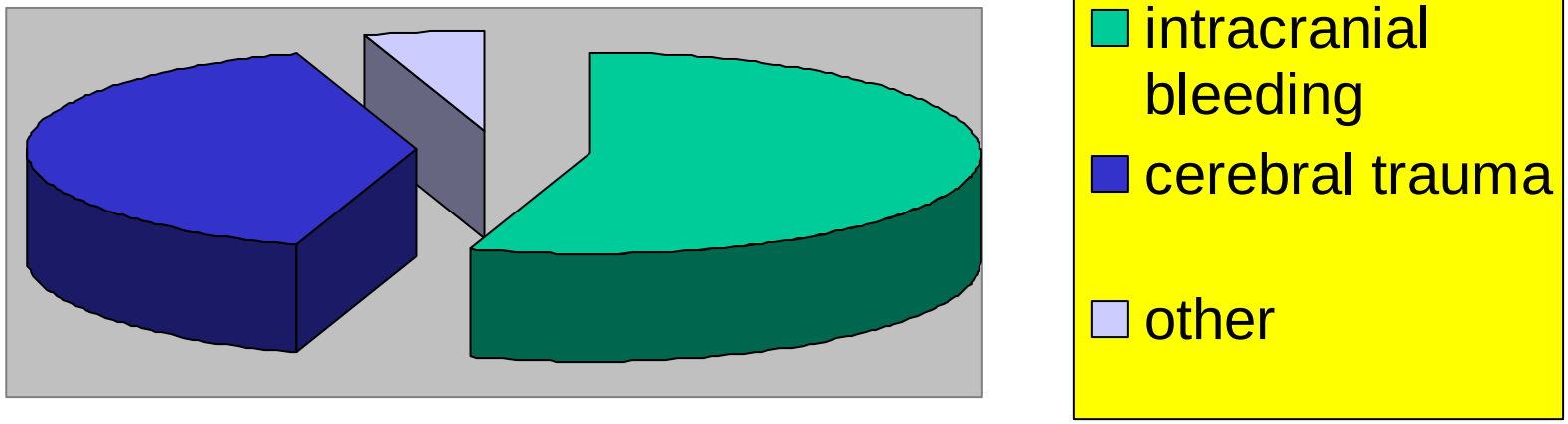
"The saving of life is not absolute, but subject to the amount of cost that has to be borne. Therefore, although the above quotation enjoins the saving of life this is not without restriction or caveats.

According to some Muslim scholars organ donation is not permitted. They consider that organ donation compromises the special honour accorded to man and this cannot be allowed whatever the cost. Scholars, such as the Islamic Fiqh Academy of India, allow live donations only

JEWISH TEACHING ON ORGAN DONATION

- near unanimous agreement about this issue
- late 1960s, the Conservative and Reform movements both accepted cessation of brain activity as the Jewish definition of death
- twenty years later the Orthodox chief rabbinate of Israel endorsed the same definition
- 1991 the Rabbinical Council of America, an Orthodox rabbinical organization, followed suit
- 1992, Rabbi Shlomo Zalman Auerbach, a leader influential among the ultra-Orthodox both in Israel and the U.S., also accepted this definition. He suggested, however, that in addition to brain death, the heart must stop beating for thirty seconds before vital organs are removed.

CAUSES OF THE BRAIN DEATH



CONFIRMATION OF DIAGNOSIS

CLINICAL DIAGNOSIS

SUSPICION

DIAGNOSIS OF THE BRAIN DEATH

I STEP: confirmations and exclusions - suspicion of brain death

•Confirmation of: apnoe, cause of coma, irreveribility of damage, no further therapeutic options,

•Exclusion of: intoxication, muscle-relaxants, narcotix, metabolic disturbances, external

II STEP: clinical diagnosis of brain death

•pupil reflexes, corneal reflexes, caloric test, vomiting and coughing test, oculo-cerebral test, apnoe test

III STEP: Brain Death Diagnosis Commitee: neurologist or neurosurgeon, anesthetist, specialist

STEP 1 – SUSPICION OF BRAIN DEATH

1. Permanent apnoe	yes*	no*
2. Requires artificial ventillation	yes*	no*
3. Cause of coma diagnosed	yes*	no*
4. Structural damage to the brain is irreversible due to prolonged tome and lack of therapeutic options	yes*	no*
5. Patient is intoxicated or under the influence of narcotics, neuroleptics, Chory jest zatruty i pod wpływem niektórych środków farmakologicznych (narkotyki, neuroleptyki, muscle relaxant or similar	yes*	no*
6. In hypothermia caused by external factors	yes*	no*
7. With metabolic or endocrinologicl disturbances	yes*	no*
8. With convulsions or spasms	yes*	no*
9. Is under-born baby or new-born baby younger than 7 days	yes*	no*

STEP 2 – CLINICAL DIAGNOSIS OF BRAIN DEATH

TEST RESULT	TEST I		TEST II	
Absence of pupil reflex	yes*	no*	yes*	no*
Absence of corneal reflex	yes*	no*	yes*	no*
Absence of spontaneous ocular movements	yes*	no*	yes*	no*
Absence of caloric reflex	yes*	no*	yes*	no*
No response to the pain stimuli[1]	yes*	no*	yes*	no*
Absence of vomiting and cough reflexes	yes*	no*	yes*	no*
Absence of oculo-cerebral reflex	yes*	no*	yes*	no*
Permanent apnoe	yes*	no*	yes*	no*

PUPIL REFLEX

a) Eyelids down for 30 sec.

PUPIL REFLEX

b) Both eyelids up, strong light

c) Test repeated 3x, with 5 sec. interval

d) 5 sec. observation

<u>RESULT: both pupils wide, areactive. Be avare of consensual reaction</u>

CORNEAL REFLEX

a) eyelid up

b) cornea irritated with sterile swab

c) bilateral

RESULT: no motoric response

CALORIC TEST

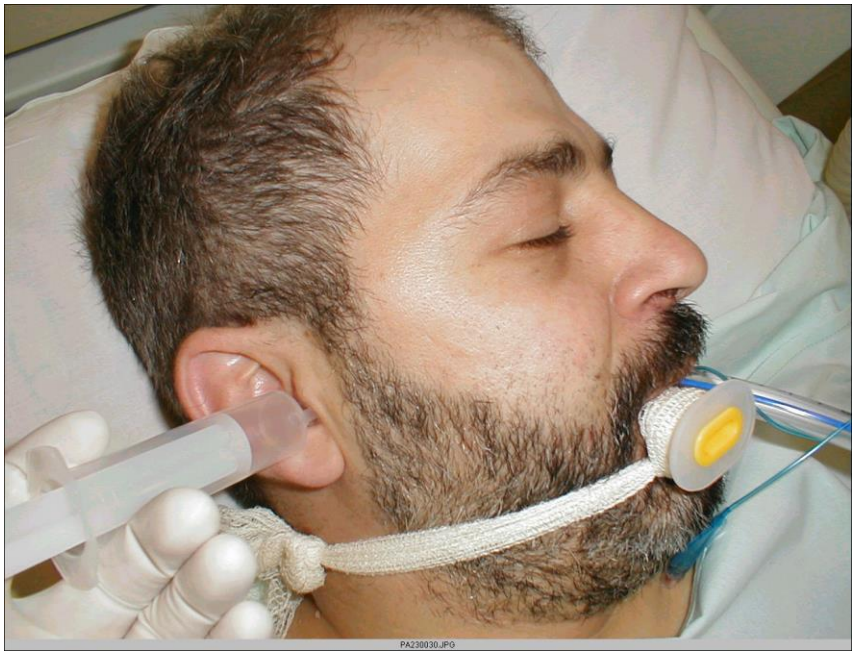
a) check external acoustic duct

b) 20 mls of ice cold water

c) observe for nystagmus

d) bilatera

RESULT: absence of nystagmus



RESPONSE TO PAIN STIMULUS within cranial nerves

a) pressure on supraorbital nerve

b) Observe any motoric response

RESULT: total absence of muscular response (neither central nor motoric)

RESPONSE TO PAIN STIMULUS
within peripherial nerves

a) pressure on thumb nail

b)) observe central and peripherial motoric response

RESULT: absence of central motoric response

POSSIBLE and expected peripherial motoric response

VOMITING REFLEX

a) irritation of the throat with canula

b) observe for any motoric response

RESULT: absence of any motoric response

COUGHING REFLEX

a) irritation of the trachea with canula

b) observe for any motoric response

RESULT: absence of any motoric response

OCULO-CEREBRAL REFLEX

a) eyelids up

b) head side- twist, stop for 5 sec.

c) Head opposite side-twist, stop for 5 sec.

d) eyeball observation

RESULT: absence of nystagmus, eyeballs fixed

APNOE TEST

a) 10 min. ventillation with 100% oxygen

b) reach CO2 5%

c) blood gases

APNOE TEST

d) respirator off for 10 minutes

e) Oxygen insuflation 6l/min

f) Observe for motoric response

RESULT: no spontaneous movements of chest and/or abdomen

APNOE TEST

g) blood gases

h) respirator on

RESULT: expected rise in CO2, expected fall in O2

III STEP: Brain Death Diagnosis Committee:

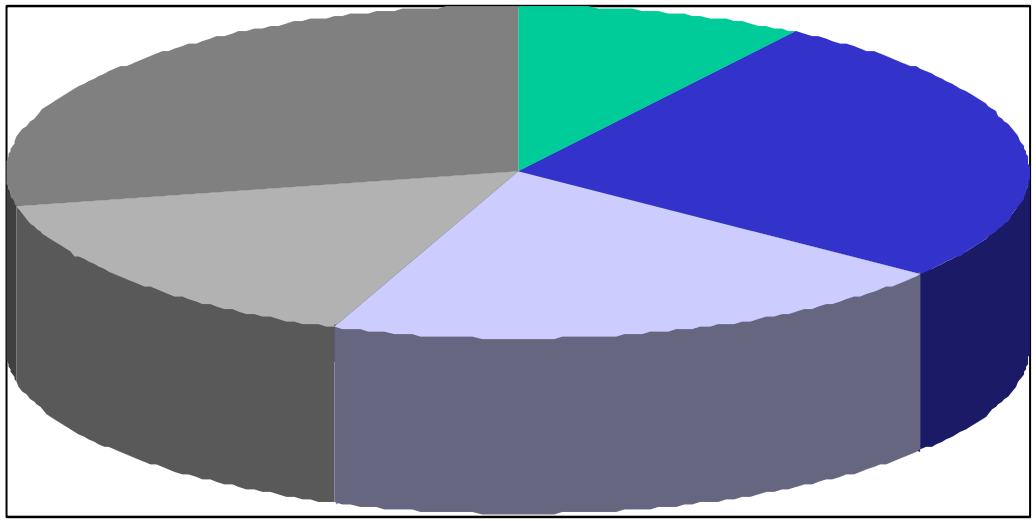
neurologist or neurosurgeon

anesthetist

specialist

Member of the committee is prohibited from participation in the transplantation team

INDICATIONS FOR KIDNEY TRANSPLANTATION



- polycystic kidney disease 9,2%
- glomerulonephritis 26,4%
- diabetic nephropaty 20,3%
- urinary tract infections 15,9%
- Other 28,2%

CONTRINDICATIONS FOR kTx

Unconditional

* HIV/AIDS

* Active neoplastic disease

* History of neoplastic disease (various grace period)

* NYHA III/IV

* Severe and generalized arteriosclerosis

* Severe psychiatric disorders/noncompliance

CONTRINDICATIONS FOR kTx

Conditional

- High risk of nephropaty reccurence
- Current bacterial and viral infections
- Severe hepatic disorders
- Active gastric or duodenal ulcer
- Circulatory diseases
- Lower urinary tract disorders
- Obesity BMI > 35

Organ Retrieval

- Surgical intervention
  - Complex proceedings
  - Several surgical teams
  - Time coordination

  - Final decision on organ validity
  - Communication with organ sharing office and transplant centers

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Organ Retrieval

- Surgical Intervention (2)
  - Specific perfusion liquid for each organ
  - Cold ischemia time
    - Starts after organ perfusion and cooling
    - Impact in graft function

Time limit
- 4-6 h for Heart
- 12 h for Liver, Lung and Pancreas
- 24 h (-48 h) for Kidney

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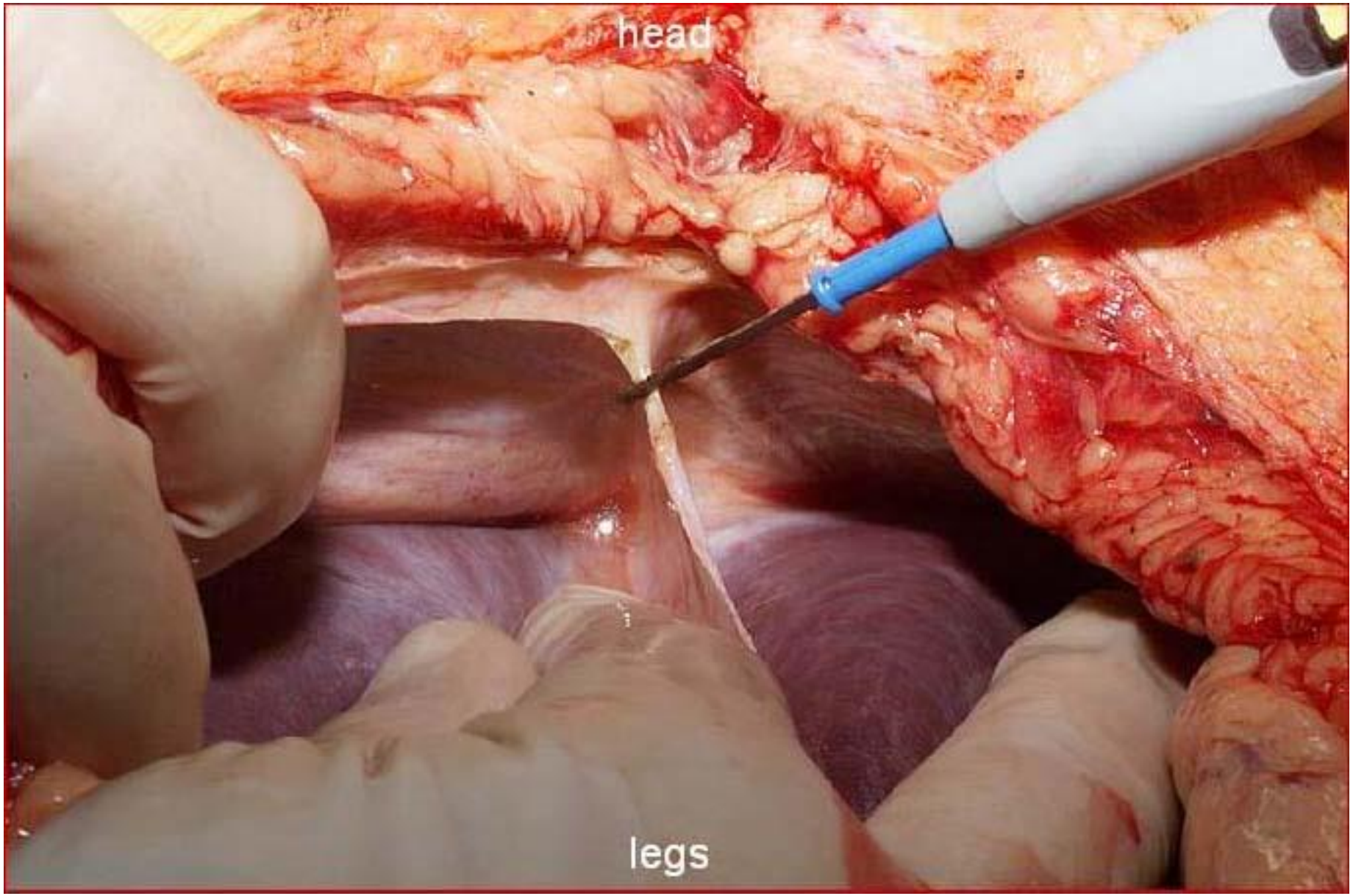
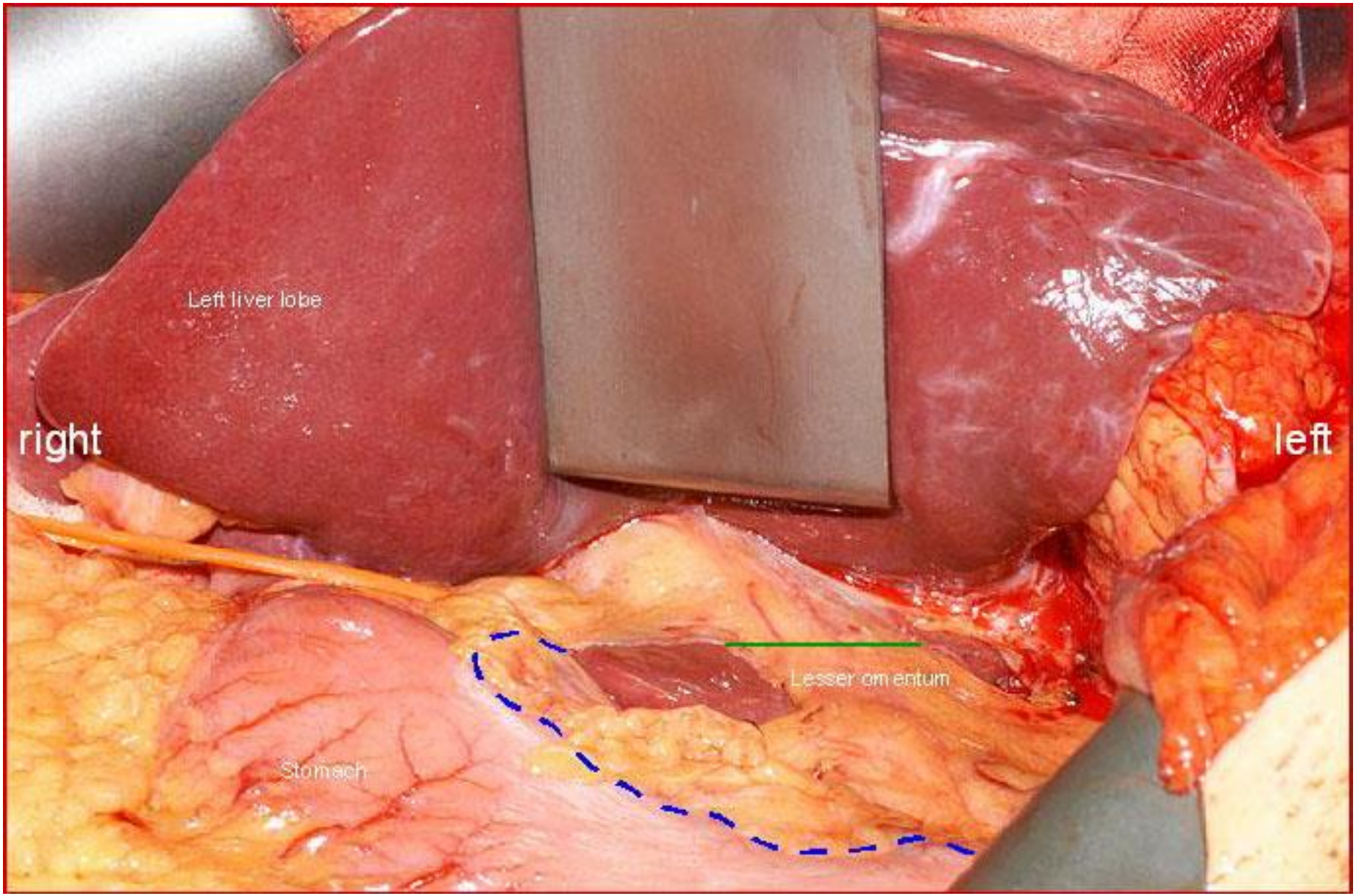
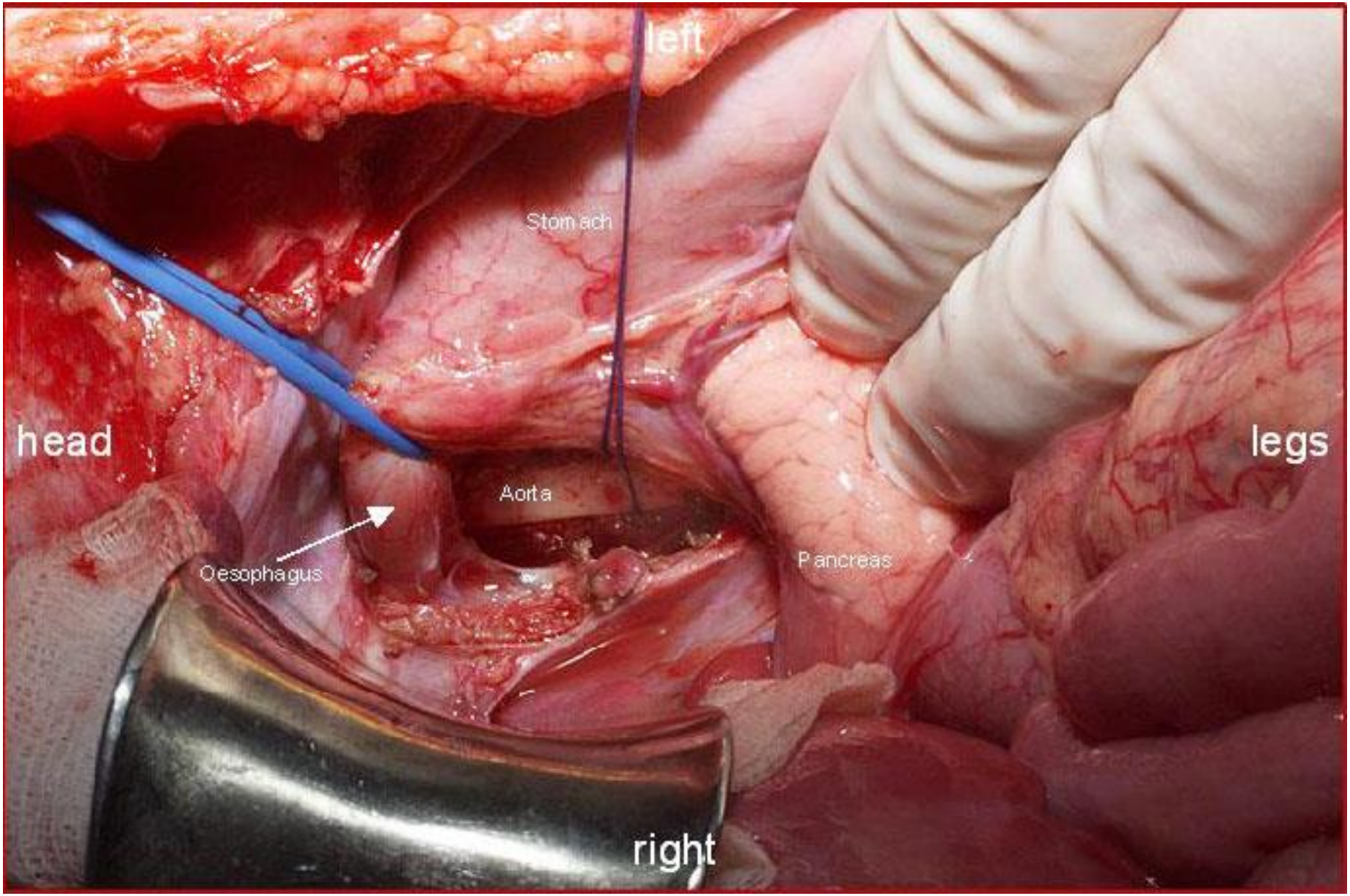
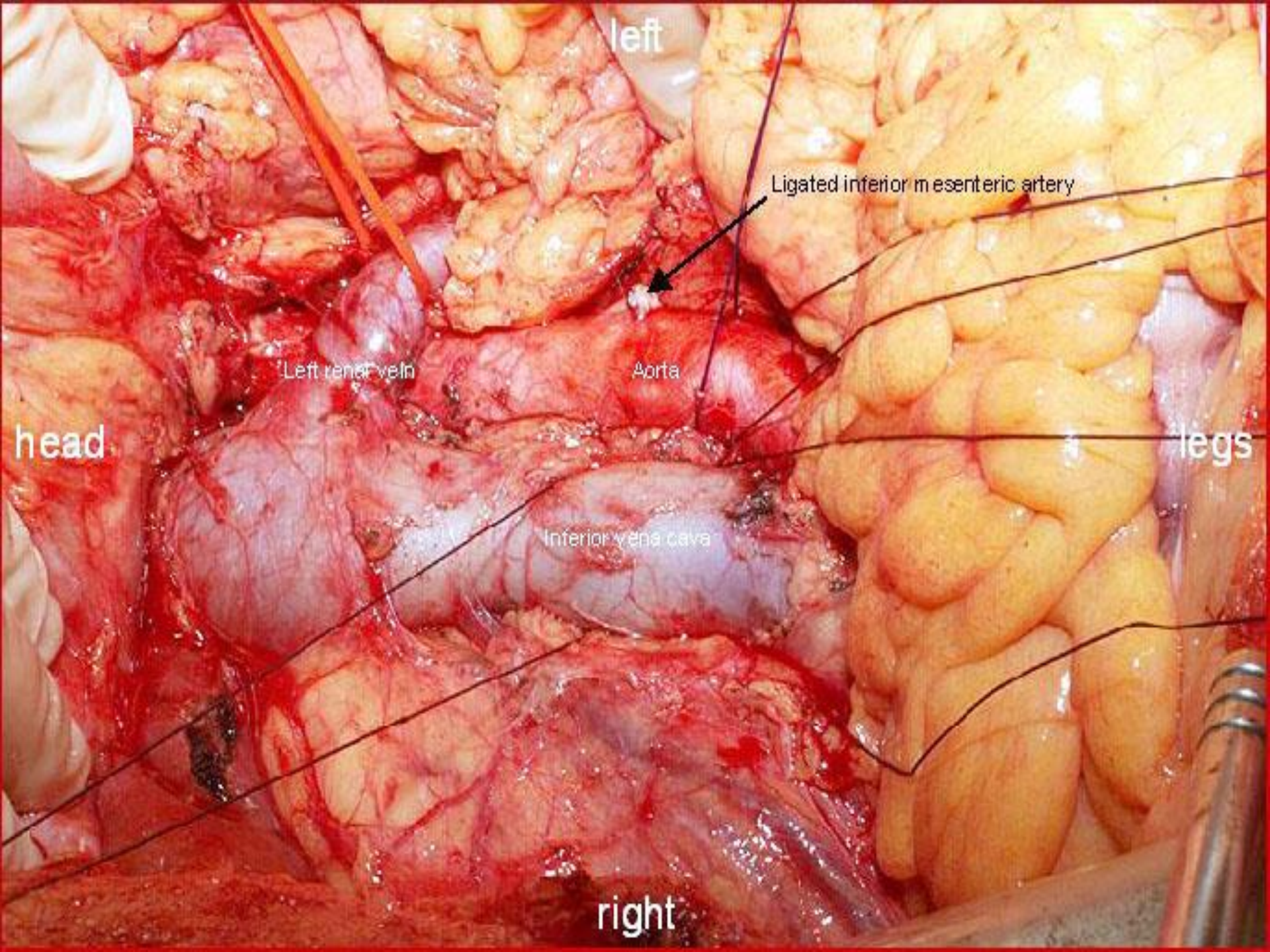
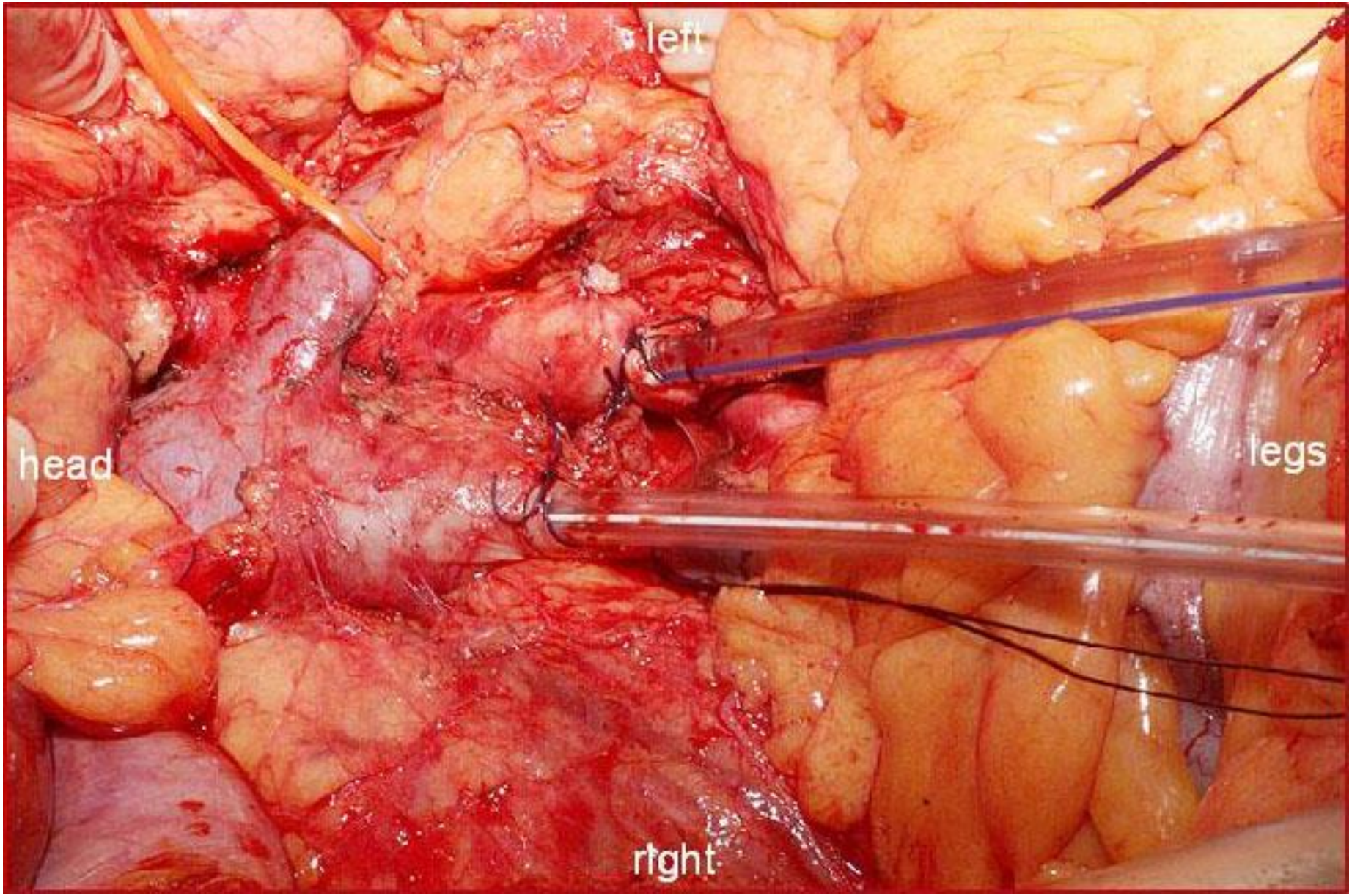
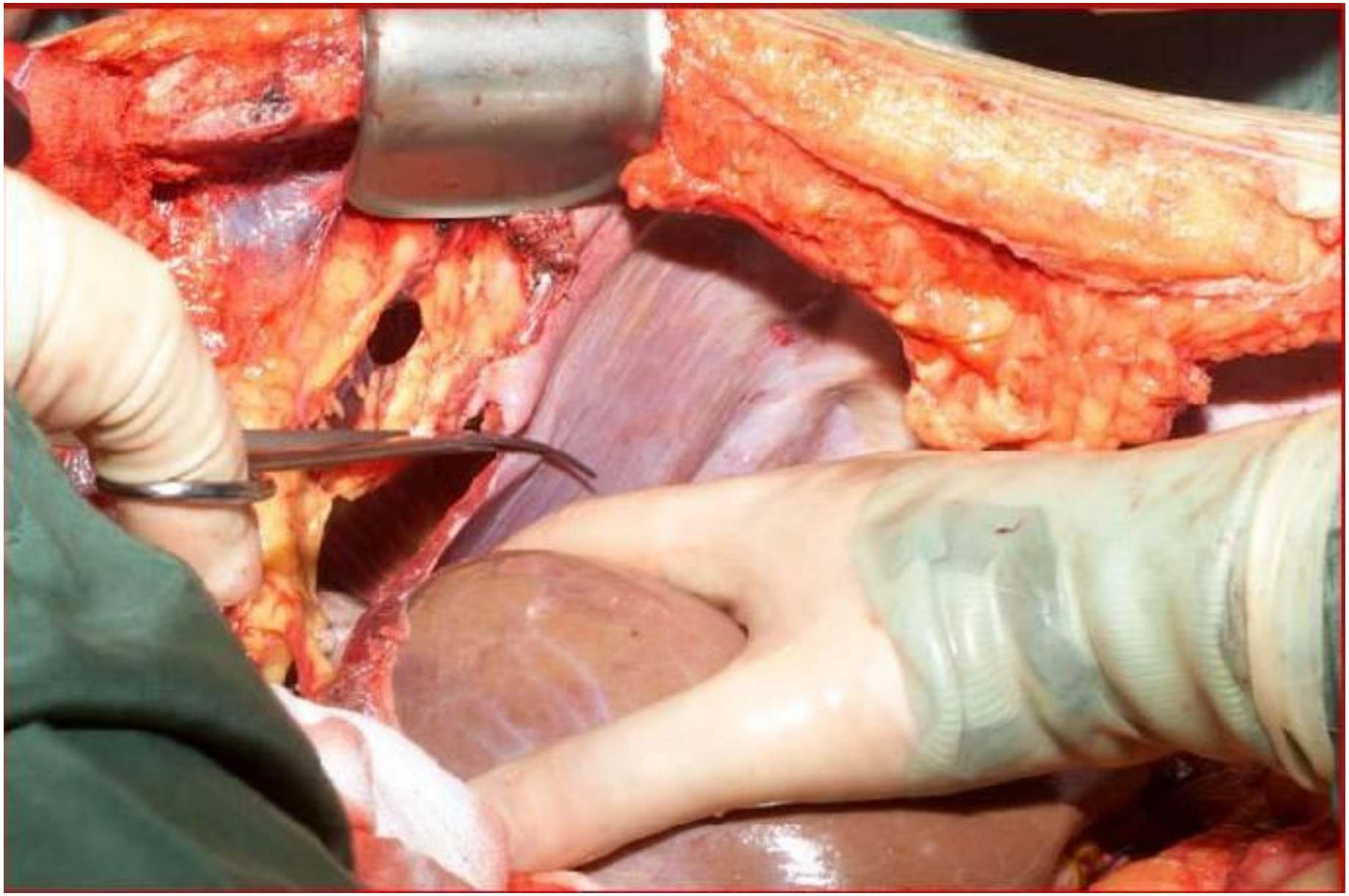

head
legs

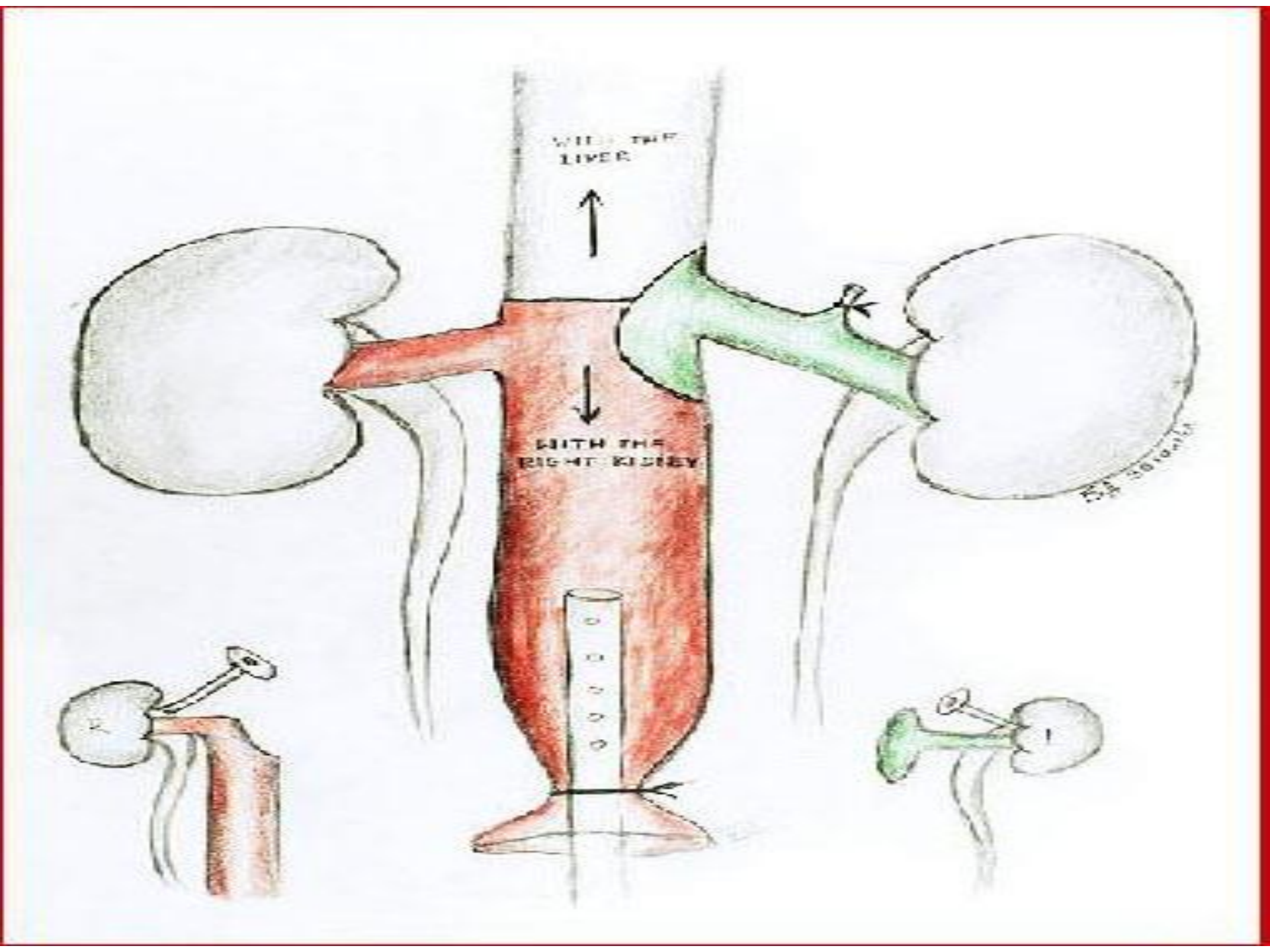

Left liver lobe
right
left
Lesser omentum
Stomach

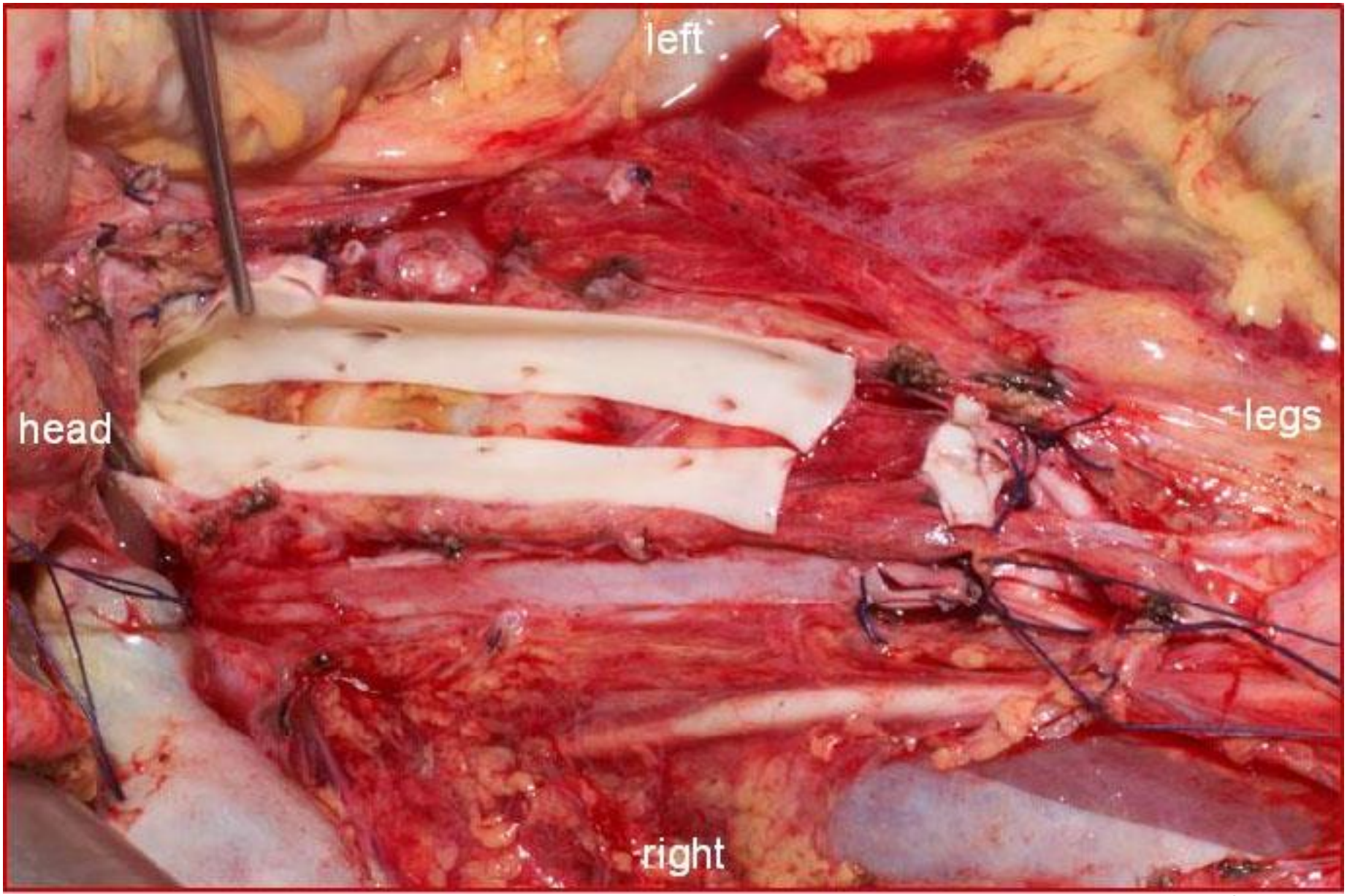

left
Stomach
head
legs
Aorta
Oesophagus
Pancreas
right


left
Ligated inferior mesenteric artery
Left renal vein
Aorta
head
legs
Inferior vena cava
right

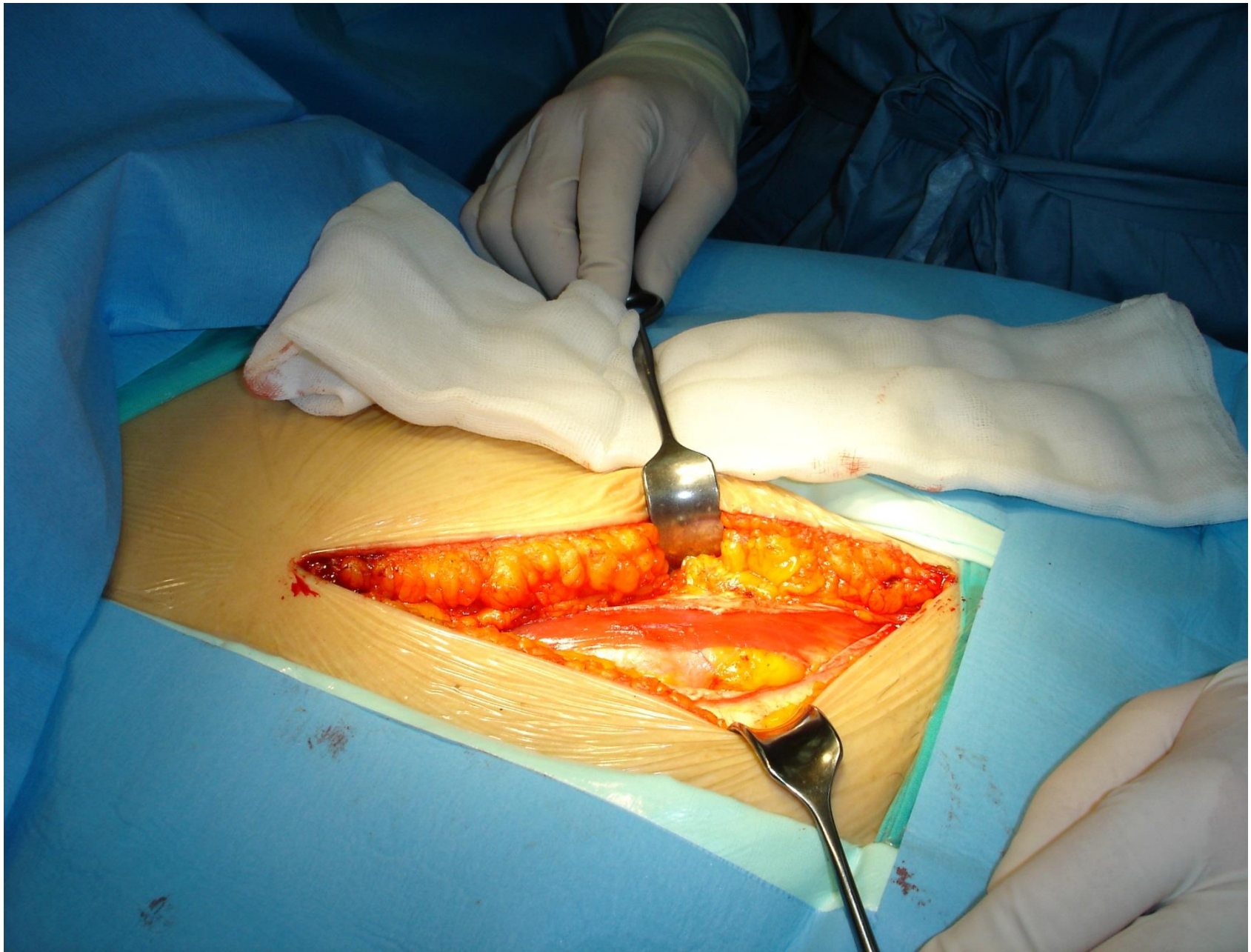

left
head
legs
right

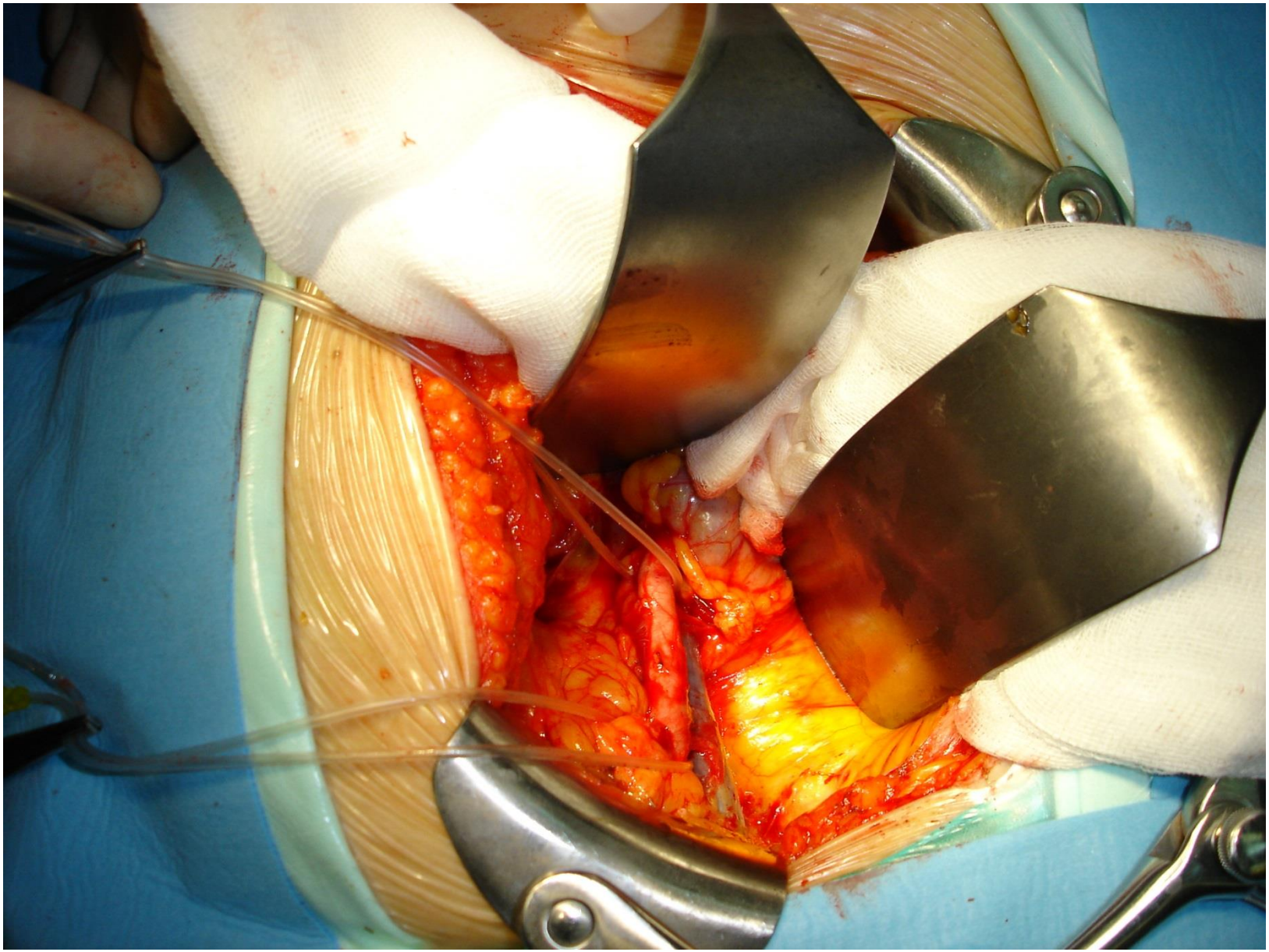


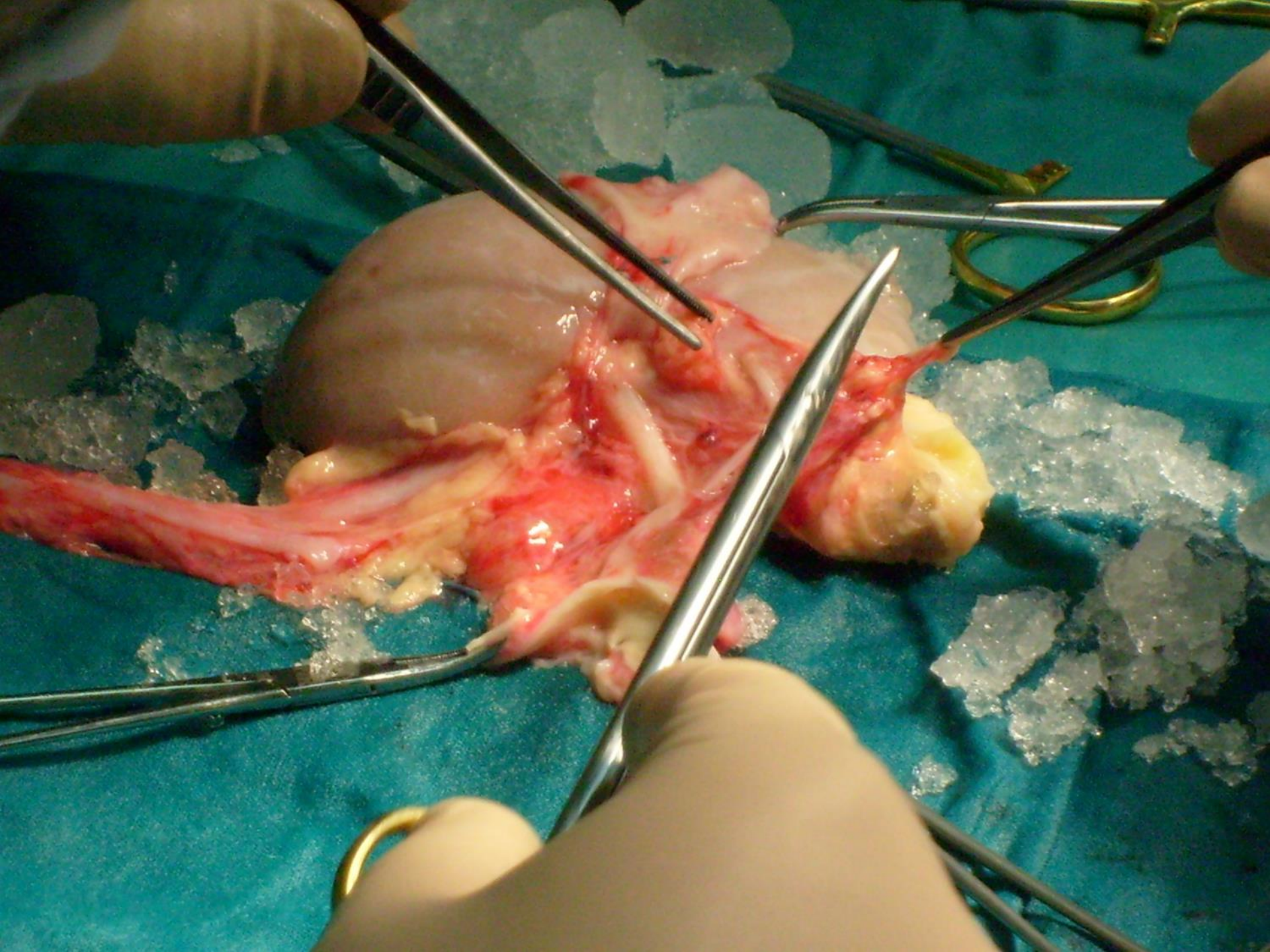

LIVER
WITH THE
RIGHT KIDNEY

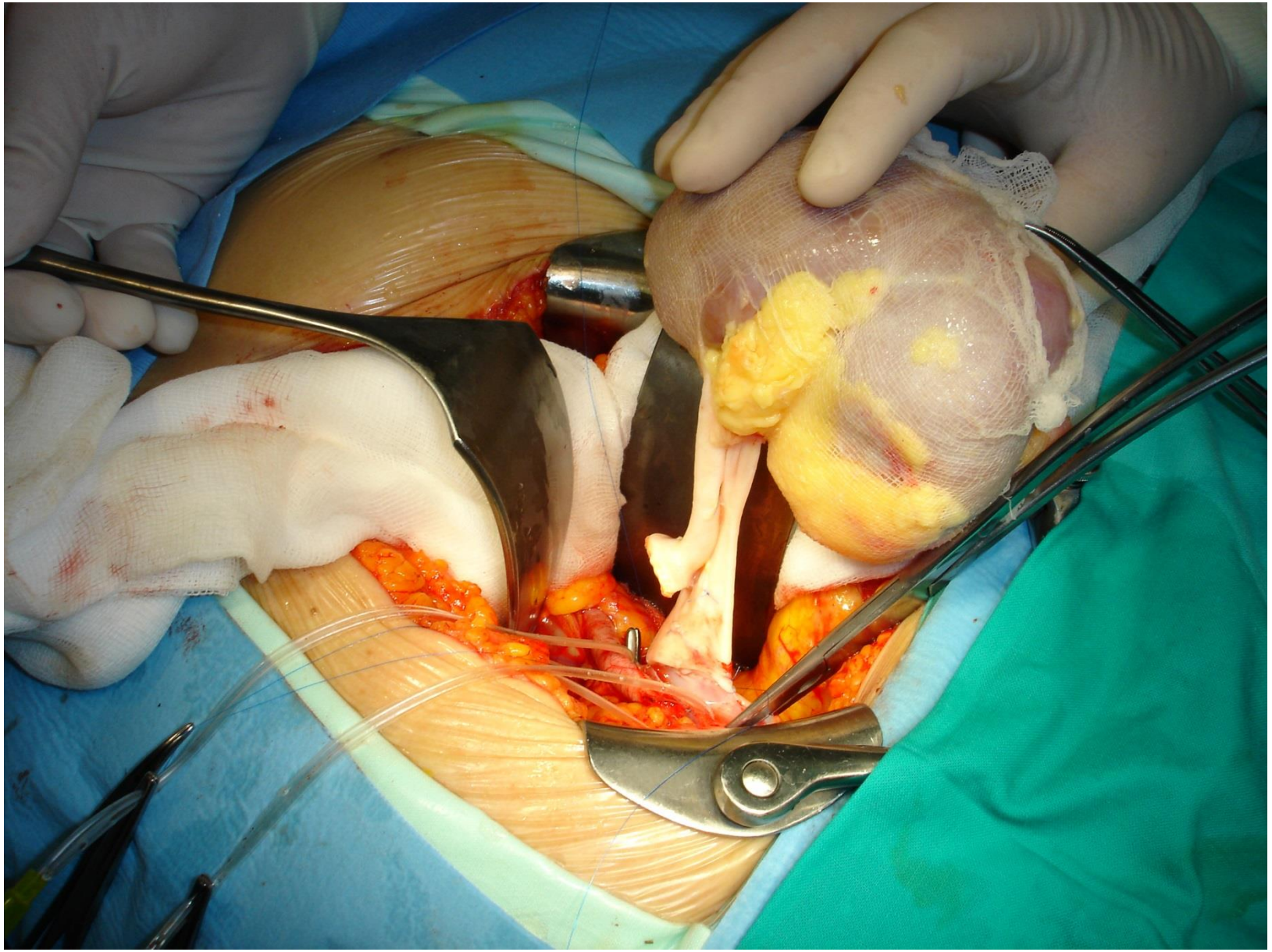

left
head
legs
right

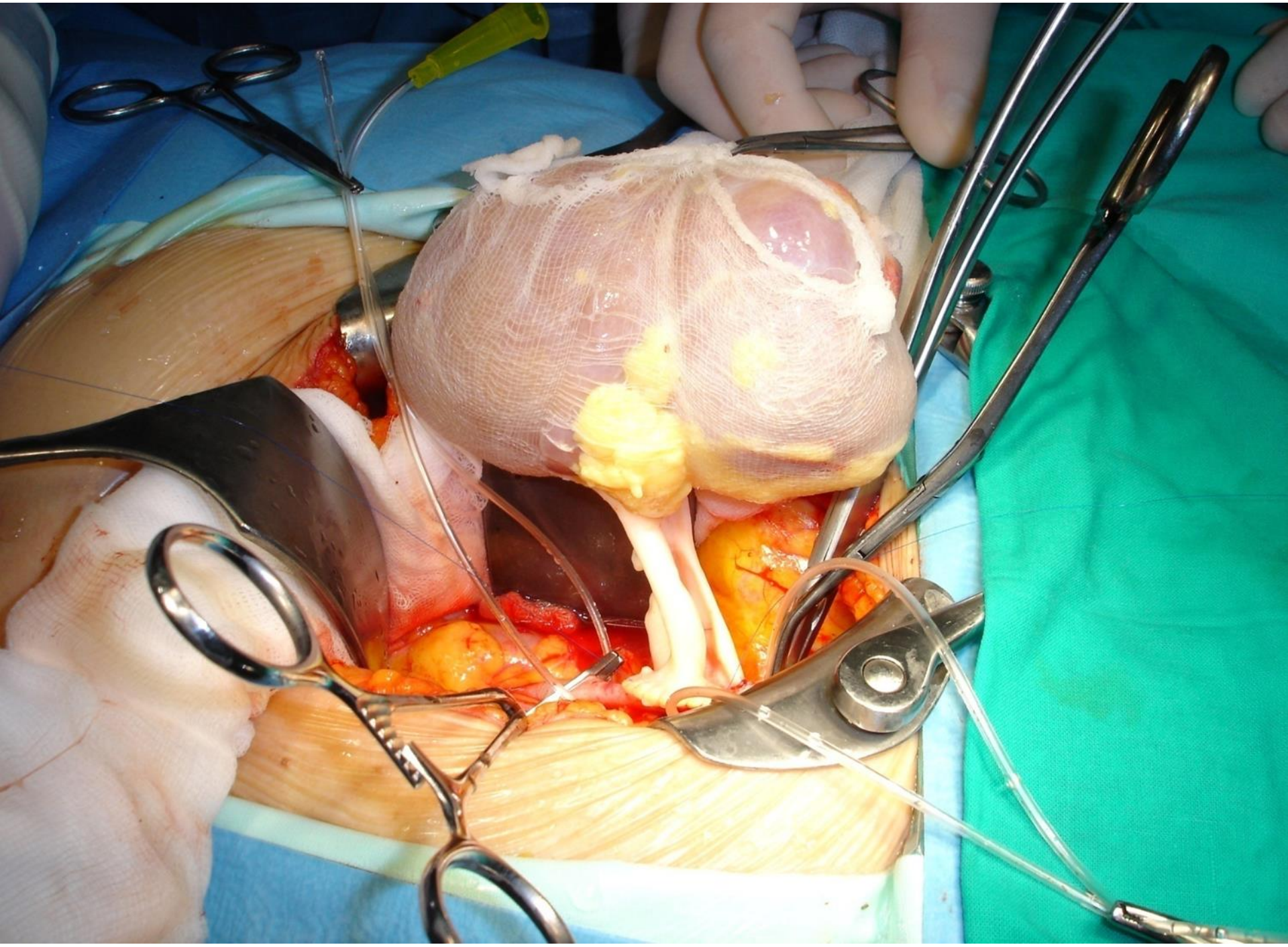
Kidney transplantation procedure

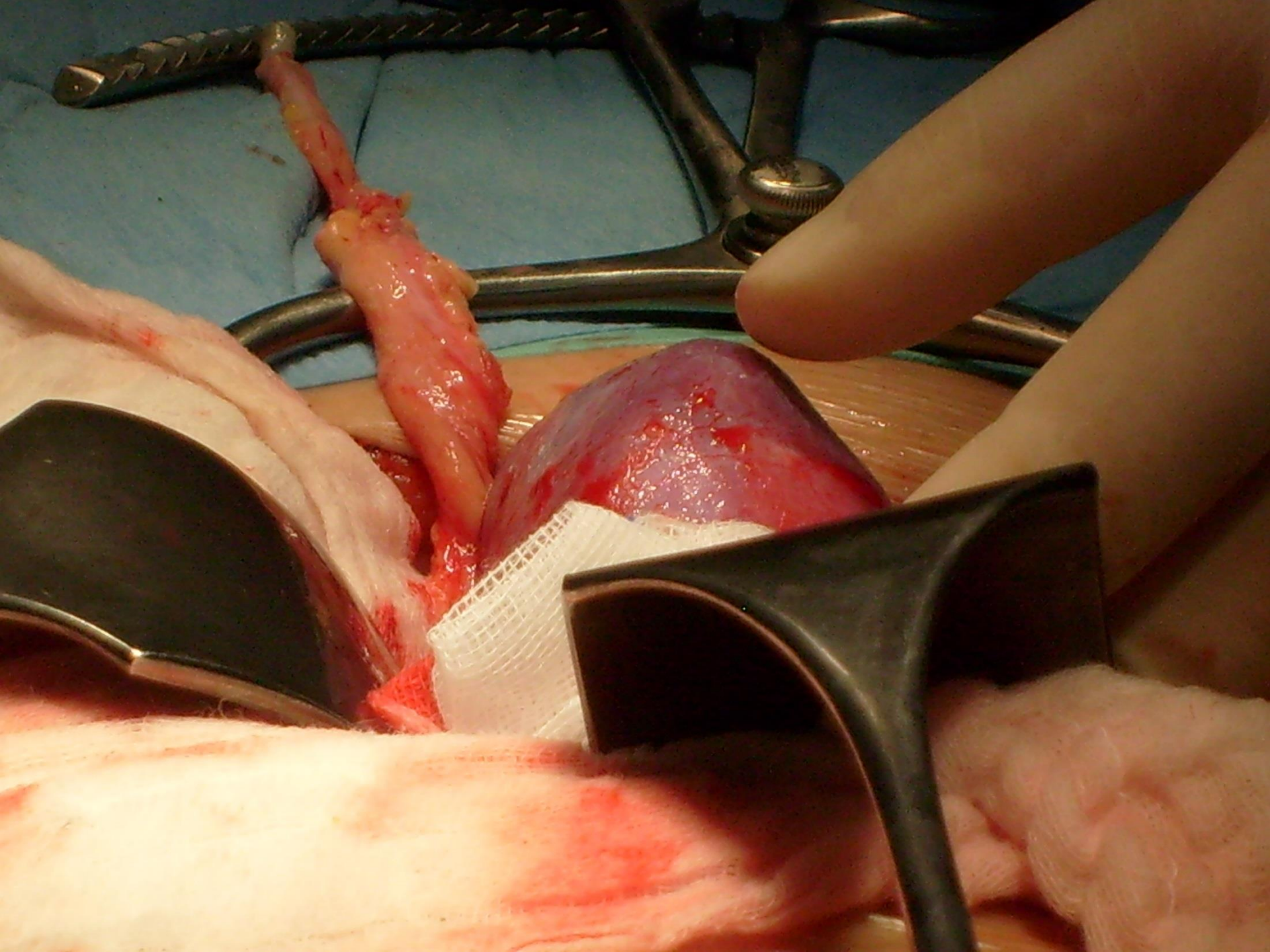


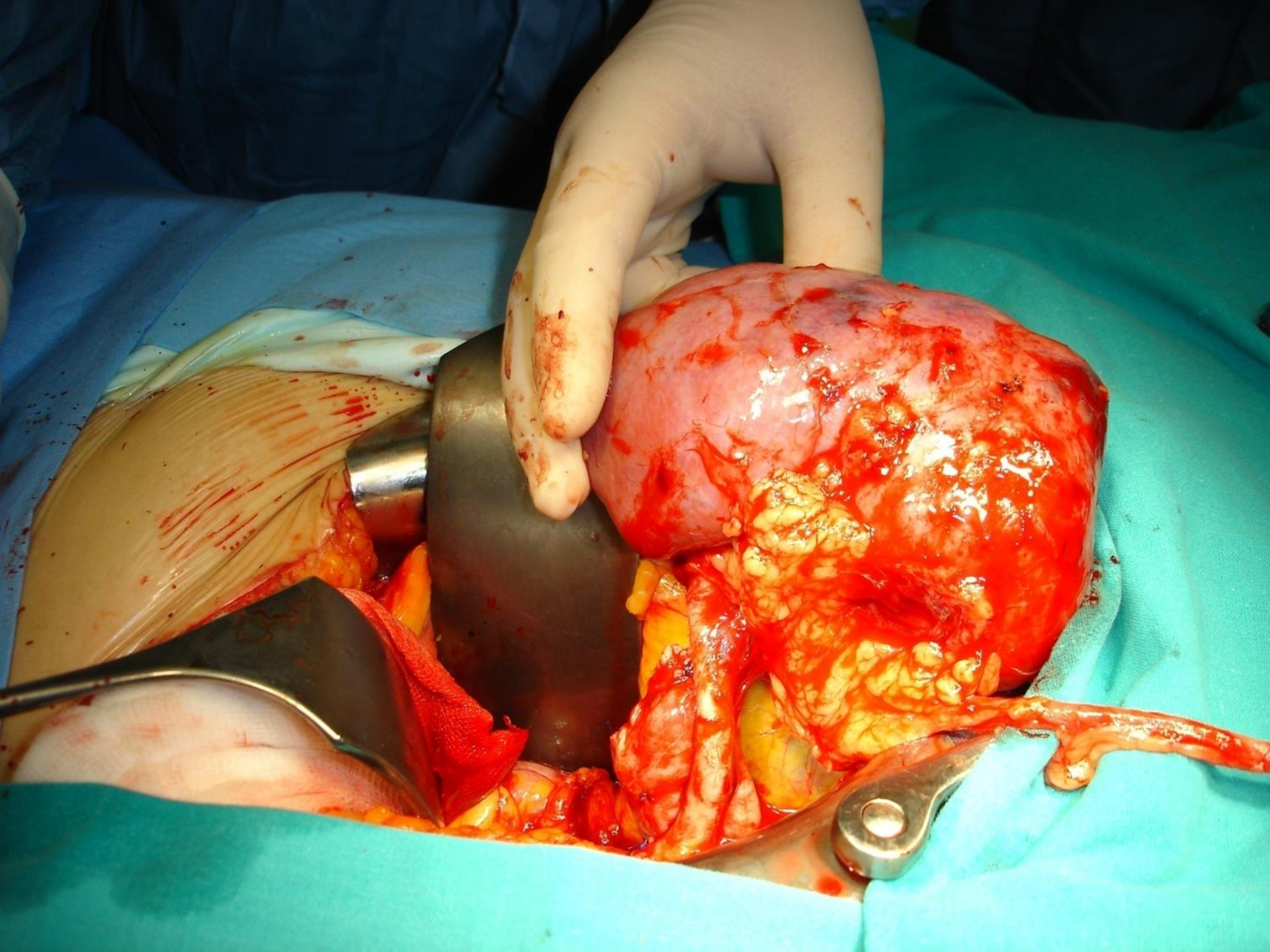












POSTOPERATIVE CARE

* Preoperative start of immunosupression
* Precise water-electrolite balance
* Urinary bladder drained for 24-48 hours
* Retroperitoneal space drained
* Postoperative dialysis if required
* Active treatment of possible complications
* Early check for blood level of immunosupressant
* v. lenght of in-hospital stay: 7-20 days

ORGAN REJECTION

*** HYPERACUTE:** follows reperfusion (within seconds or minutes), caused by pre-formed antibodies against donor HLA antibodies

*** ACUTE:** vascular or cellular, caused by limphocyte response tothe donor/s antigens

*** CHRONIC:** inflammation, fibrosis, changest in blood vessels, atherosclerosis

BASICS OF IMMUNOSUPRESSION

* Use of two or three immunosupressants
* Higher doses in early post-operative period
* Blood concentration monitoring
* Alteration or withdrawal in case of side effects
* Active treatment of acute rejection

IMMUNOSUPRESSIVE DRUGS

- **Cyclosporine** (Sandimmun, Neoral) - polipeptide, calcineurin inhibitor
- **Tacrolimus** (FK506, Prograf) - calcineurin inhibitor
- **Sirolimus** (Rapamycine) – inhibits limphocyte activation caused by IL 2, 4, 6
- **corticosteroids** – inhibit gene transcription
- **Azatioprine** (Imuran) – inhibits the synthesis of purines
- **CellCept** - inhibits MID (monophospate inositol dehydrogenase), thus blocking DNA syntesis. Active selectively on B and T lymphocytes

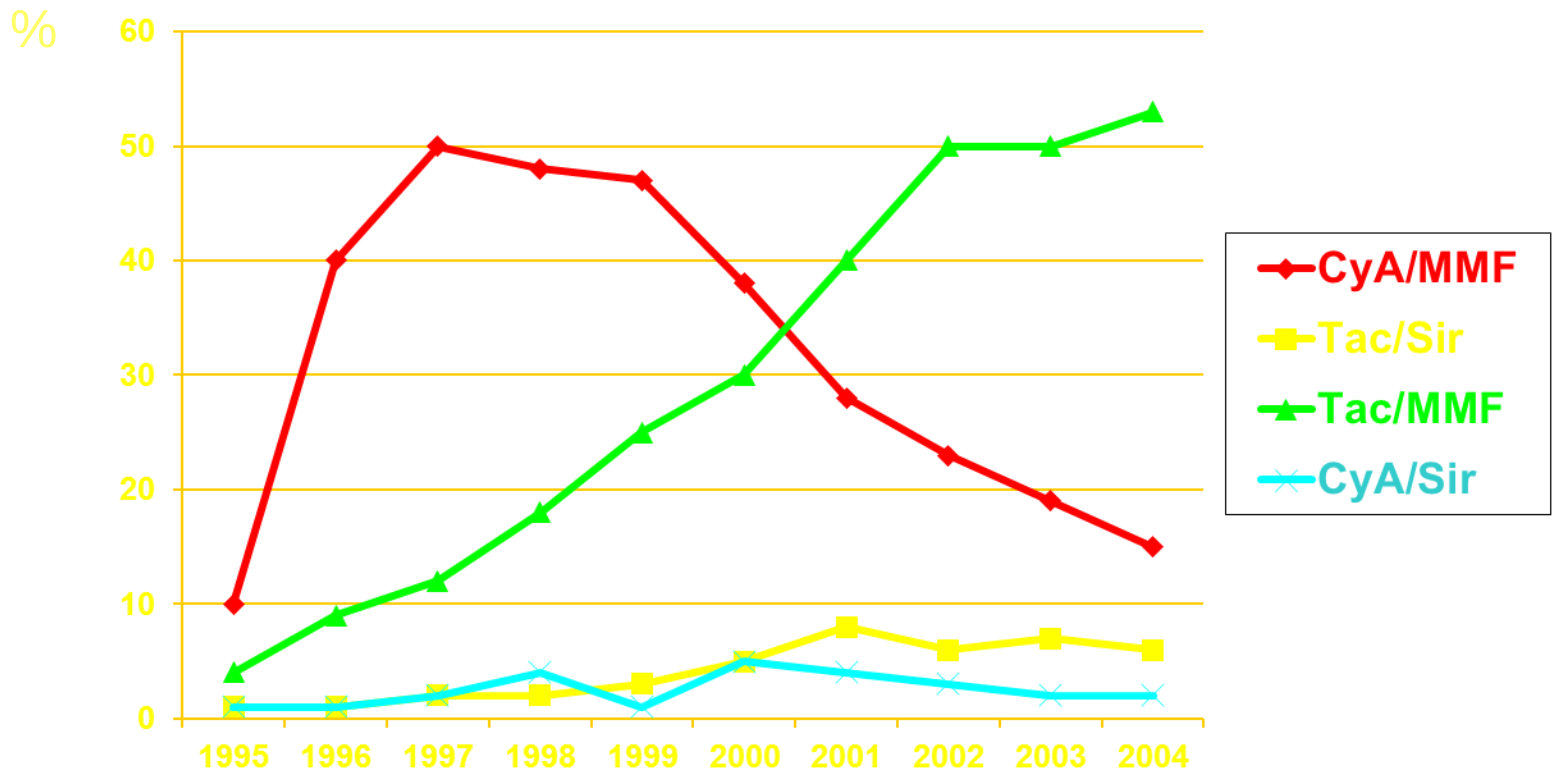
IMMUNOSUPRESSIVE DRUGS

* **Policlonal antibodies** – antilymphocytes antibodies against subpopulations CD2, CD3,

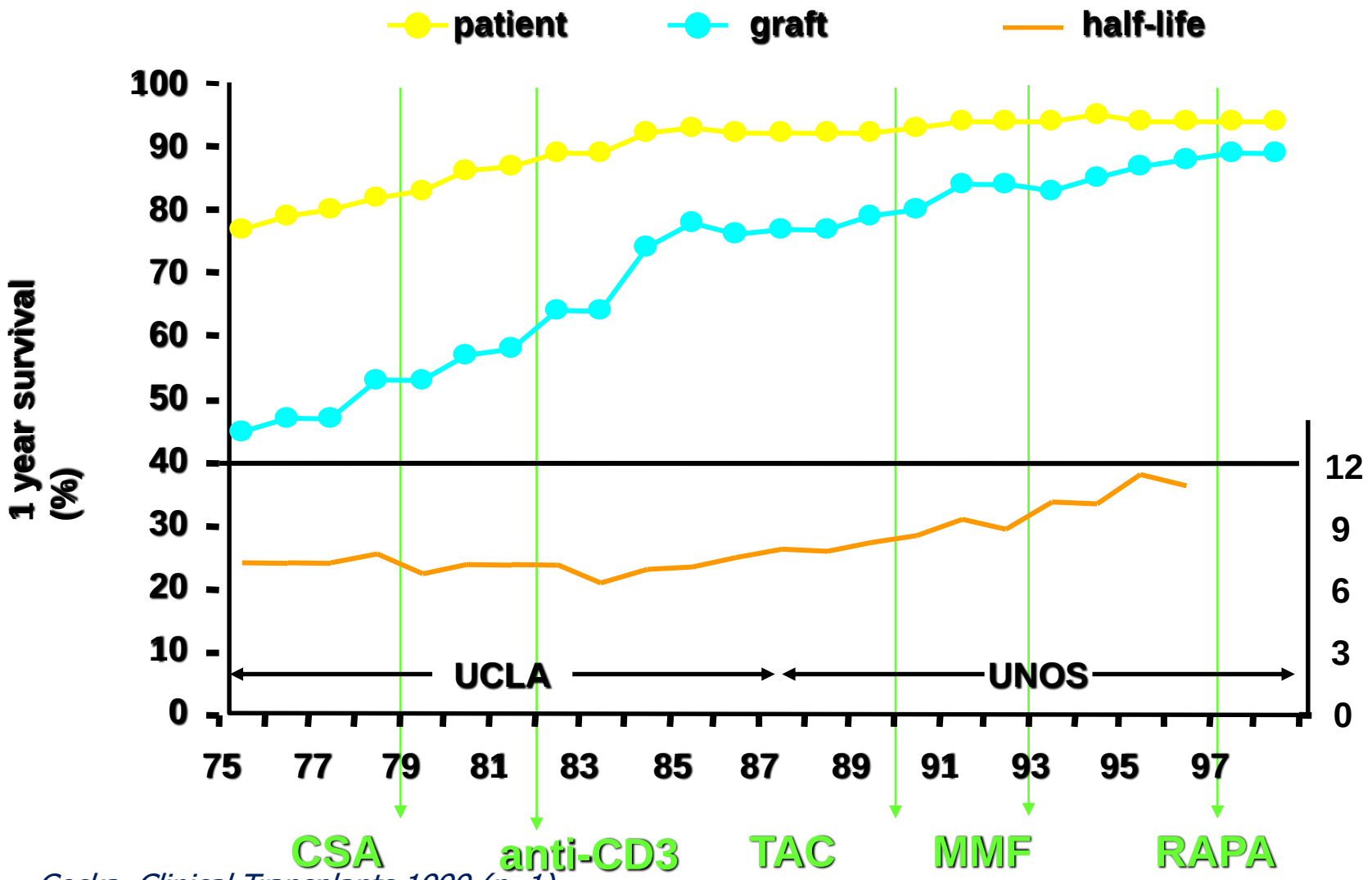
*** Antibodies for IL 2 receptor** – basiliksimab (Simulect)

* New agents

Discharge immunosuppression regimens for kidney Tx
2005 OPTN/SRTR Annual Report



1 year results of kidney transplantation



Cecka, Clinical Transplants 1999 (p. 1)

UCLA (University of California at Los Angeles)

UNOS (United Network for Organ Sharing)

Thank you for your attention