State Establishment “N.N. Alexandrov National Cancer Centre of Belarus”

Minsk, Belarus 2009

THE COUNCIL OF MINISTERS OF THE BYELORUSSIAN SSR

Resolution On Intensifying Cancer
from May 23, 1959 № 364 Research Investigations

The Council of Ministers of the Byelorussian SSR states that the level of researches on malignant neoplasm diseases is absolutely insufficient in medical and research institutes and establishments of the Byelorussian SSR. There is no material and technical basis for experimental studying the most important problem in the republic. Some oncological dispensaries (Mogilev, Gomel and others) are located in premises, inadequate in area, Vitebsk and Grodno dispensaries have no in-patient departments; there are no hostels-hotels for oncological patients undergoing out-patient treatment. With the aim to create necessary conditions for organizing and conducting broad experimental and clinical researches on cancer problem at an up-to-date level, training highly qualified specialists-oncologists as well as improving prophylactic and medical help to patients with malignant diseases, the BSSR Council of Ministers

D e c i d e s:

1. To take into consideration that in the seven-year plan, the BSSR Public Health Ministry forsees constructing a 200-bedded research institute of oncology and medical radiology in a zone out of Minsk; 5 oncological dispensaries with radiological and in-patient departments.

1960 y.

N.N. Alexandrov – the founder and first director near a model of the future institute

.

ГУ РНПЦ ОМР
им Н.Н. Александрова

Administration building

Modernized building for oncological mammalogical department

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им Н.Н. Александрова

Laboratory building

Recreational pavilions in pedestrian zones on the Centre territory

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им Н.Н. Александрова

With the Decree of President of the Republic of Belarus Alexandr Grigoryevich Lukashenko from July 6, 2005 oncology is included into the structure of main trends of scientific and technical activities in the Republic of Belarus in 2006 – 2010

Specialized Medical Help to Oncological Patients

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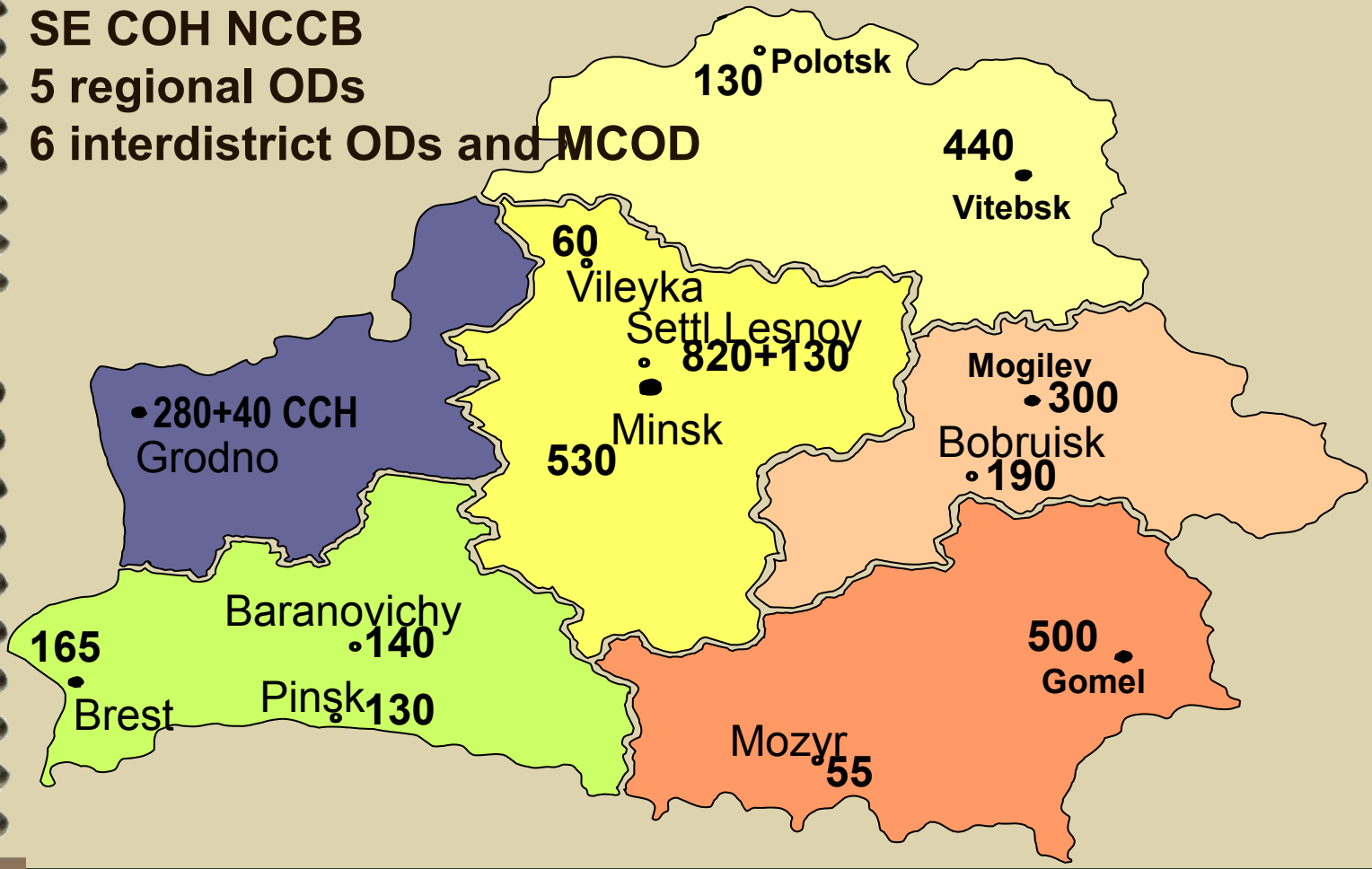
3 910 special beds for oncological patients

SE N.N.Alexandrov NCCB
SE COH NCCB
5 regional ODs
6 interdistrict ODs and MCOD



Centre Structure

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Research Sector:

Research departments – 13
Auxiliary services – 3

Staff: 135 persons, including
79 researchers

Doctors of Sciences– 16
Candidates of Sciences 22

Clinical Sector:

Departments and laboratories– 31
Auxiliary services - 21

Staff: 1578 persons,
including 270 doctors

Doctors of Sciences - 7
Candidates of Sciences – 31

At the base of the Centre, the BelMAPO Oncology Department (2 Doctors of Sciences and 2 Candidates of Sciences) functions as well as the Council for dissertation defense Д 03.12.01 on specialties
14.00.14 – oncology
14.00.19 – radiodiagnosis, radiotherapy

Research Trends

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- organizing anticancer struggle, studying cancer epidemiology and prophylaxis
- developing new technologies for diagnosing malignant tumours
- developing new technologies for managing patients with malignant neoplasms
- developing new technologies for rehabilitation and bettering quality of oncological patients' life
- carrying out clinical trials of new drugs
- improving medical and technical basis of the oncological service of the republic

Center Bedding

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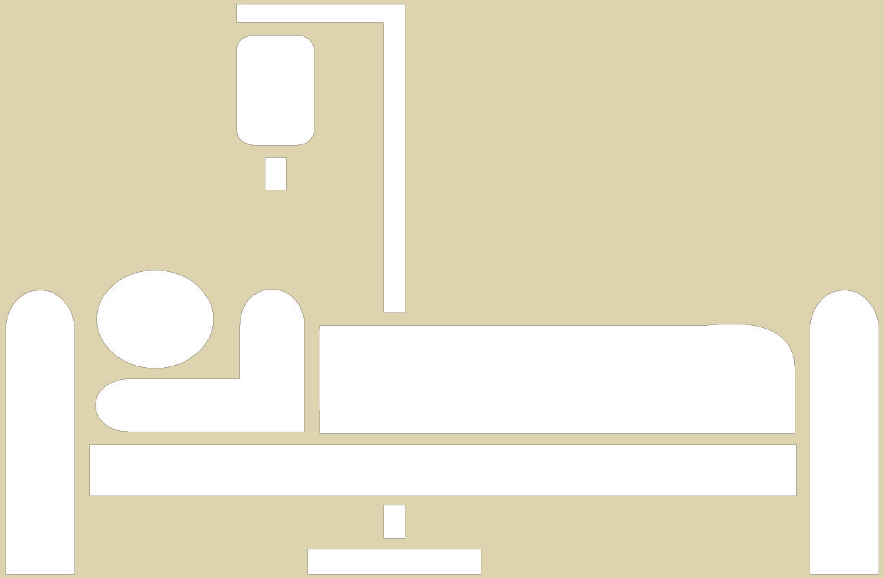
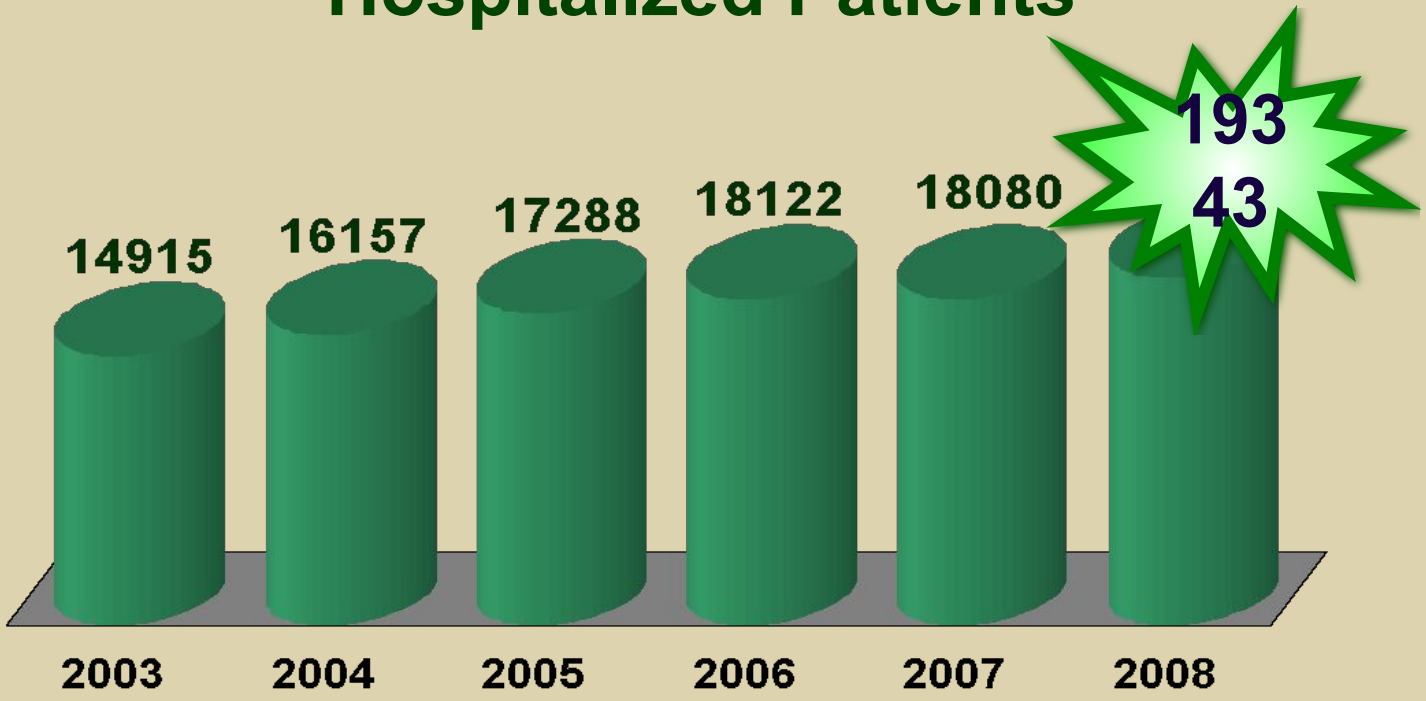
820 beds

12 beds— the Resuscitation Department



Hospitalized Patients



Annually more than 200 foreign patients from the USA, France, Russia, India, Iraq, Poland, Azerbaijan, Armenia, Georgia, Kazakhstan, Latvia, Lithuania, Moldova, Uzbekistan, the Ukraine and other countries undergo medical treatment in the Centre.

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Diagnostic Base of the Centre

Laboratory Diagnosis

Practically, the whole specter of biochemical, clinical, immunohistological, radioisotopic, molecular and genetic investigations is performed.

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Laboratory of Molecular Oncogenomics

Specter of Performed Investigations

- Detecting mutations in genes of hemodialysis system
- Detecting mutations in genes hereditarily associated with breast and ovarian cancer (BRCA1 and BRCA2) development
- Identifying mutations in genes hereditarily associated with colon cancer (APC, K-ras, MLH1, MSH2, BCL2) development
- Assessing a residual minimal disease under malignant neoplasms of breast, lung and prostate

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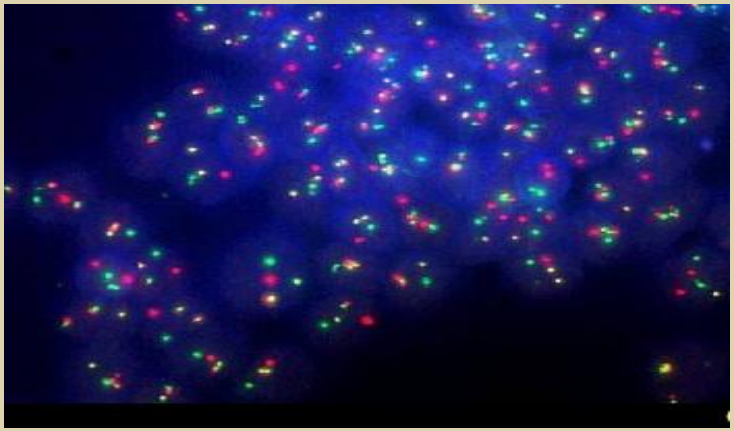
FISH-Laboratory

FISH – fluorescent in situ hybridization

- identifying amplifications of HER-2/neu gene at breast cancer for performing a target (using monoclonal antibodies) therapy;
- detecting translocations, deletions, inversions in non-Hodgkin's lymphomas;
- detecting chromosomal aberrations in solid tumours (breast and bladder cancer, some soft tissue tumours, brain tumours)



Translocation t(11,14) under lymphoma from mantle zone cells

Fluorescent microscope Axioskop 40

Laboratory of Molecular Cytogenetics

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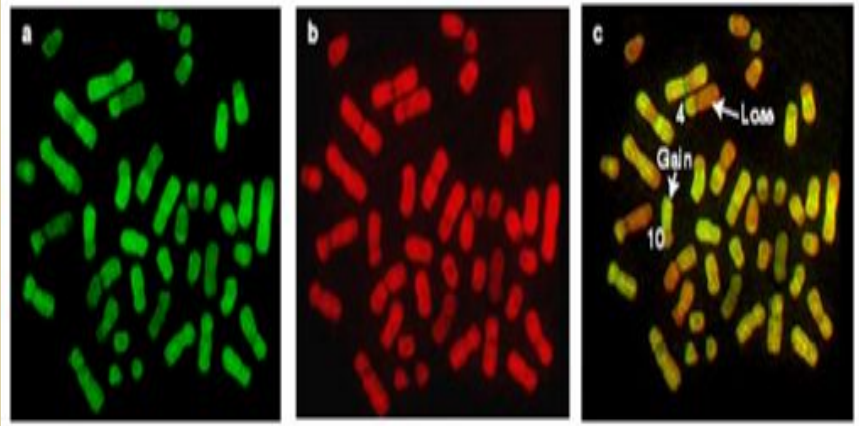
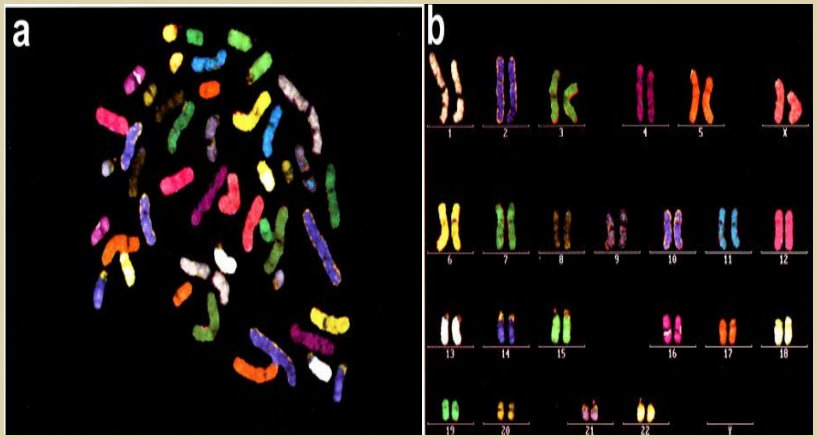
Modern Methods of Molecular and Cytogenetic Investigations

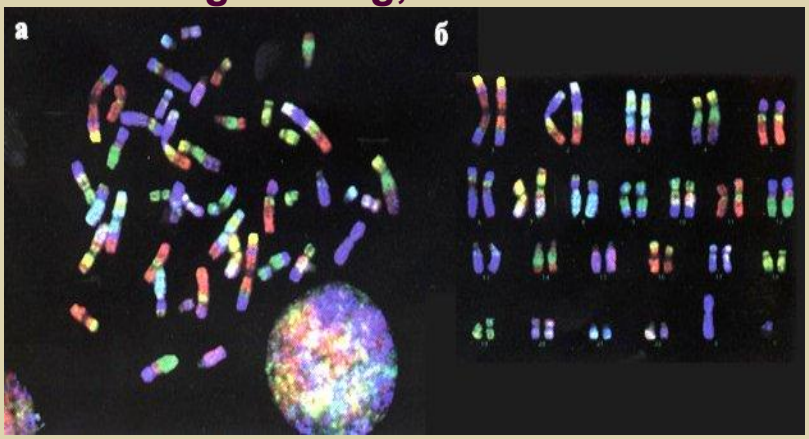
Comparative Genomic Hybridization, CGH



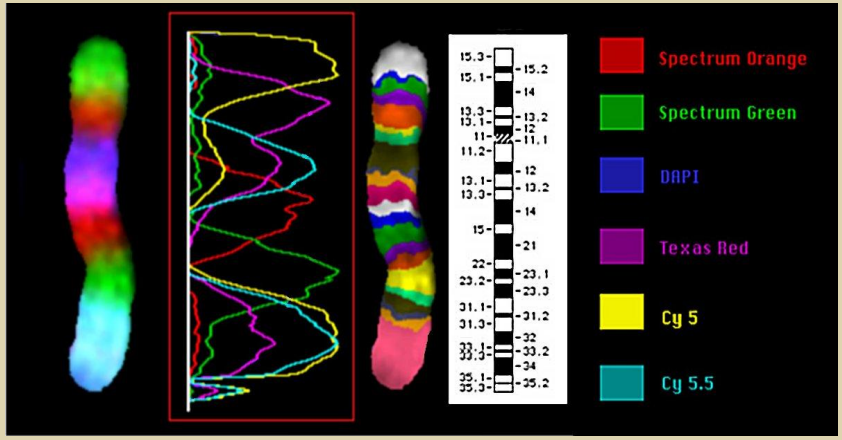
Spectral Karyotyping, SKY



Interspecific chromosomes segmenting, RxFISH



Multicoloured human chromosome 5 staining , MCB



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Morphological Methods of Investigation

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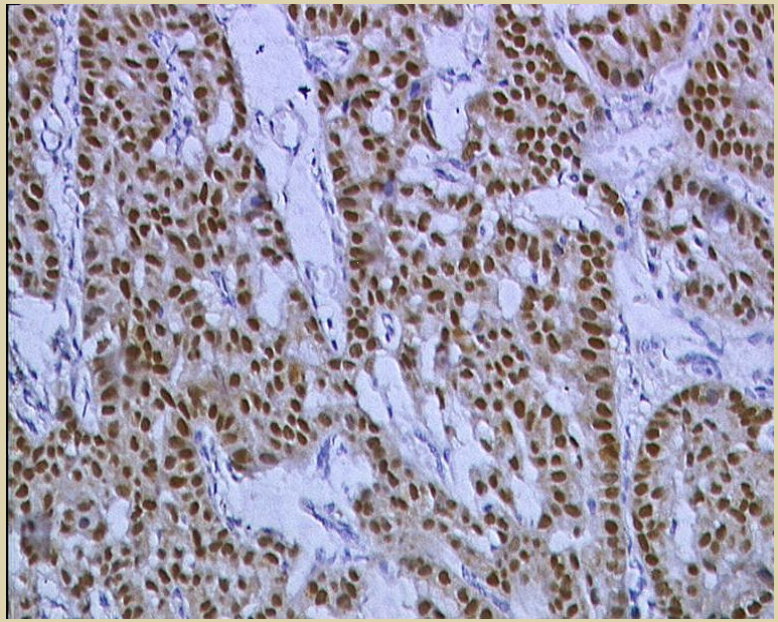
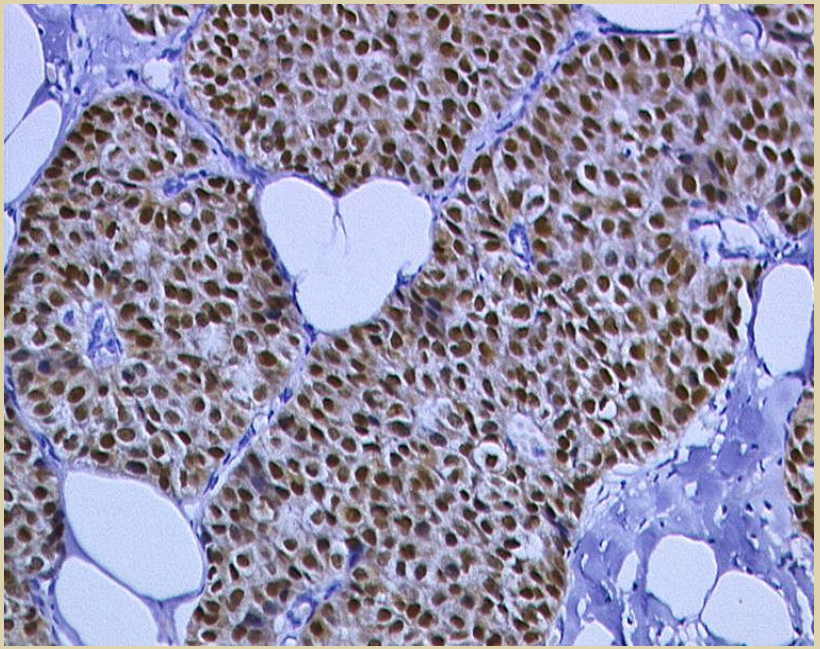
Up-to-date immunohistological investigation methods using more than 60 poly- and monoclonal antibodies are introduced and widely used in practical work at present .

- Receptor status: **ER, PR**

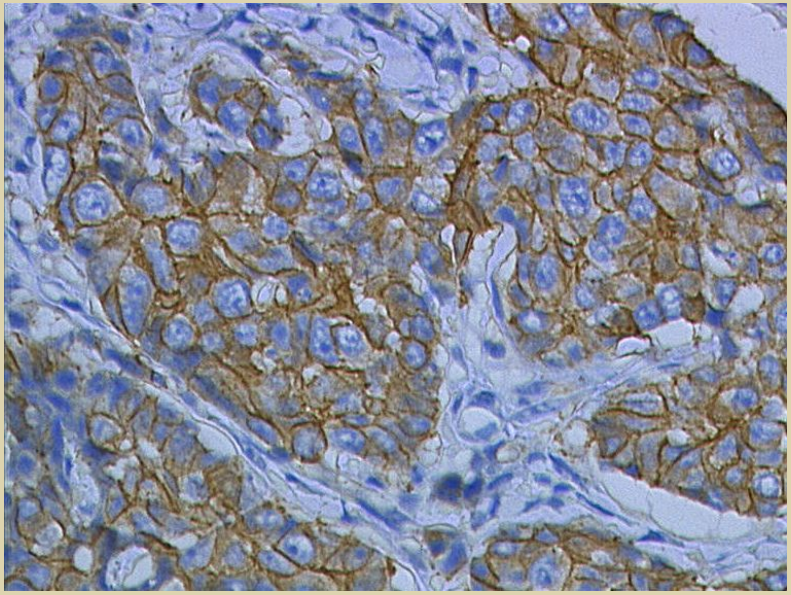


Distribution of protein ER in tumour cell nuclei at BC, x40. Immunohistochemical staining MKAT (clone 1D5, DAKO)

Distribution of protein PR in tumour cell nuclei at BC, x40. Immunohistochemical staining MKAT (clone PgR636, DAKO)

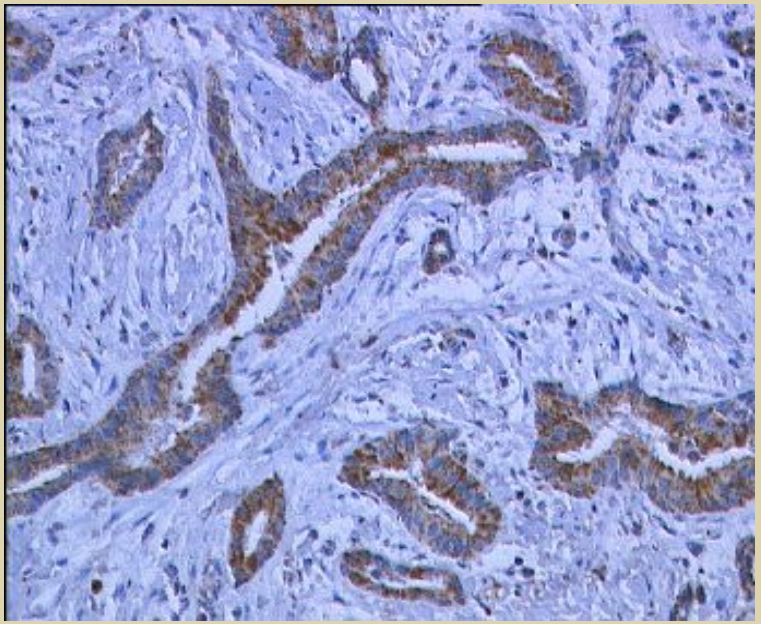


Level of Protein c-erbB-2 and Protein BRCA I Expressing



Distribution of protein c-erbB-2 in tumour cell nuclei at BC, x40. Immunohistochemical staining MKAT (dilution 1:300, polyclonal, DAKO)

Cytoplasmatic distribution of protein BRCA1 in tumour cells at BC, x40. Immunohistochemical staining MKAT (dilution 1:50,clone E30, DAKO)



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Telepathology system for giving on-line consultations on morphological preparations

Modern equipment for biopsy material automated paraffin covering

Radiodiagnosis

The department is equipped with modern, mainly, digital diagnostic instruments securing the use of an advanced filmless technology of getting, transmitting, processing and keeping images.

At the base of the department one realizes a big work on training specialists in radiodiagnosis for medical institutions of the oncological profile of the Republic of Belarus (at working places and conducting thematic seminars). The permanent school for advanced training of radiodiagnosticians of Minsk region has been functioning here for 5 years.

Computer roentgen tomographs

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Magnetic resonance tomograph

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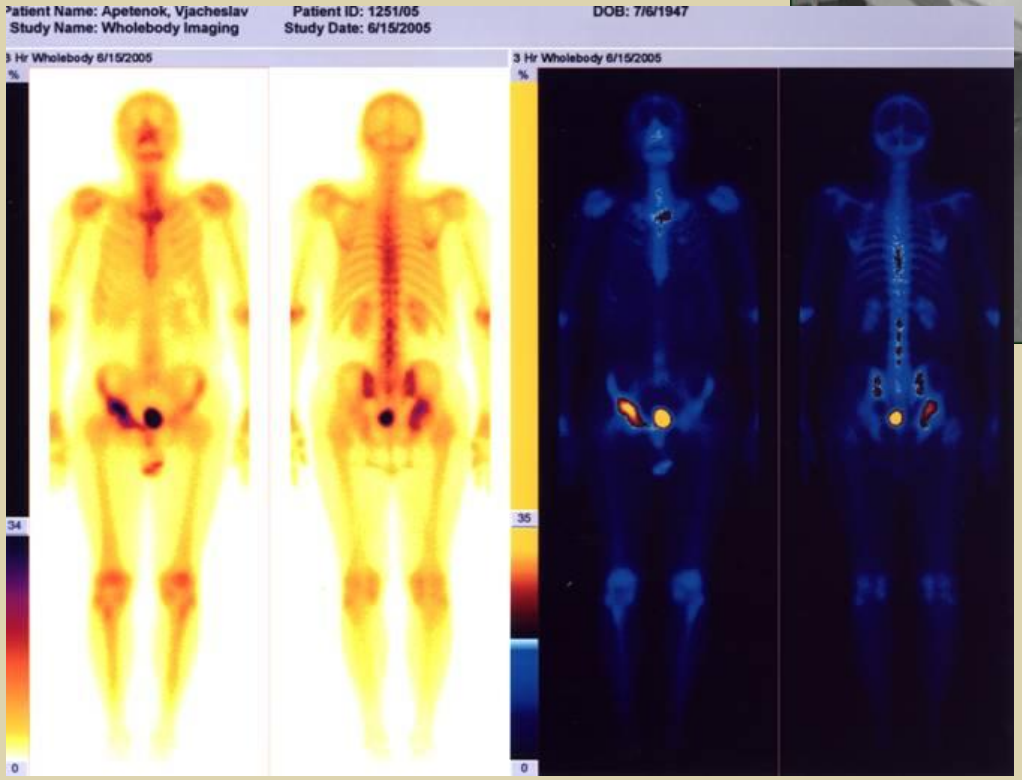
One-photon emission tomograph



Angiographic investigations

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Ultrasound investigations

USI scanners in the expert class

Intraoperative ultrasound investigation

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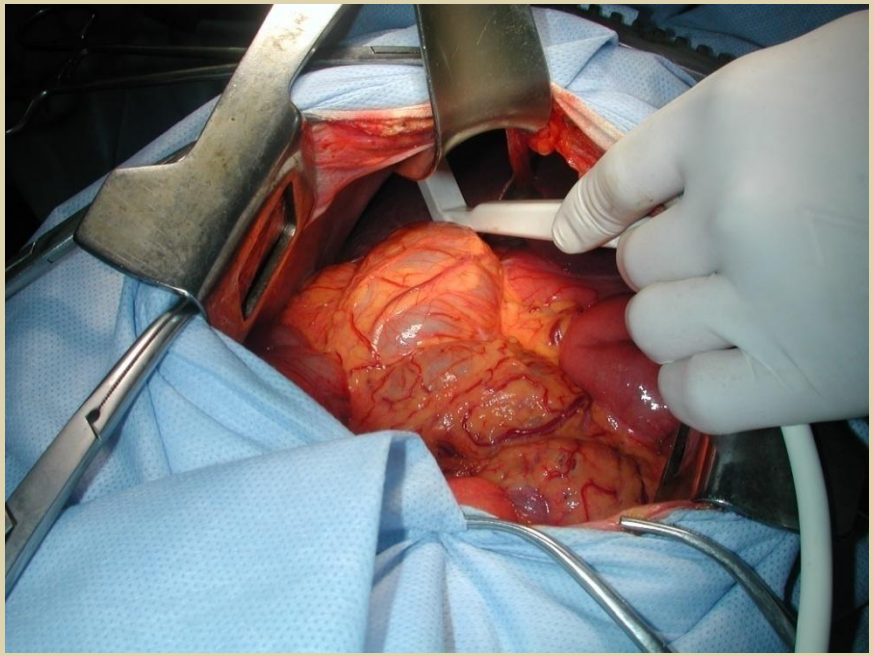

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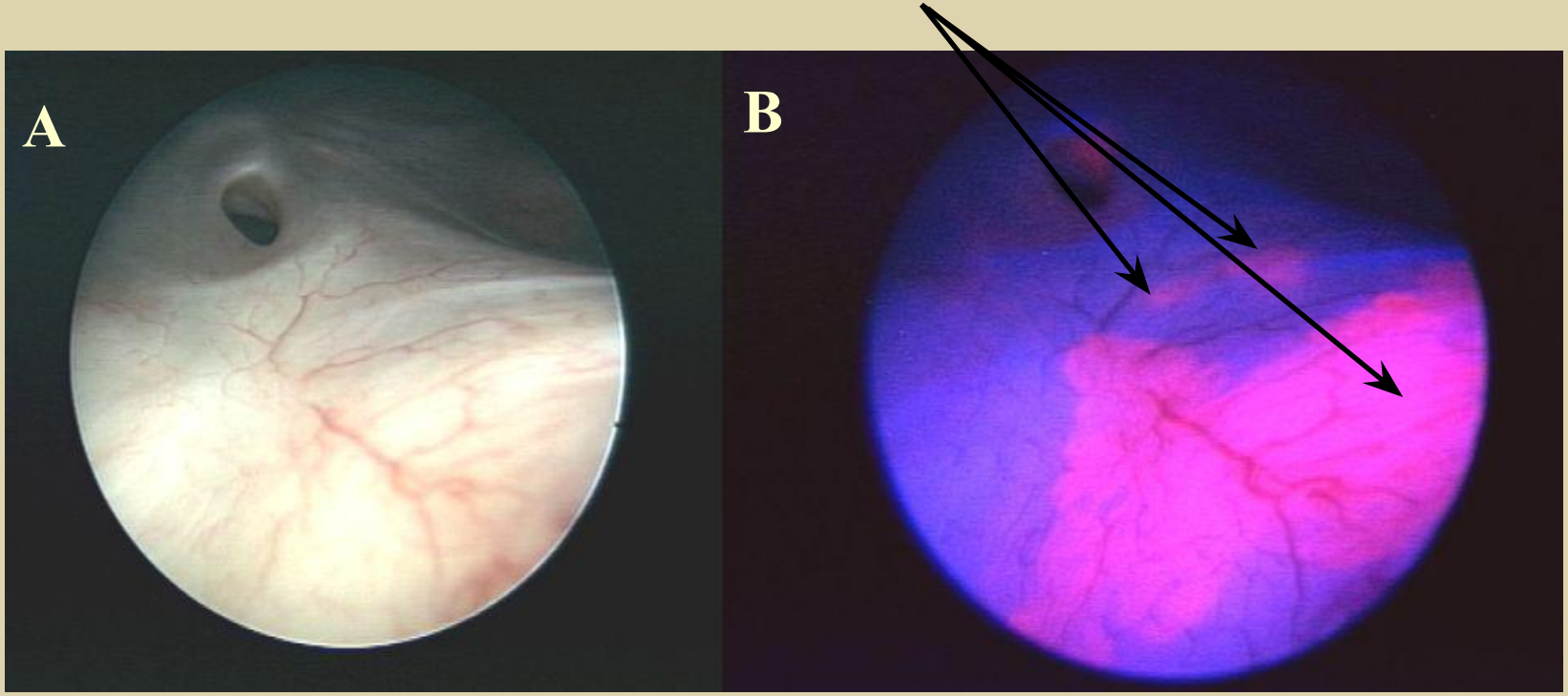
Diagnosing Bladder Cancer on the Basis of Photodynamic Effect

Bladder cancer manifestation after intravesicular introduction of 5-ALA (Alamin):

A – white lit;

B – blue lit (λ = 400 nm),

one can see additionally detected bladder tumours



Efficacy of Clinical Use of 5-ALA (Alamin) of the Belarusian Production

- Additional malignant bladder tumours are detected in more than 18% of patients
- Obligate precancer is detected in 13% of patients

Highly Technological Methods of Treatment

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Surgical Activities

Totally, there were made

2007 — *9 323 operations*

2008 — 10 628 *operations.*

There were operated

2007 — 9 027 patients

2008 — 9 721 patients

Highly Technological Medical Interventions

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- Combined operations with resection and prosthetics of arch and chest aorta, vertebrae bodies as well as resection of atrium with alloplasty of its wall using an artificial circulation apparatus in lung cancer patients
- Bronchoplastic operations with resection and plasty of pulmonary artery and vena cava superior at lung cancer
- Intrapleural and intra-abdominal thermochemotherapy in patients with pleural mesothelioma and metastatic involvement of abdomen
- Pancreoduodenal resections at pancreas head cancer, with pylorus being saved

- Pancreatectomy under total pancreas cancer, with pylorus constrictor being saved
- Gastropancreatoduodenal resections under locally spread stomach carcoma (with involvement of pancreas head)
- Biliary stenting at pancreas head cancer complicated with mechanical jaundice
- Management of liver and lung metastatic lesions using radiofrequency ablation
- Extended operative interventions into liver with removing 6 segments
- Radical cystectomy with forming artificial bladder from intestine

- Multicomponent management of patients with primary liver cancer and colorectal cancer with metastases in liver using preoperative chemoembolization of hepatic artery
- Laparoscopic radical prostatectomy
- Extracorporeal nephrectomy
- Operations under brain and skull base tumours
- Reconstructive and plastic operations using a microsurgical technique
- Photodynamic diagnosis and therapy using original Belarusian drugs (5-aminolevulinic acid, fotolon)

High Technologies Introduced in 2008

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- method of combined and radiation treatment of patients with supratentorial gliomas and a metastatic brain lesion ;
- pneumoectomy with resection and prosthetics of descending aorta;
- distal resection of pancreas with resection and angioplasty of celiac trunk;
- exenteration of pelvis at locally spread cervical cancer;
- monoblock hystervaginavulvectomy with lymphaden-ectomy;
- fluorescent diagnosis and photodynamic therapy for precancer cervical diseases;
- subtotal laryngectomy;

- reconstruction of mandible using titanium implants;
- use of the navigation system for diagnosing and treating brain and skull base tumours;
- shunting operations under brain tumours;
- extraperitoneal videoassisted radical prostatectomy;
- extracorporeal nephrectomy with autotransplantation;
- videoassisted nephroablation;
- subtotal coloproctectomy with forming intestine reservoir and ileoanal anastomosis;
- intersphincter proctectomy;
- stenting esophagus and trachea.

Radiofrequency Ablation of Tumours

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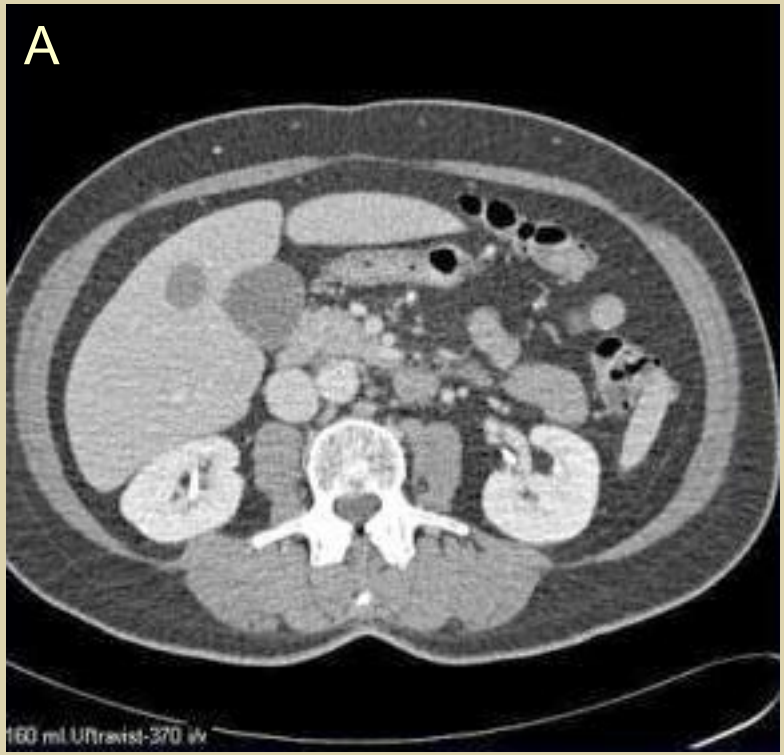
им Н.Н. Александрова

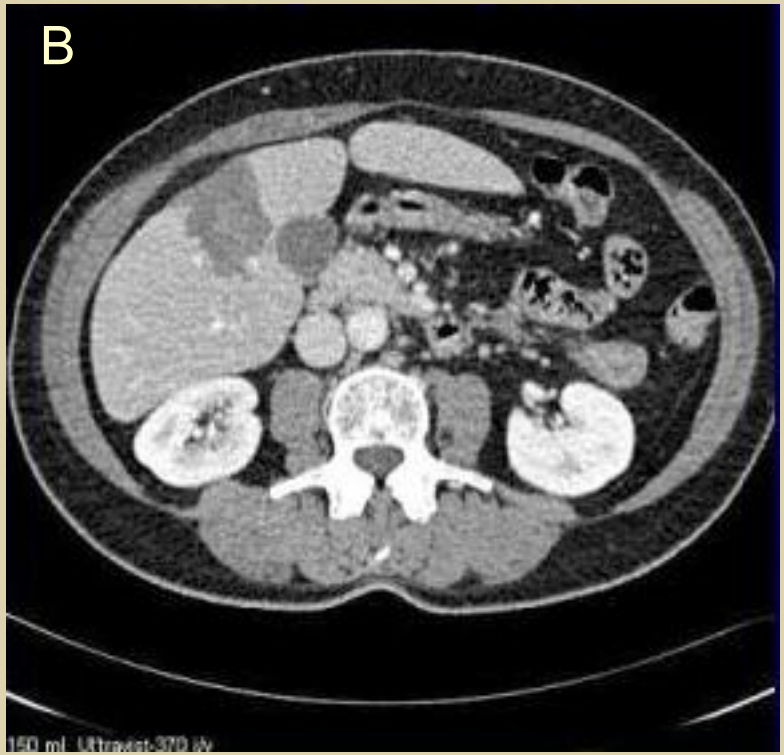
Generator

Integra Elektrotom HITT®106

Perfused elecrodes

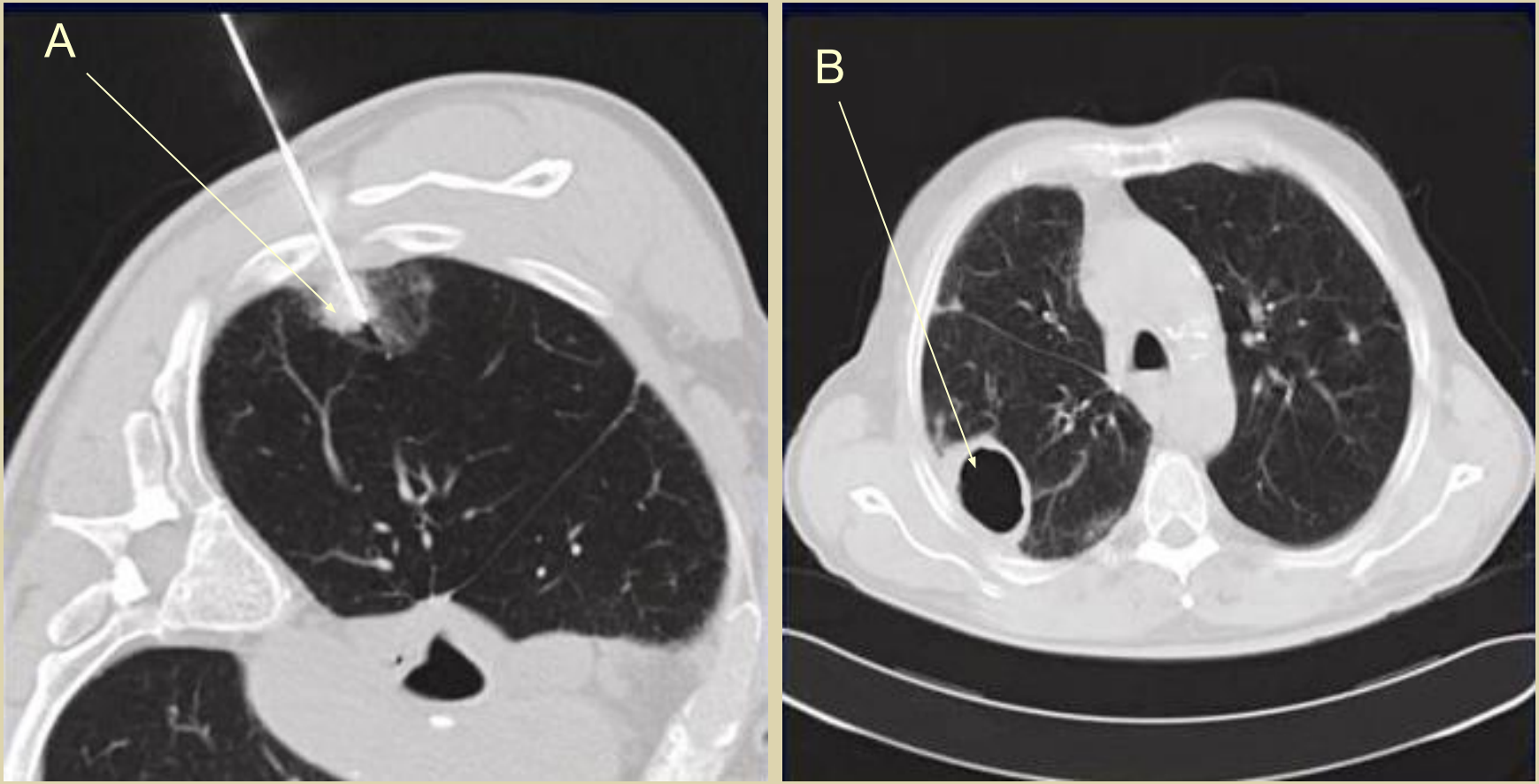
Radiofrequency Ablation of Hepatic Tumour





Liver CT with bolus contrasting (portal phase) before (A) and after (B) radiofrequency ablation of solitary metastasis of bronchial carcinoid

Radiofrequency Ablation of Pulmonary Neoplasm



Computer tomograms during the ablation (A) and 1 month afterwards (B) of the patient with a lung cancer metastasis after lobectomy. There is an encysted cavity at the metastasis place.

Radiofrequency Ablation of Kidney Neoplasm

Endoscopic Operations

Laparascopic: splenectomy,adrenalectomy, nephrectomy, radical prostatectomy, obstructive resection of sigmoid colon and others.

Thoracoscopic: lobectomy, thymectomy, removing posterior mediastinum, parasternal lymphadenectomy at breast cancer.

Videoassisted mediastinoscopy

100% of morphological verification of pathological changes of mediastinum lymphnodes.

10% of changed diagnoses after mediastinoscopy

Complications – 0,32%.

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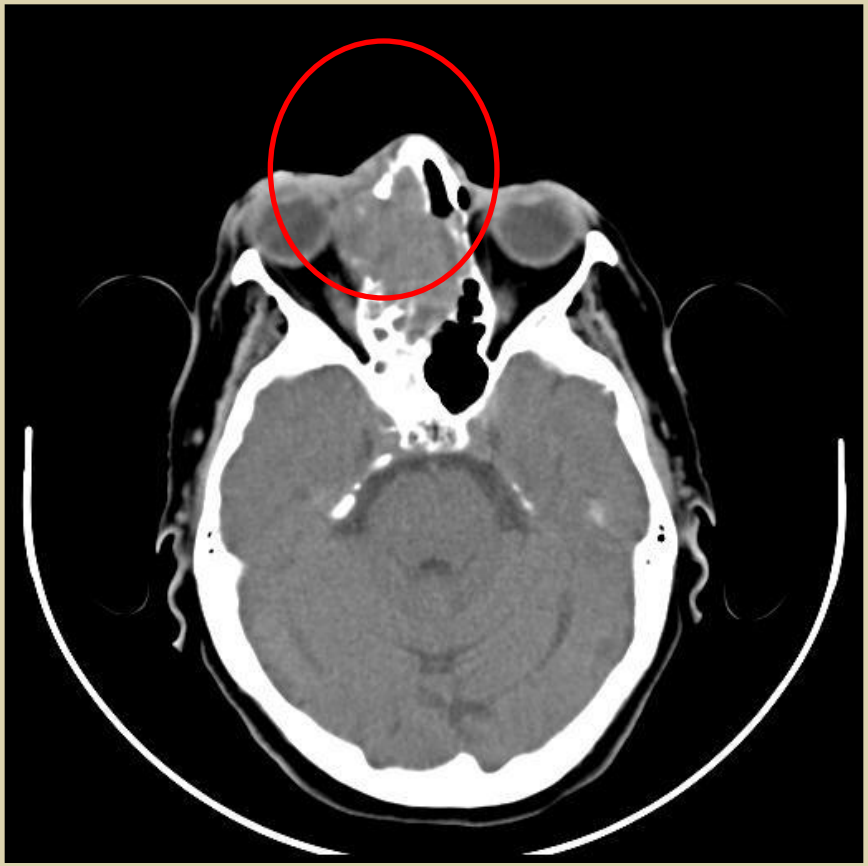
OPERATIONS UNDER HEAD AND NECK TUMOURS

CRANIOFACIAL RESECTION



Upper maxilla cancer with growing into the orbit and spreading into the anterior cranial fossa

CRANIOFACIAL RESECTION

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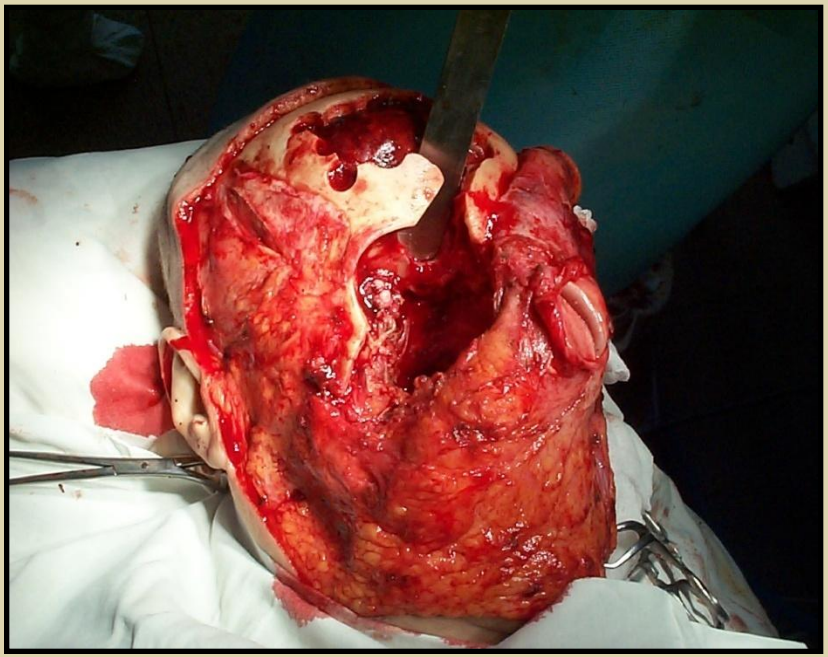
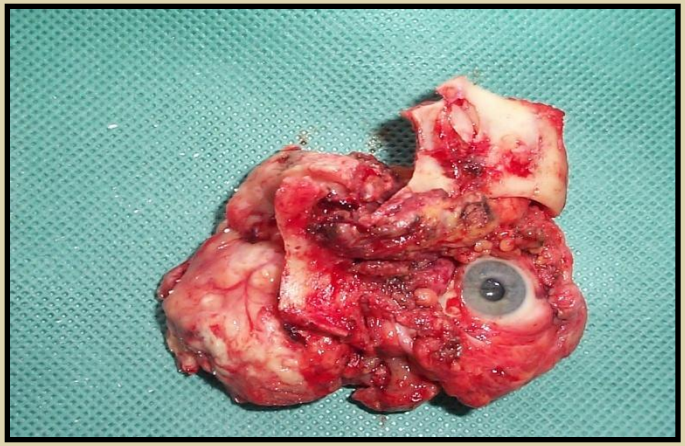
Cranial and facial stage



View of the wound after removing preparation



Macropreparation

TECHNOLOGY OF TRACHEOESOPHAGEAL SHUNTING WITH VOCAL PROSTHESIS INSERTING

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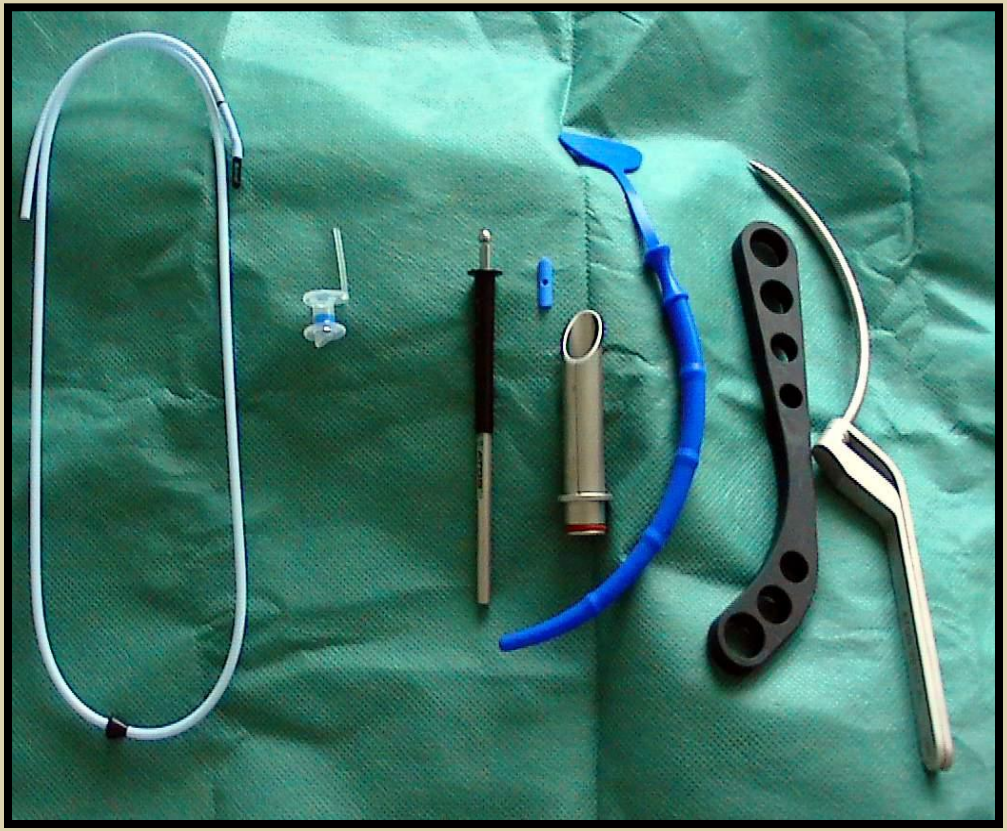
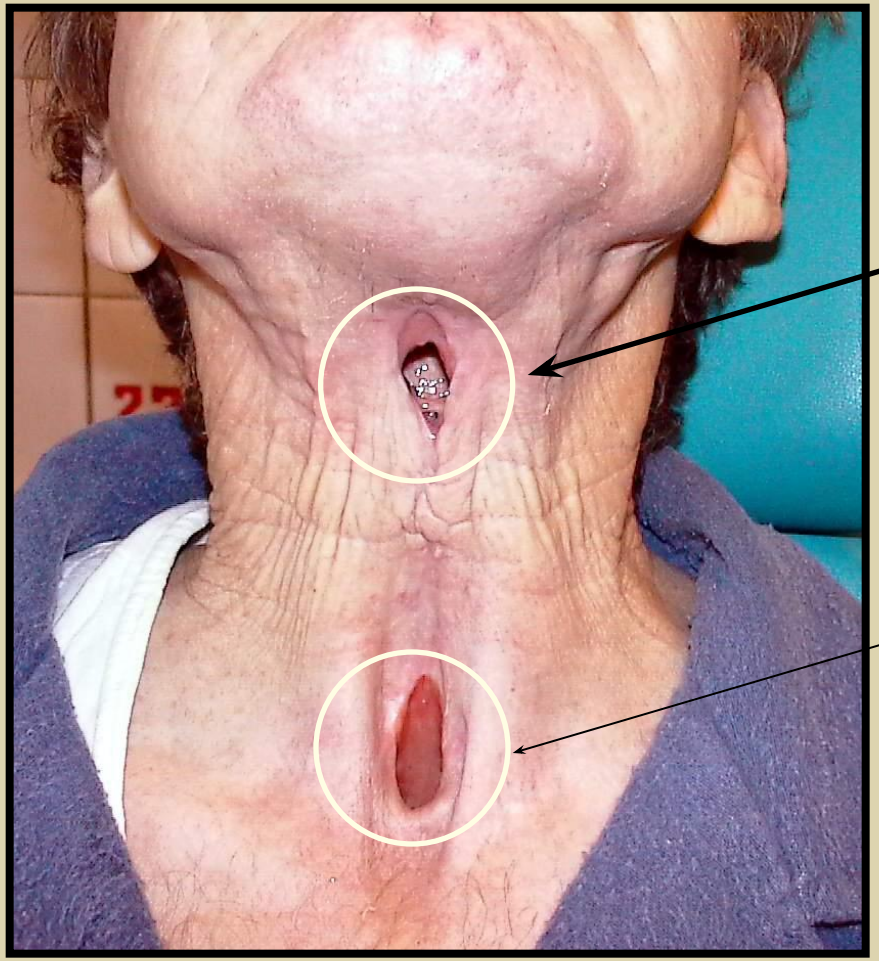


SET FOR INSERTING VOCAL PROSTHESES

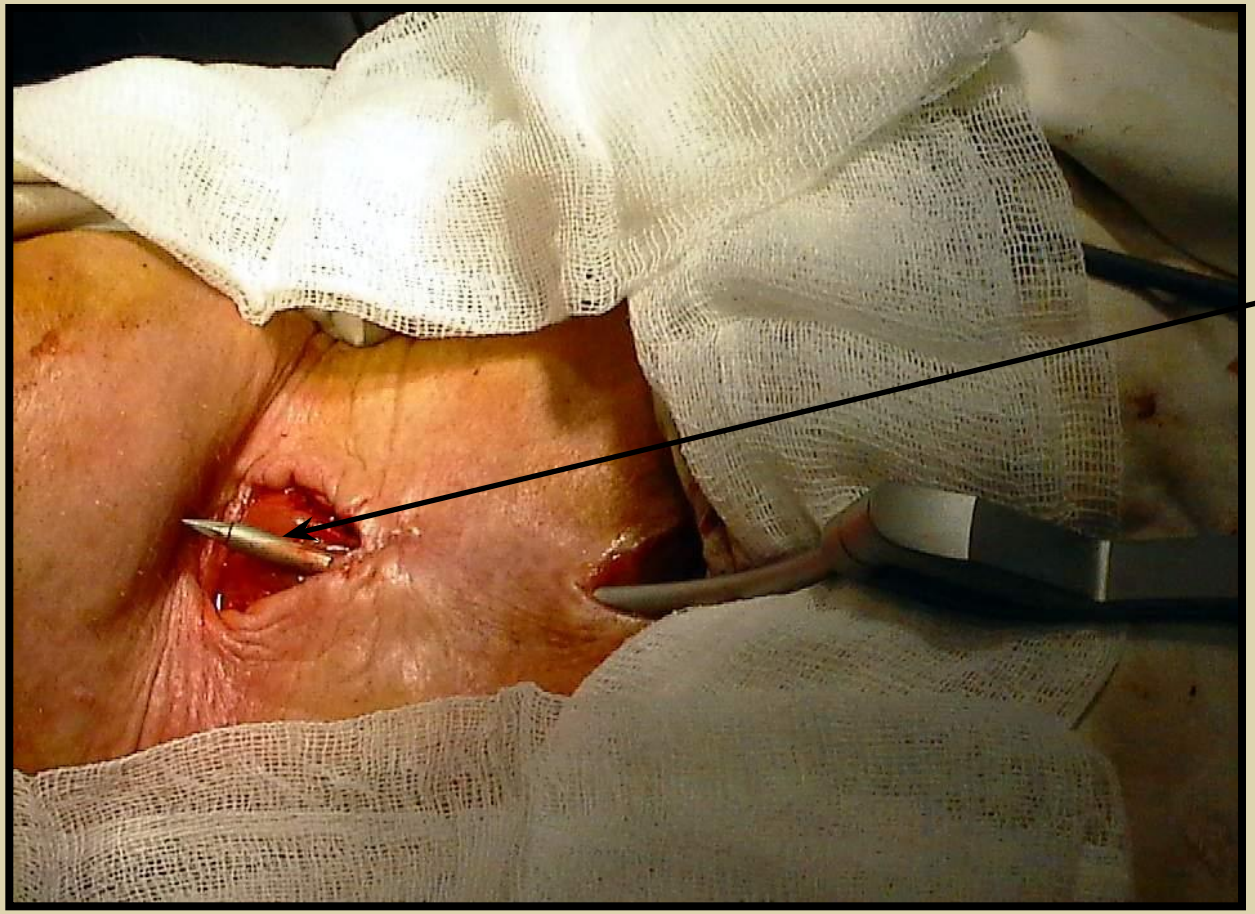
ONE-STAGE REPARATION OF VOCAL AND ESOPHAGEAL FUNCTIONS



PHARYNGOSTOMA

TRACHEOSTOMA

TRACHEOESOPHAGEAL ANASTOMOSIS FORMING

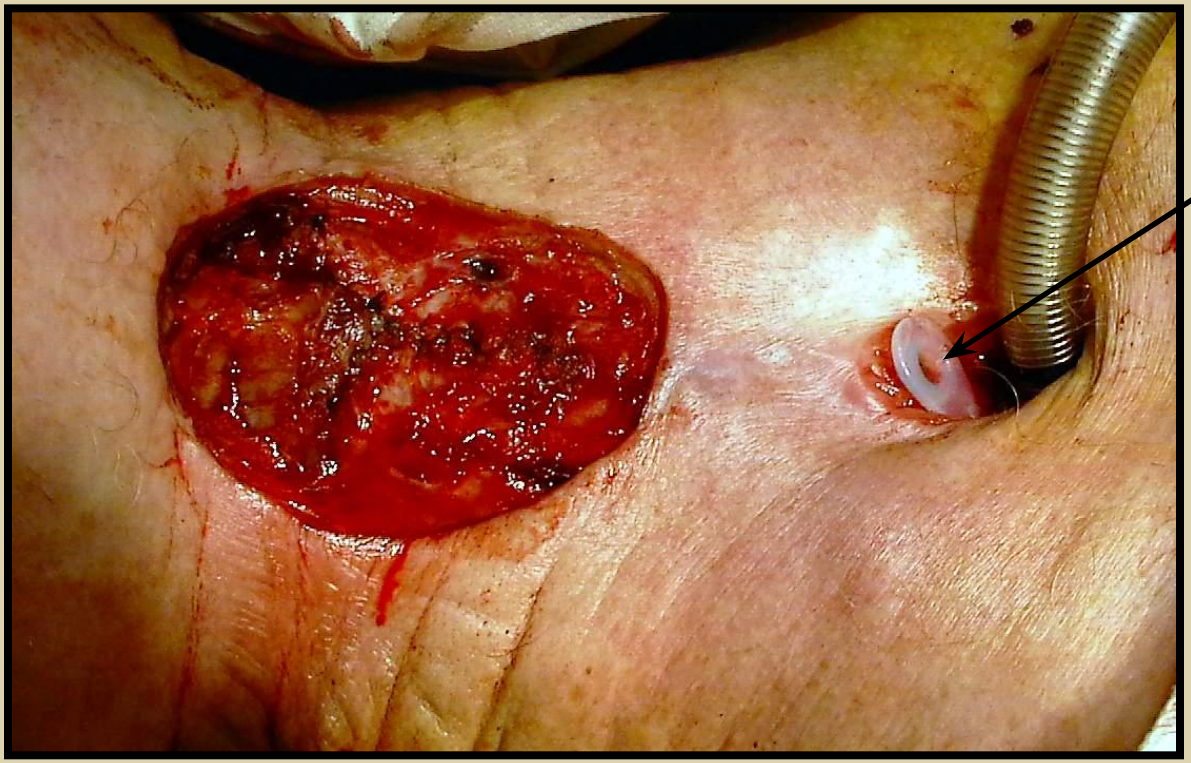


The trochar is inserted via pharynx

PROSTHESIS FIXATION IN CONDUCTOR

The prosthesis is fixed in a conductor

PHARYNX ANTERIOR WALL FORMING WITH LOCAL TISSUES



THE SKIN DEFECT IS REMOVED WITH SKIN AND MUSCULAR PECTORAL GRAFT

INSERTED VOCAL PROSTHESIS

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им Н.Н. Александрова

Plastic Operations in Patients with Breast Cancer

DELAYED MAMMAPLASTY

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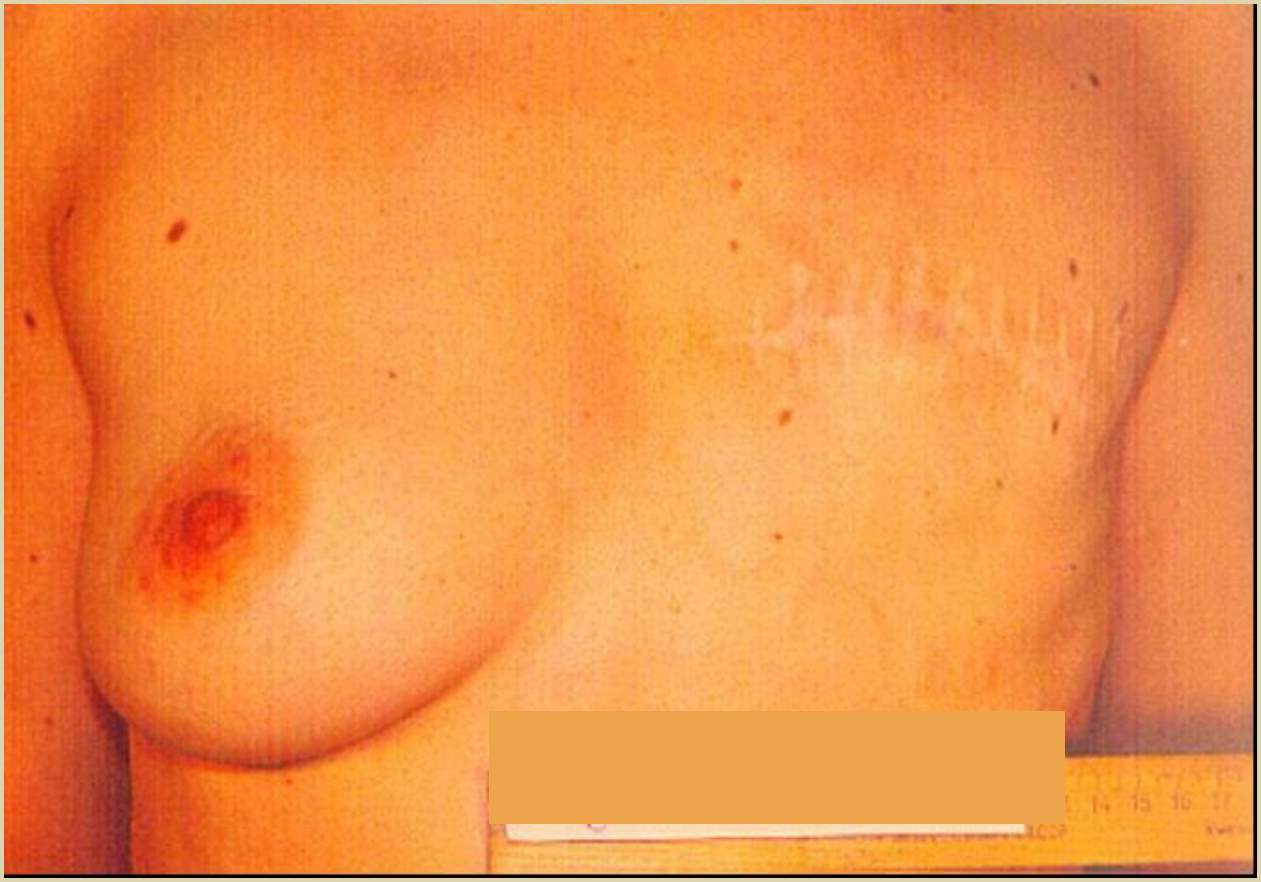
им Н.Н. Александрова



Patient Z, 34 y.o.
Diagnosis: left breast cancer T2N0M0G2.
The condition after a complex treatment in 1996–1997.

The same patient.
The condition after a delayed mammaplasty with a free TRAM-graft in 1999.

The same patient.
The condition after the reconstruction of mamillary and areolar complex in 2001.

Right breast cancer T2N1M0.
The condition after bilateral subcutaneous mastectomy and one-stage mammaplasty through a combined method (the broadest back muscle + endoprosthesis)

Postmastectomy Syndrome

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им Н.Н. Александрова

Plasty of Soft Tissues

Rhabdomyosarcoma of Left Forearm Soft Tissues

The same patient:
plasty with a radial fixed vascular pedicle flap

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им Н.Н. Александрова

Operations Preserving Organs under Bone Tumours

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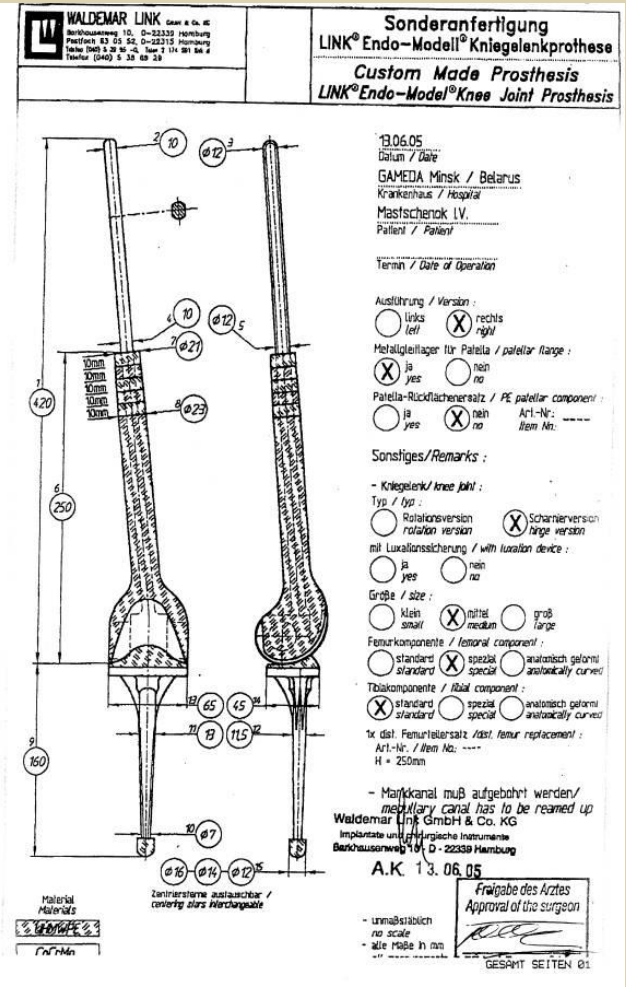
им Н.Н. Александрова



WALDEMAR LINK

Sonderanfertigung
LINK® Endo-Modell® Kniegelenkprothese

Custom Made Prosthesis
LINK® Endo-Model® Knee Joint Prosthesis

13.06.05
Datum / *Date*

GAMEDA Minsk / Belarus
Krankenhaus / *Hospital*

Mastschenok I.V.
Patient / *Patient*

Termin / *Date of Operation*

Ausführung / *Version* :
( ) links *left* (X) rechts *right*

Metallgleitlager für Patella / *patellar flange* :
(X) ja *yes* ( ) nein *no*

Patella-Rückflächenersatz / *PE patellar component* :
( ) ja *yes* (X) nein *no* Art.-Nr.: ---- *Item No.*

Sonstiges/*Remarks* :

- Kniegelenk/ *knee joint* :

Typ / *typ* :
( ) Rotationsversion *rotation version* (X) Scharnierversion *hinge version*

mit Luxationssicherung / *with luxation device* :
( ) ja *yes* ( ) nein *no*

Größe / *size* :
( ) klein *small* (X) mittel *medium* ( ) groß *large*

Femurkomponente / *femoral component* :
( ) standard *standard* (X) spezial *special* ( ) anatomisch geformt *anatomically curved*

Tibiakomponente / *tibial component* :
(X) standard *standard* ( ) spezial *special* ( ) anatomisch geformt *anatomically curved*

1x dist. Femurteilersatz /*dist. femur replacement* :
Art.-Nr. / *Item No.*: ----
H = 250mm

- Markkanal muß aufgebohrt werden/
medullary canal has to be reamed up

Waldemar Link GmbH & Co. KG
Implantate und chirurgische Instrumente
Barkhausenweg 10 · D - 22339 Hamburg

A.K. 13.06.05

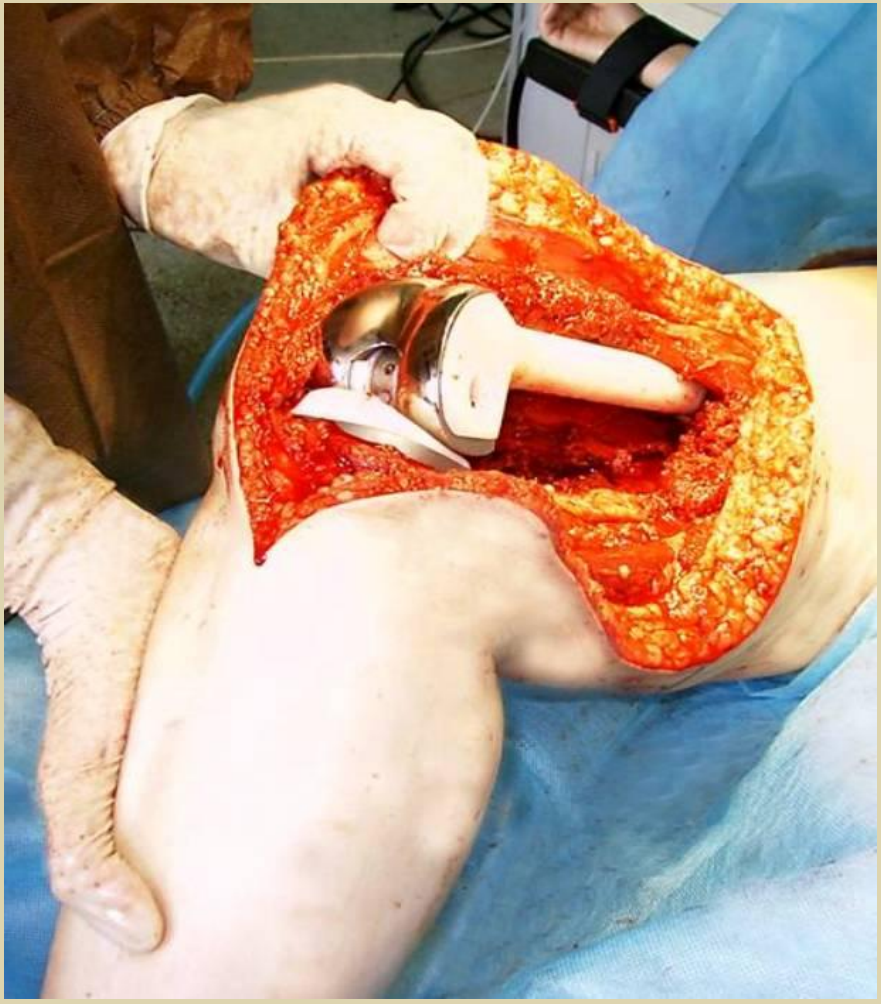
Freigabe des Arztes
Approval of the surgeon

- unmaßstäblich
no scale
- alle Maße in mm

GESAMT SEITEN 01

Material
Materials
CoCrMo

Zentriersterne austauschbar /
centering stars interchangeable



Modular Endoprostheses

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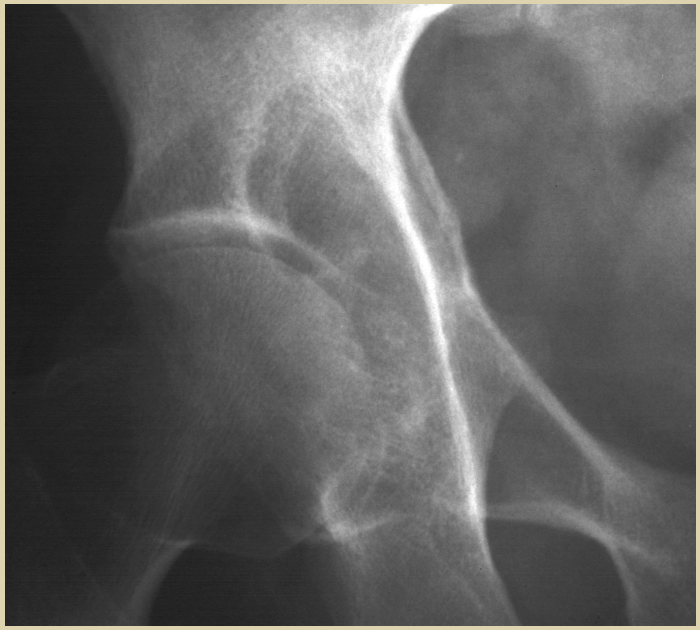
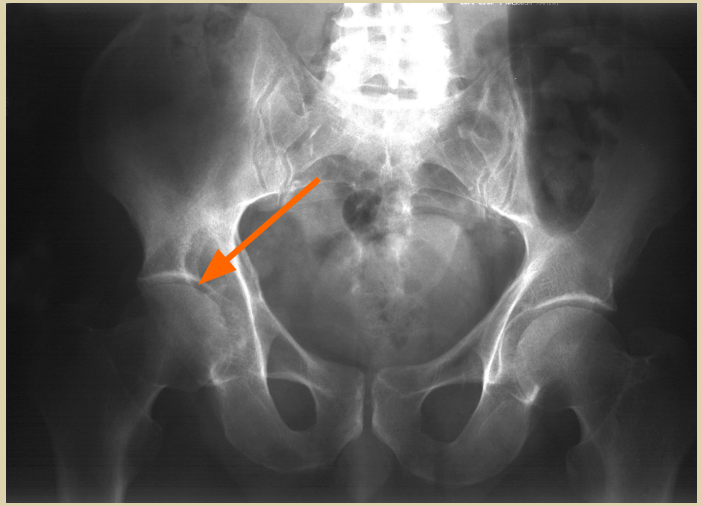
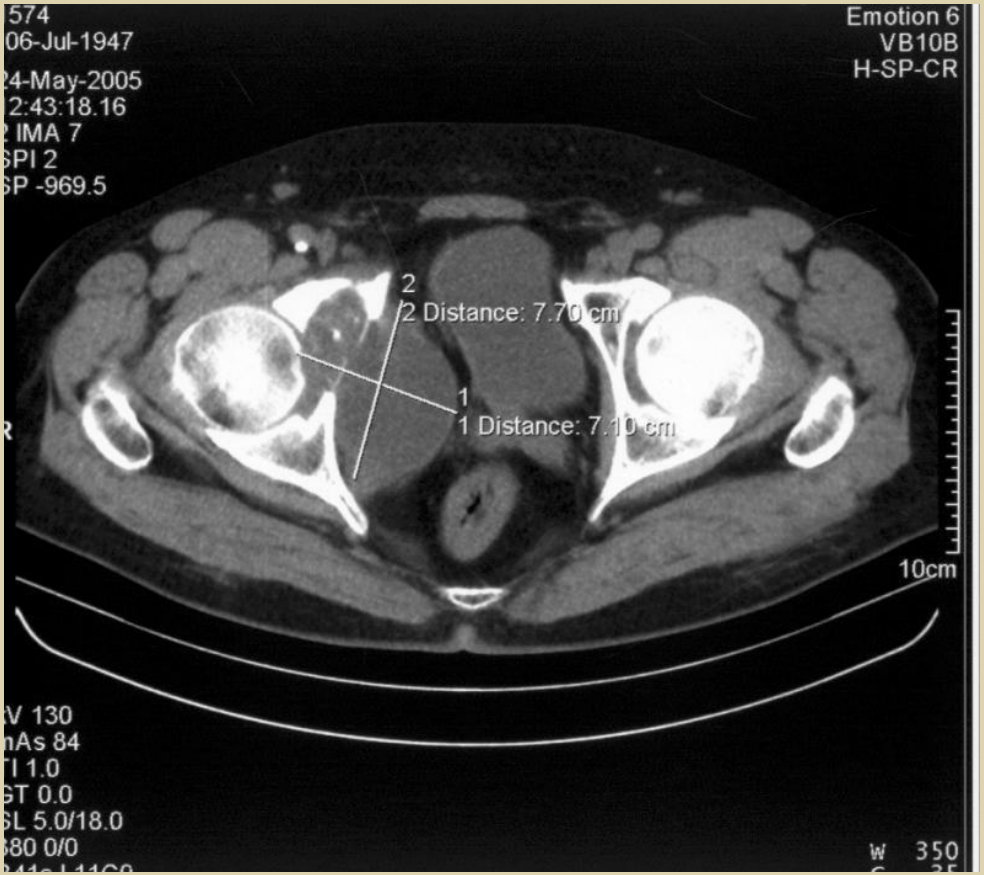
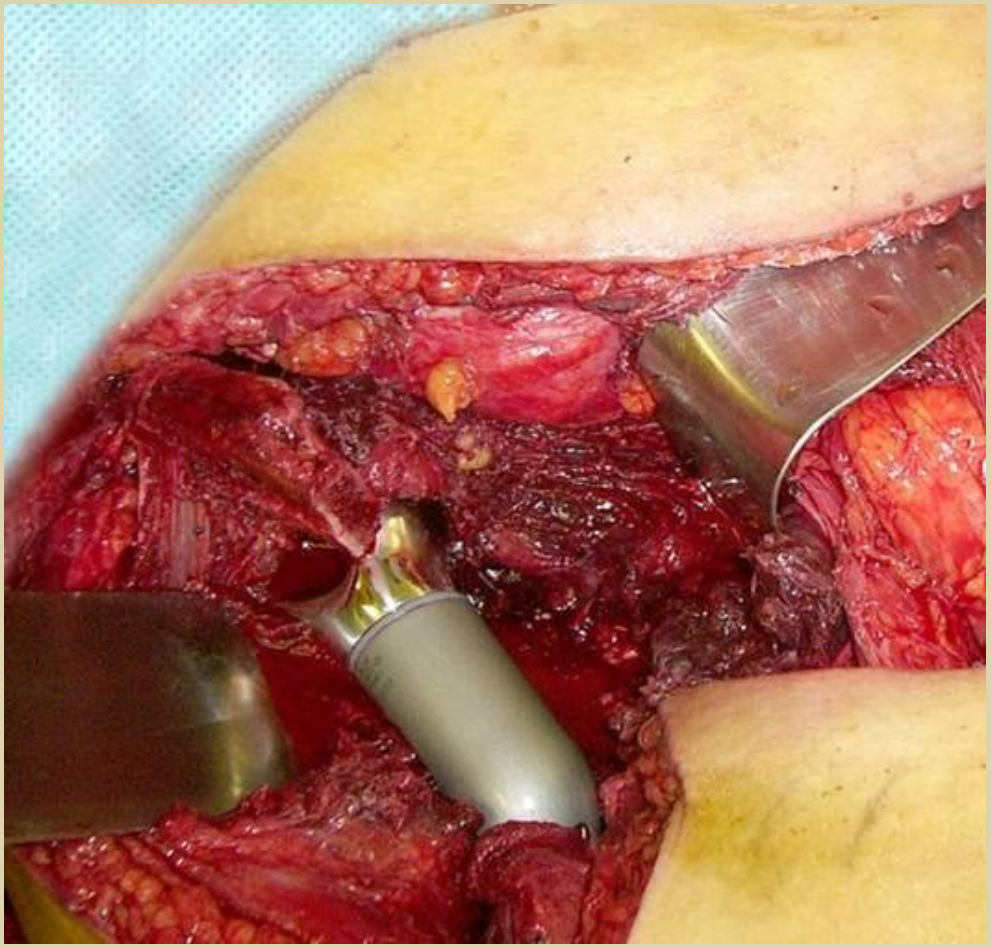
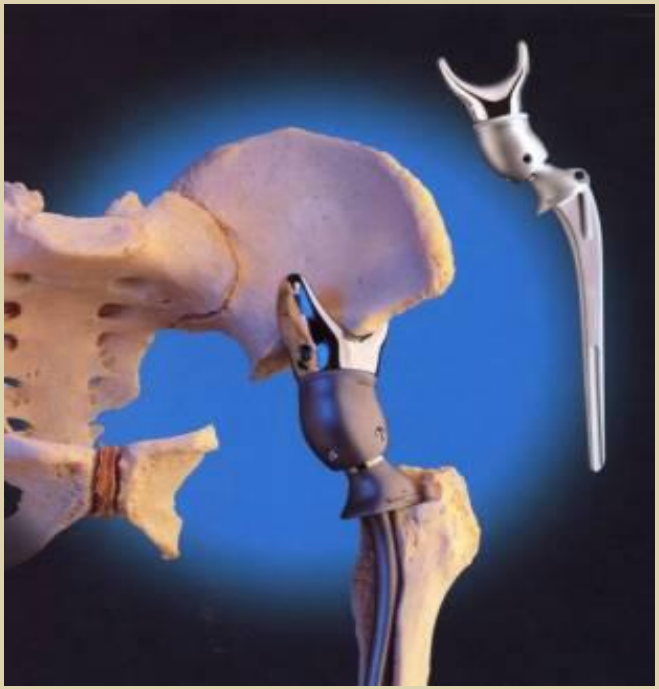
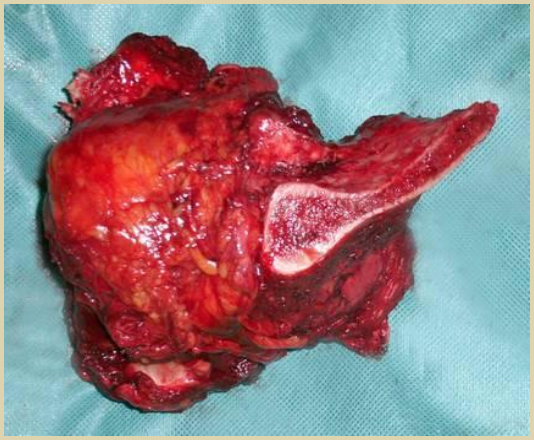





574
06-Jul-1947
24-May-2005
2:43:18.16
IMA 7
SPI 2
SP -969.5
Emotion 6
VB10B
H-SP-CR
2
2 Distance: 7.70 cm
1
1 Distance: 7.10 cm
10cm
V 130
mAs 84
TI 1.0
GT 0.0
SL 5.0/18.0
80 0/0
W 350







Endoprosthetics with saddle-like prosthesis

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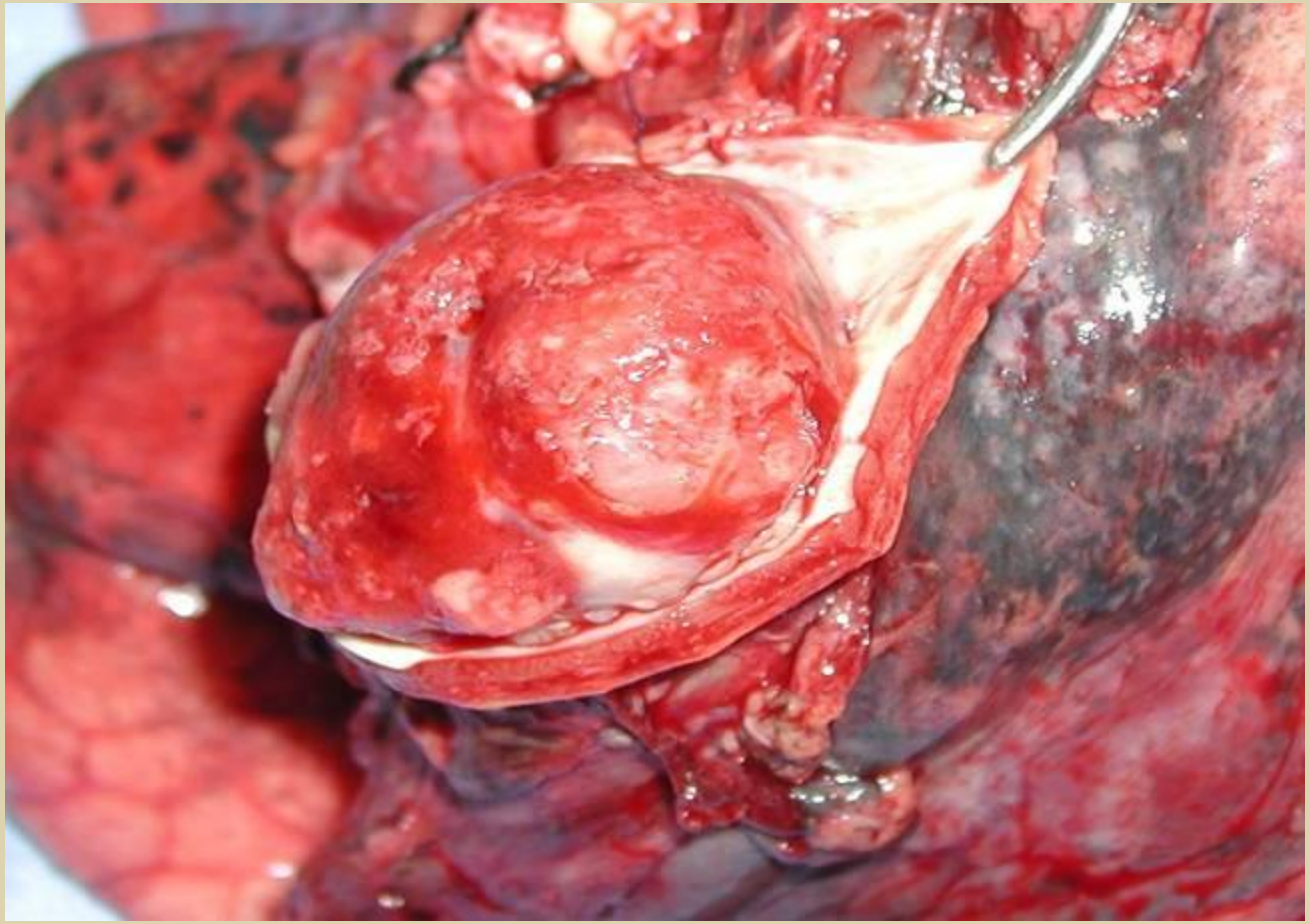
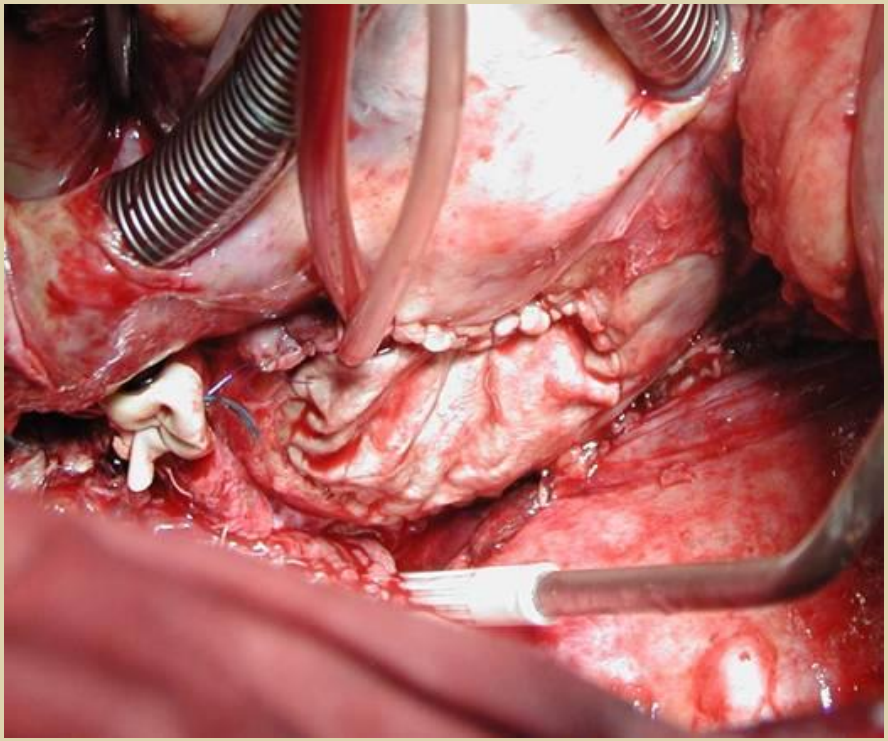
Lung Cancer and Mediastrium Tumours

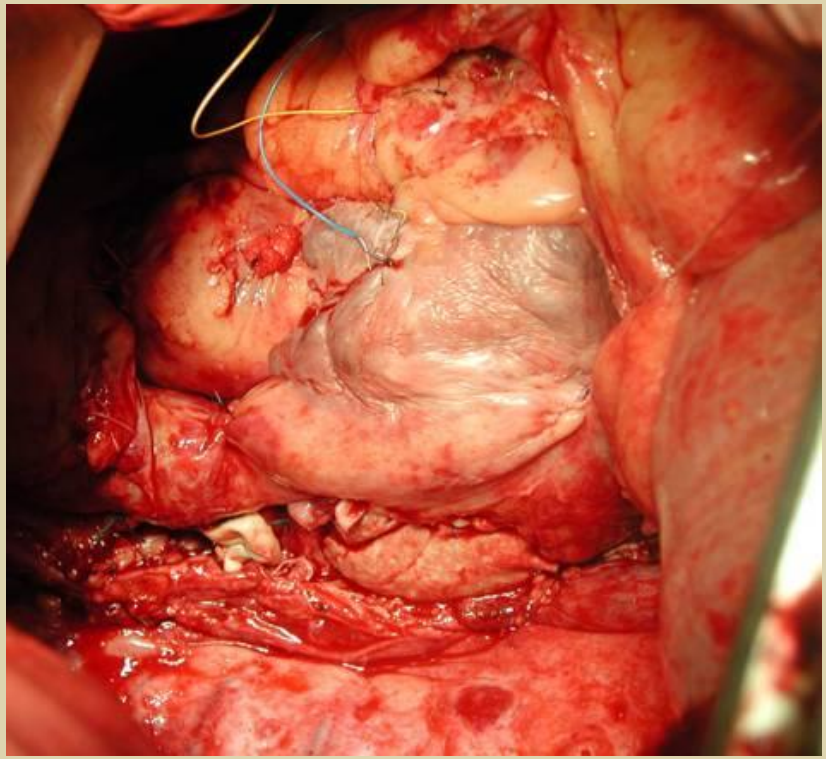
Lung Tumour Invading Left Atrium Lumen

Tumour in Left Atrium Lumen



The lung is removed, the left atrium wall defect is substituted with xenopericardium





MSCT before Operation

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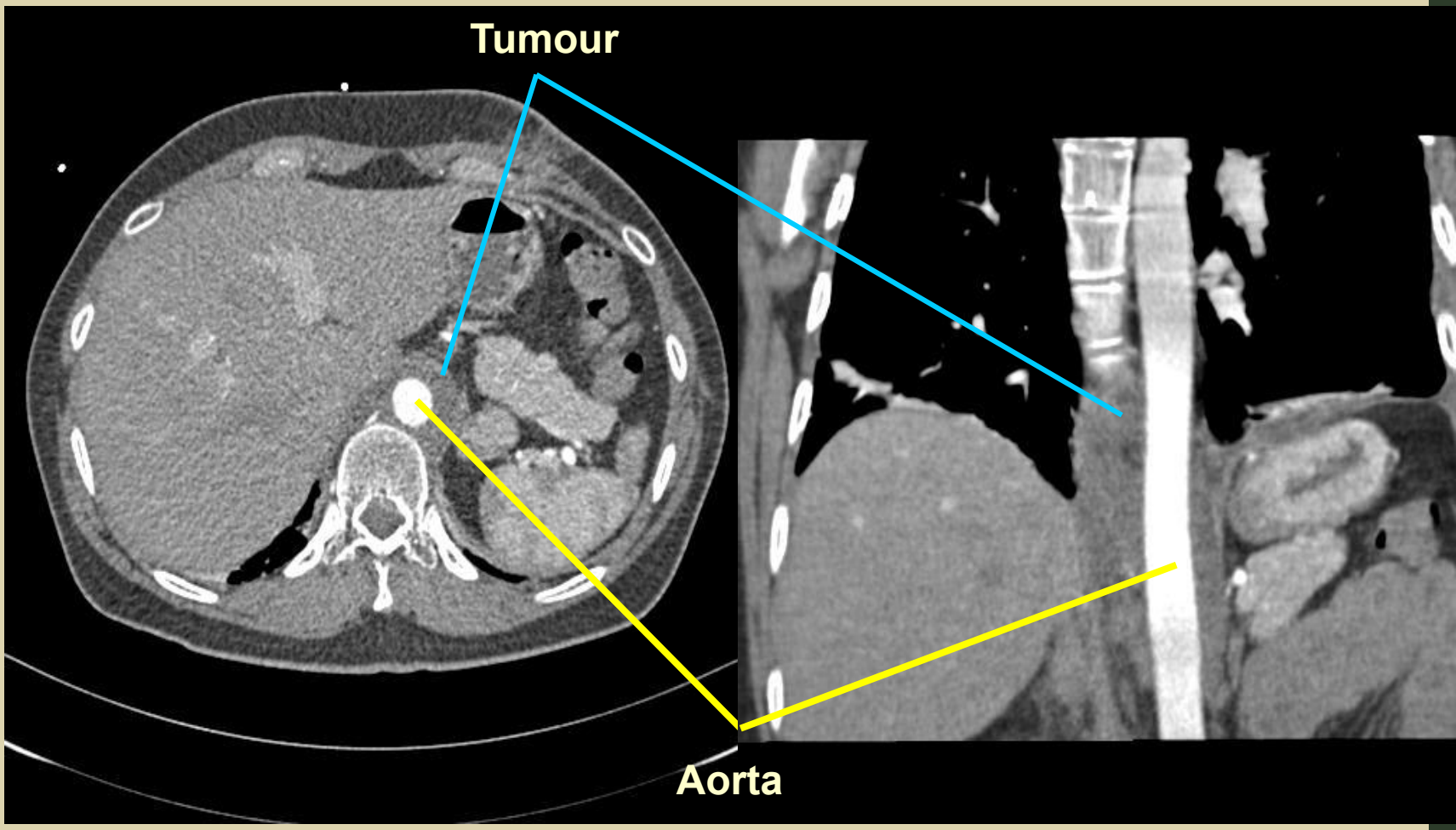

Detecting Site of Thoracic and Abdominal Aorta with Tumour

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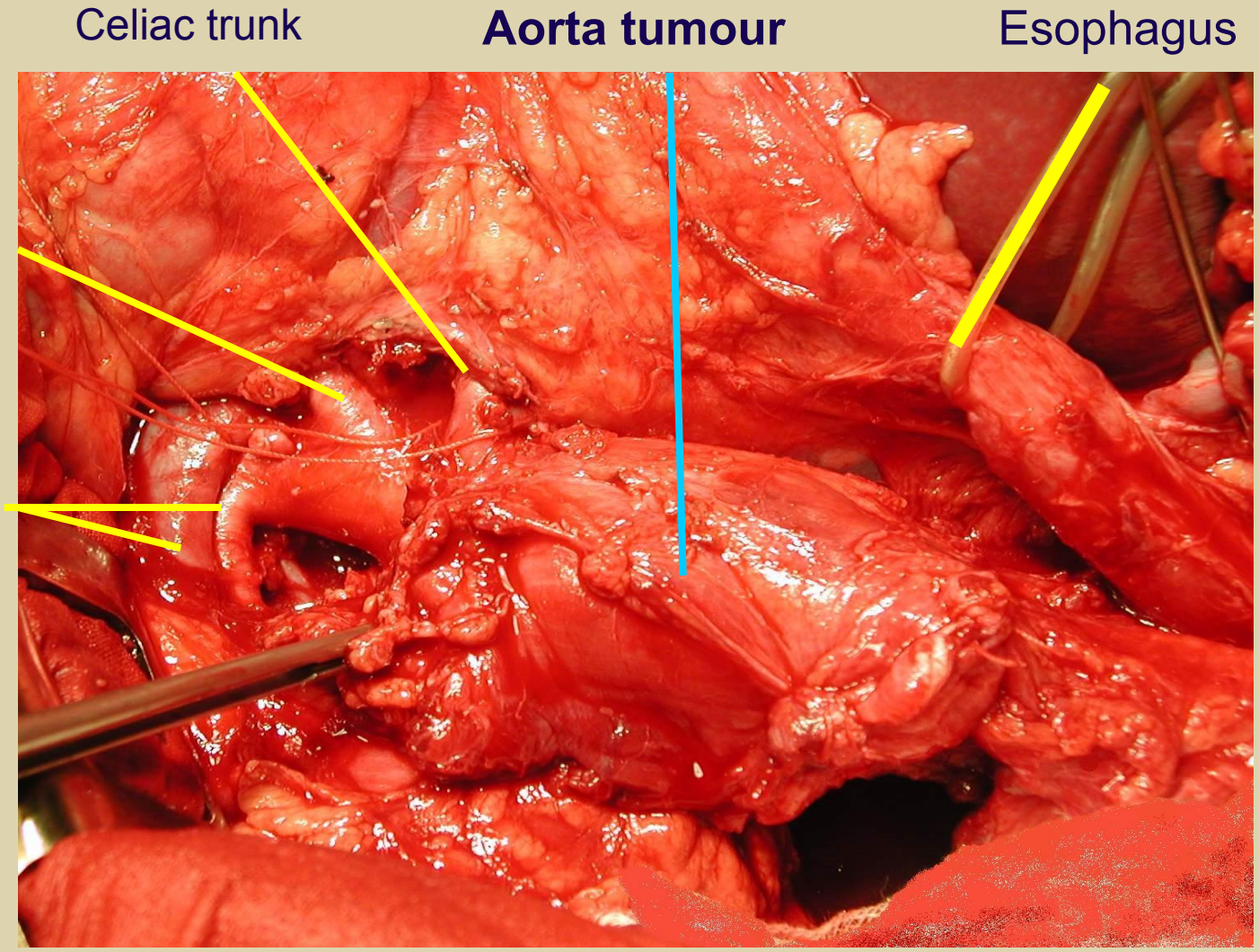
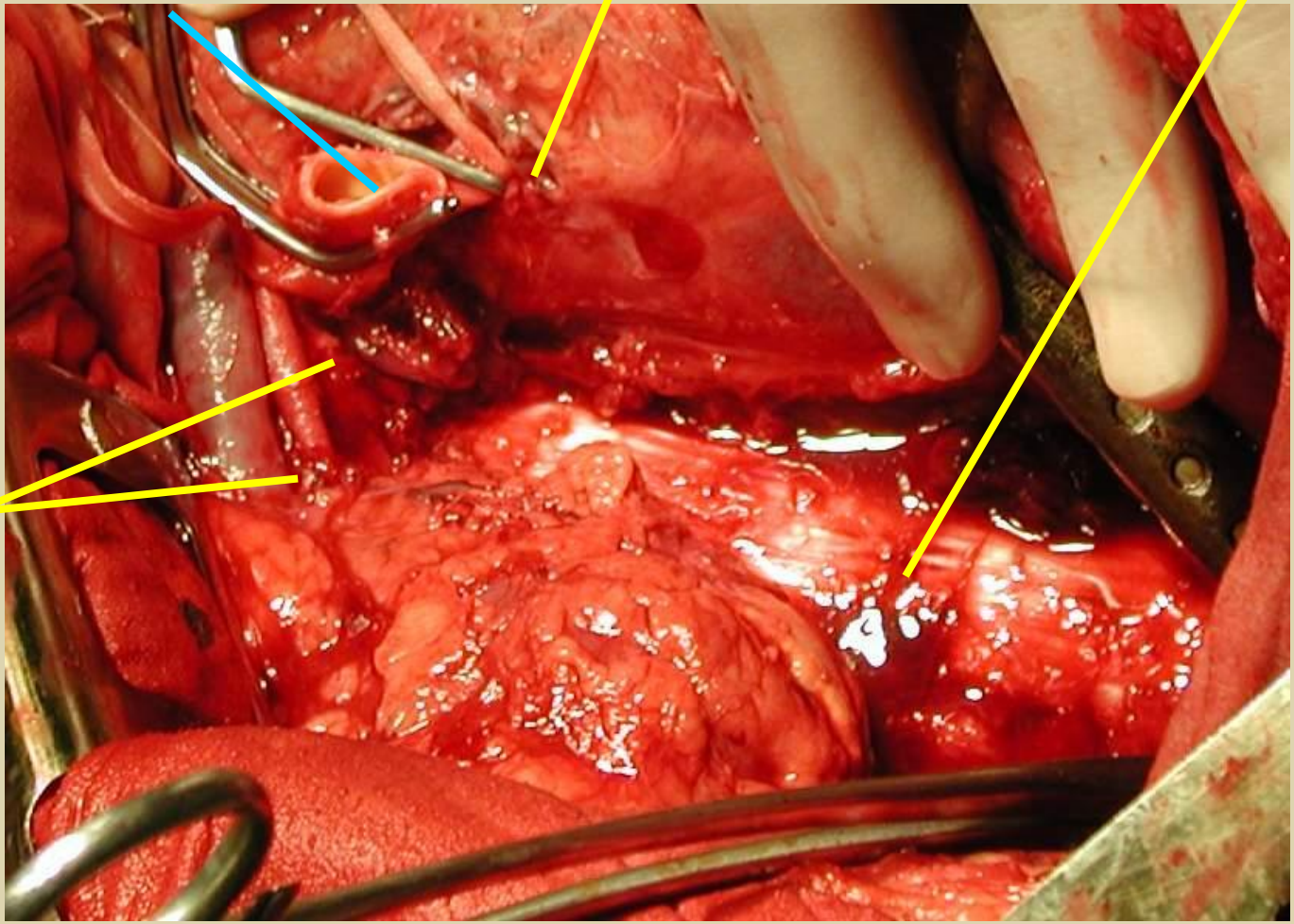


The site of aorta with tumour is resected.



The prosthesis is made to aorta.

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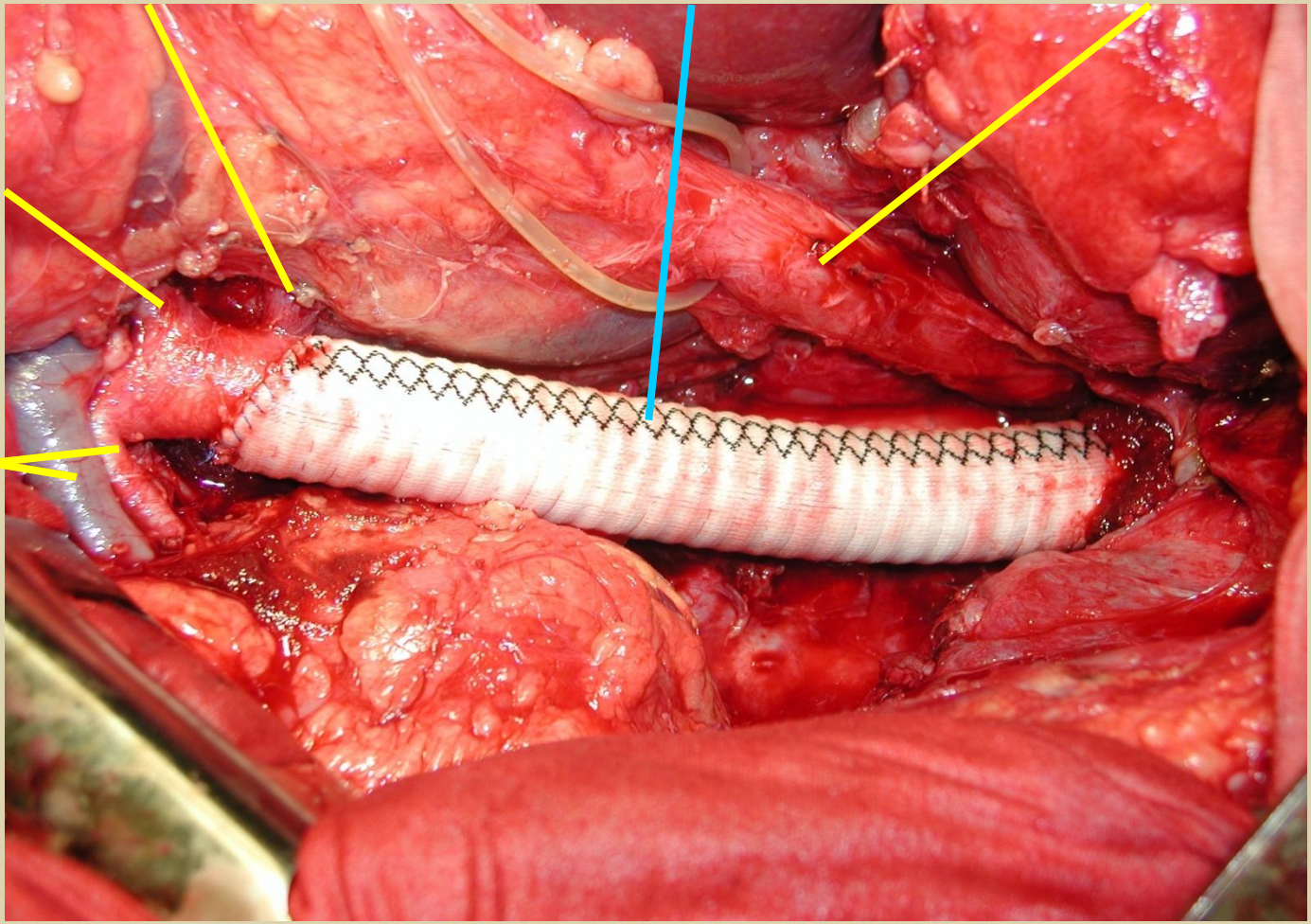
Celia trunk **Aorta prosthesis** Esophagus

SMA

Left kidney vessels



Macropreparation

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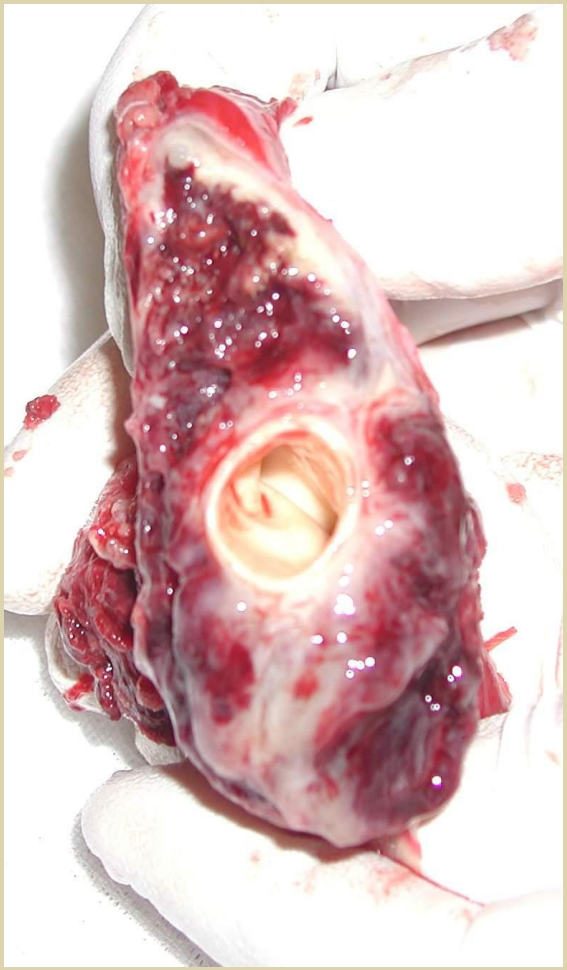
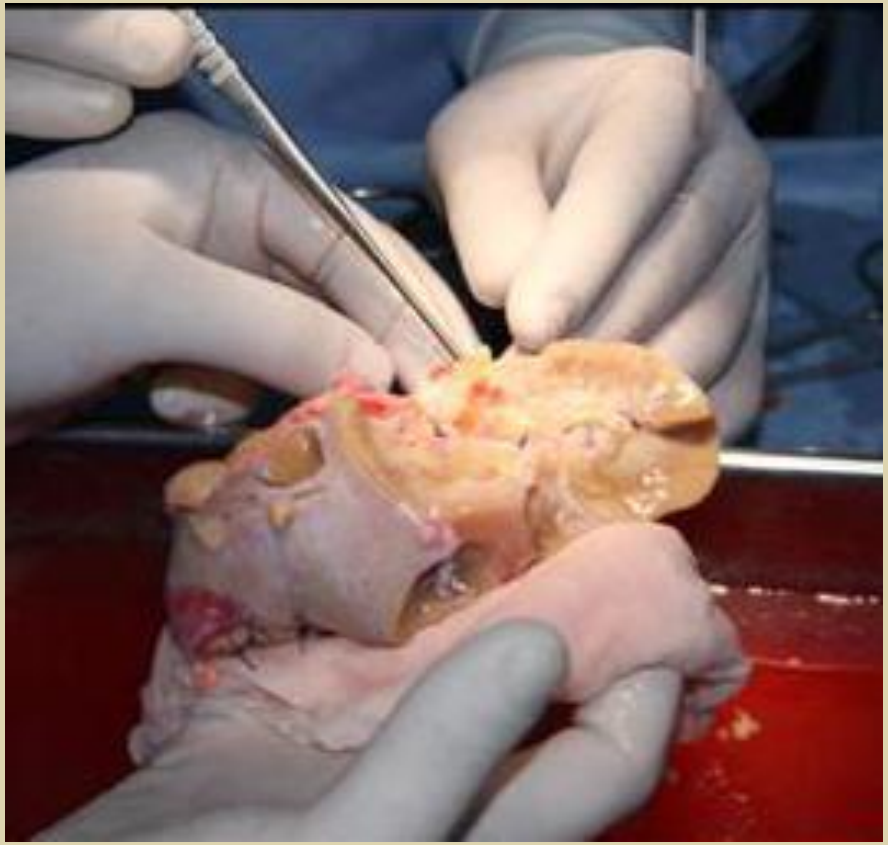
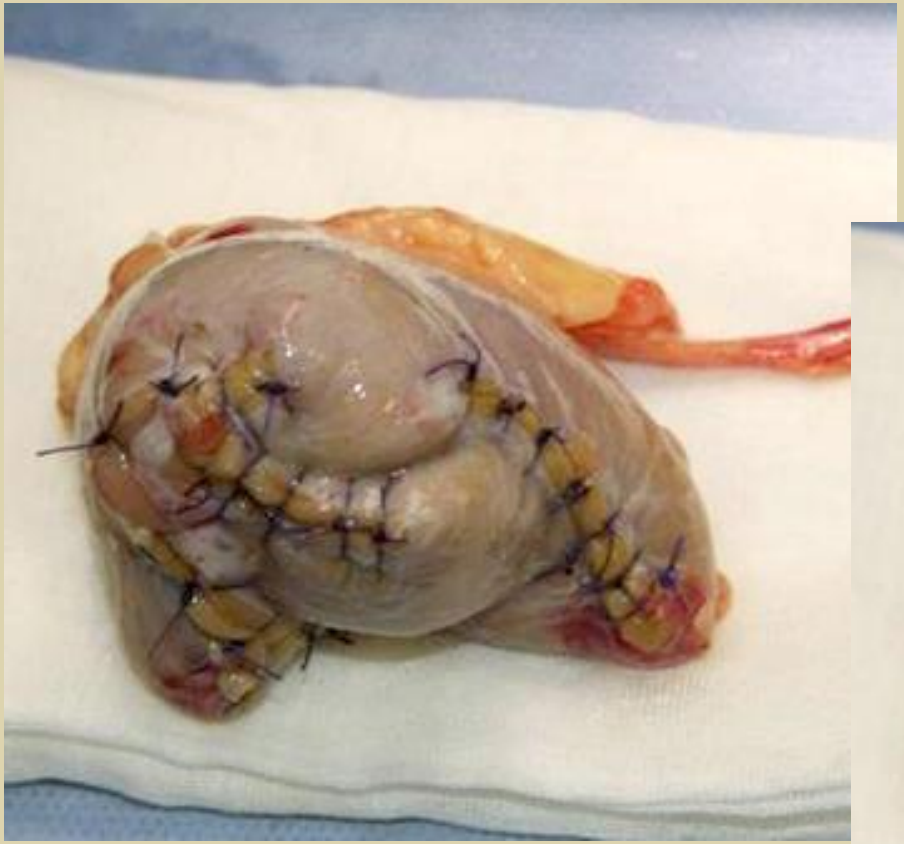
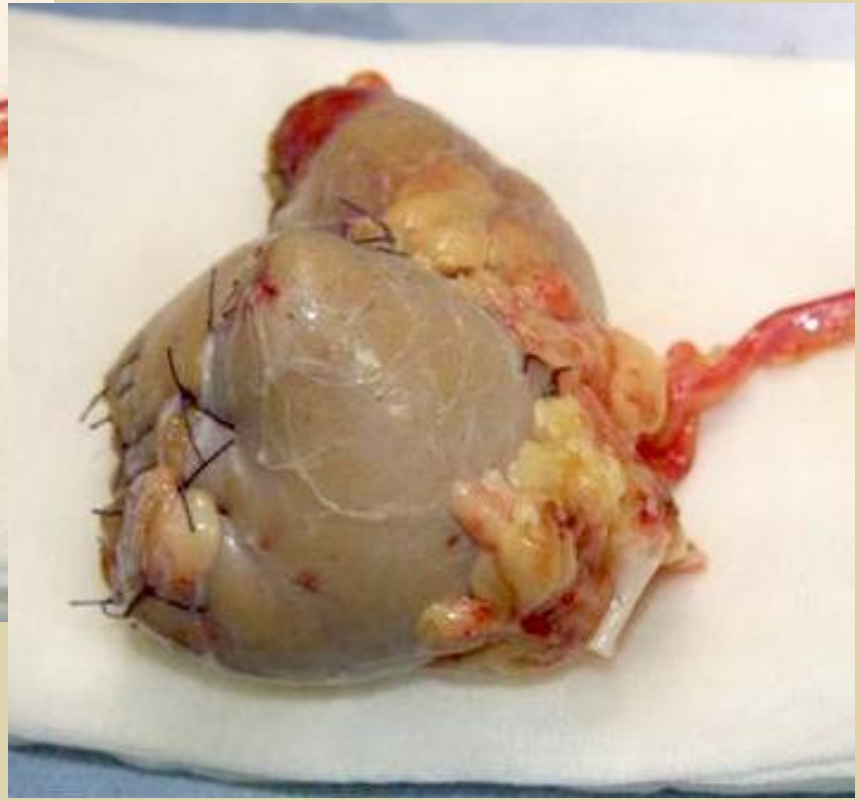


Extracorporeal nephrectomy with autotransplantation

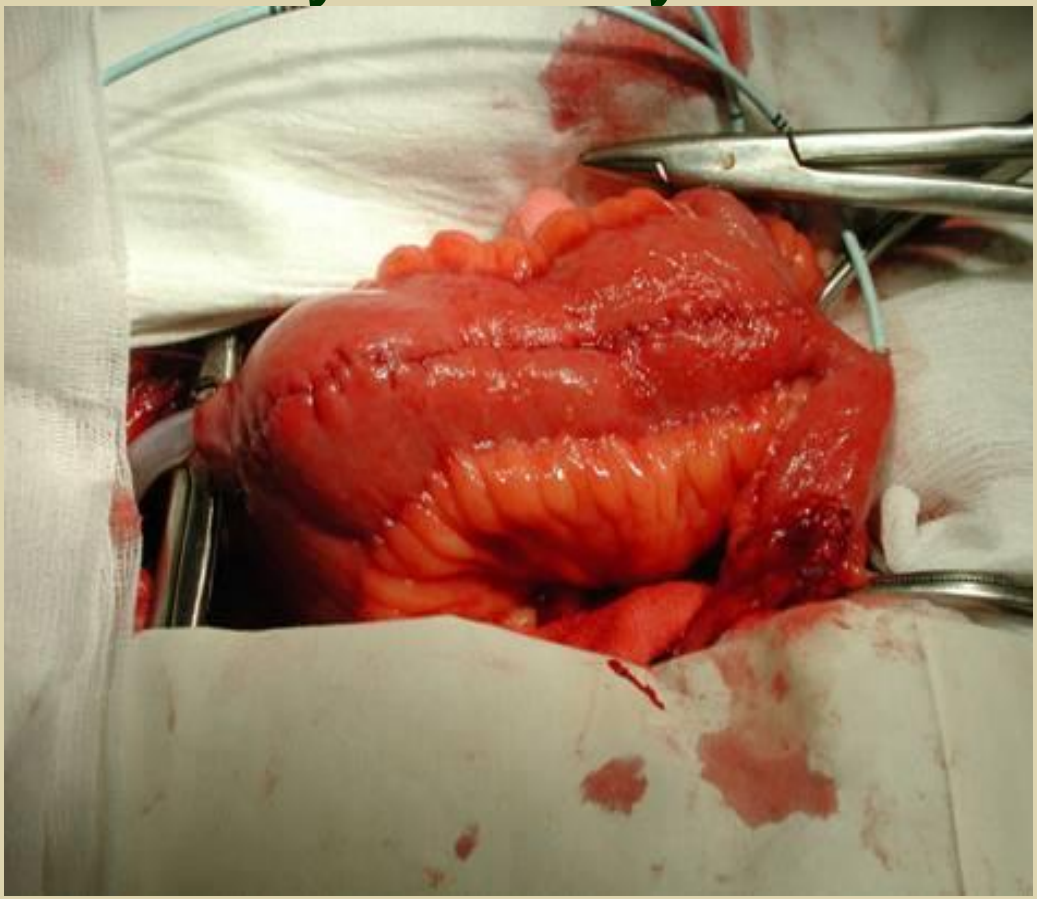


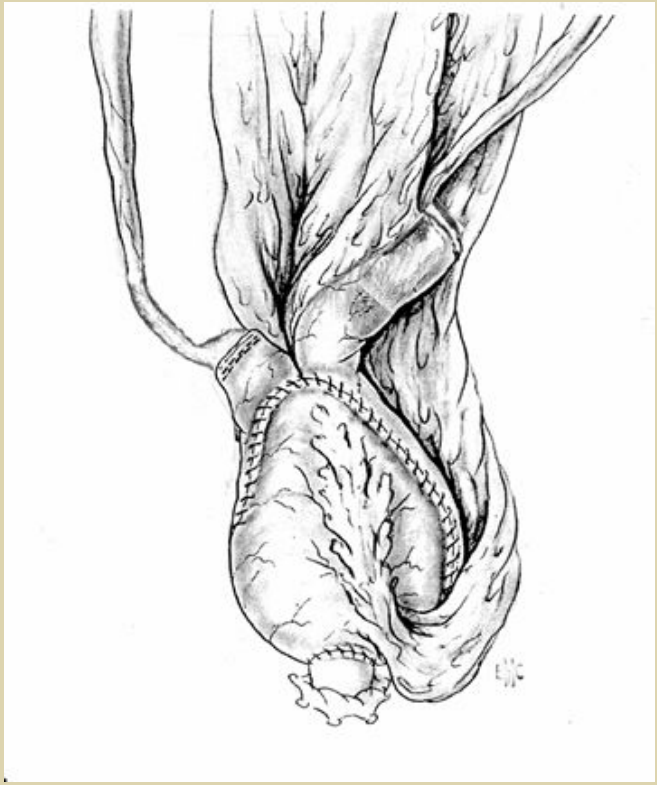




View of reconstructed kidney

Ileocystoplasty according to R. Hautmann (Modified) after Radical Cystectomy due to Bladder Cancer





Operating Block

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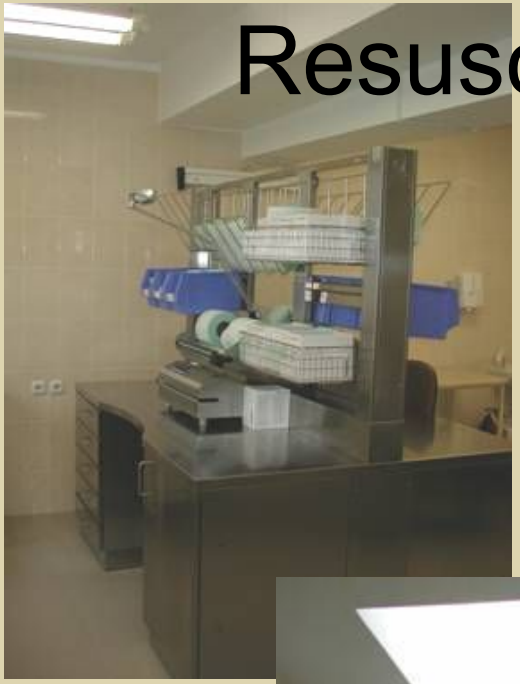
Resuscitation Department



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Procedure of extracorporeal detoxication using the apparatus «Multifiltrat»

The apparatus “Artificial Kidney”

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Radiotherapy

Material and Technical Basis of Remote Radiotherapy

№	Title of apparatus	Mark of apparatus	Producer	Exploitation start
1.	Linear accelerator	Trilogy	Varian (USA)	2008
2.	Linear accelerator	Clinac-230 0CD	Varian (USA)	2005
3.	Linear accelerator	Mevatron KD-2	Simens (Germany)	1996
4.	Gamma-therapeutic apparatus	Teratron	Canada	2008
5.	Gamma-therapeutic apparatus	Rocus-AM	Russia	1992

Material and Technical Basis of Short Focus and Contact Radiotherapy

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№	Title of apparatus	Mark of apparatus	Producer	Exploitation start
1.	Apparatus for short focus radiotherapy	X-ray-TA 01	Russia	1997
2.	Apparatus for contact radiotherapy	Microselectron HDR-old	Nucletron (Holland)	1990
3.	Apparatus for contact radiotherapy	Microselectron PDR	Nucletron (Holland)	1995
4.	X-ray-topometric complex for contact radiotherapy IBU	Microselectron HDR	Nucletron (Holland)	2008

Material and Technical Basis for Preradiation Preparation

№	Title of apparatus	Mark of apparatus	Producer	Exploitation start
1.	X-ray simulator	Acquity	Varian (USA)	2005
2.	X-ray simulator	Simulix	Neucletron (Holland)	1998
3.	System for planning	Eclipse	Varian (USA)	2005
4.	System for planning	Oncentre Masterplan	Neucletron (Holland)	2008
5.	System for planning	Plato	Neucletron (Holland)	1995
6.	System for planning	Prazur	Russia	1992
7.	Computer tomograph	Lightspeed	General Electrics (USA)	2005

Material and Technical Basis (Auxiliary Devices and Dosimetry)

№	Title of apparatus	Producer	Exploitation start
1.	System for making individual blocks	Holland	2008
2.	Fixing appliances and devices	Sivco (USA)	2005
3.	Set of dosimetric equipment	Canberra Paccard (Austria)	2005

Radiotherapeutic Complex

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Linear accelerator with 2 photon energies and 6-8 energies of electrons with a many-plane diaphragm, with a mobile system of getting tomographic images through X-ray bundle according to the procedure “Cone-beam CT” for localizing a target, verifying an irradiation plan and posing a patient (IGRT)

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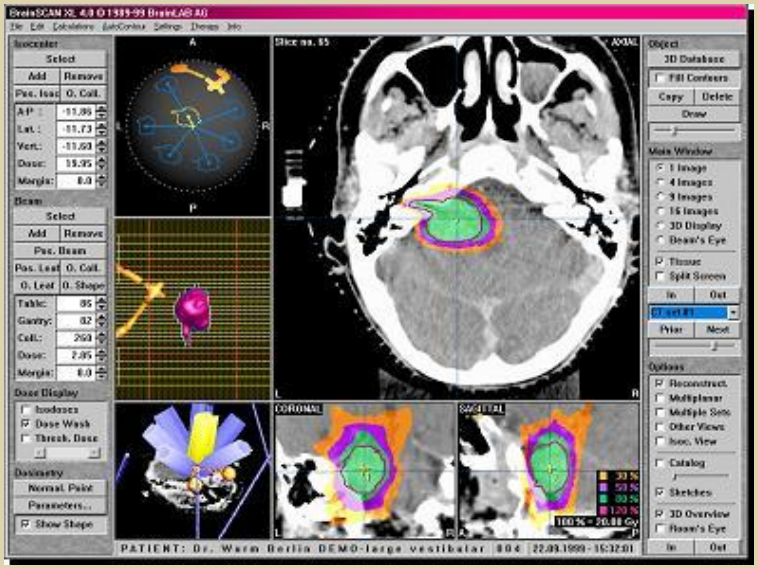

High Technologies in Radiotherapy

- Three-dimensional conformal radiotherapy
- Radiotherapy with modulating dose intensity
- Stereotaxic radiotherapy / radiosurgery
- Four-dimensional conformal radiotherapy

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Brachytherapy Using an Integrated X-ray and Topometric Complex (IBU)

Brachytherapy of prostate tumours with high dose power controlled through TRUZI and planning in the SWIFT- system online

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Hyperthermia

Equipment for Photodynamic Therapy and Diagnosis

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«Kamin-Video»

«Metalaz-M»

«Lesa-6»

«LD-680»

Photodynamic Therapy under Cervical Dysplasia

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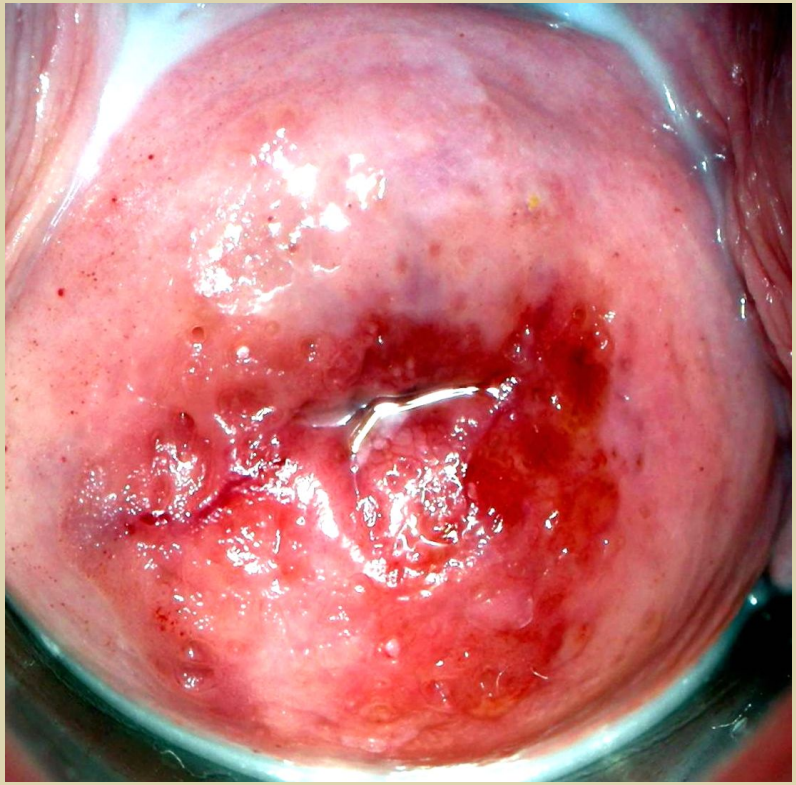
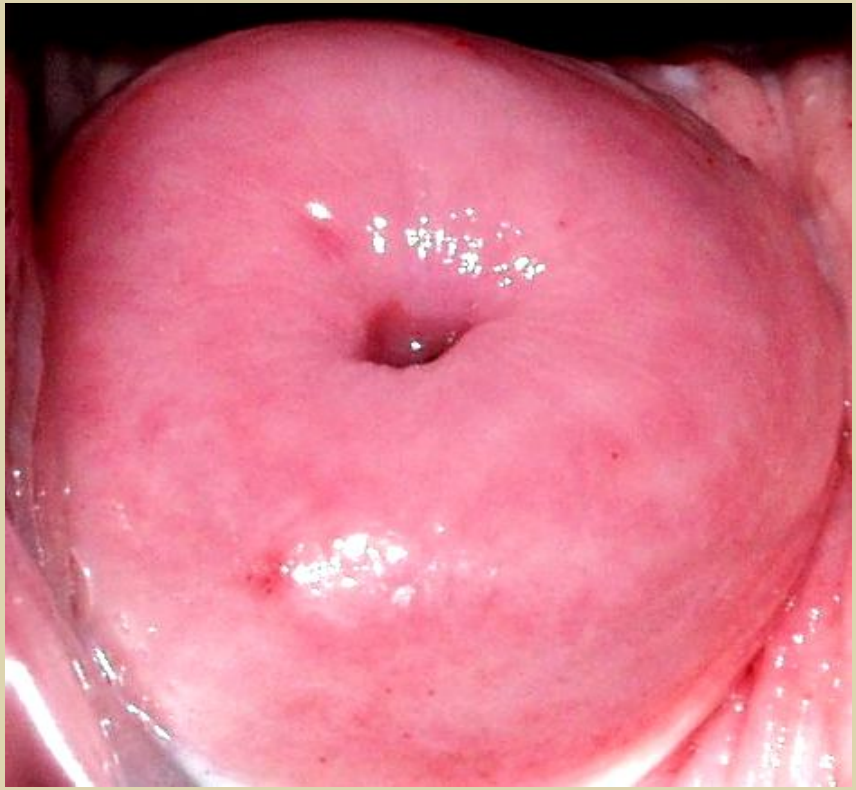
Patient C., 34 y.o., CIN III. 26.10.07. – PDT



Before treatment



6 months afterwards

Dynamics of Malignant Neoplasm Morbidity and Mortality in the Republic of Belarus

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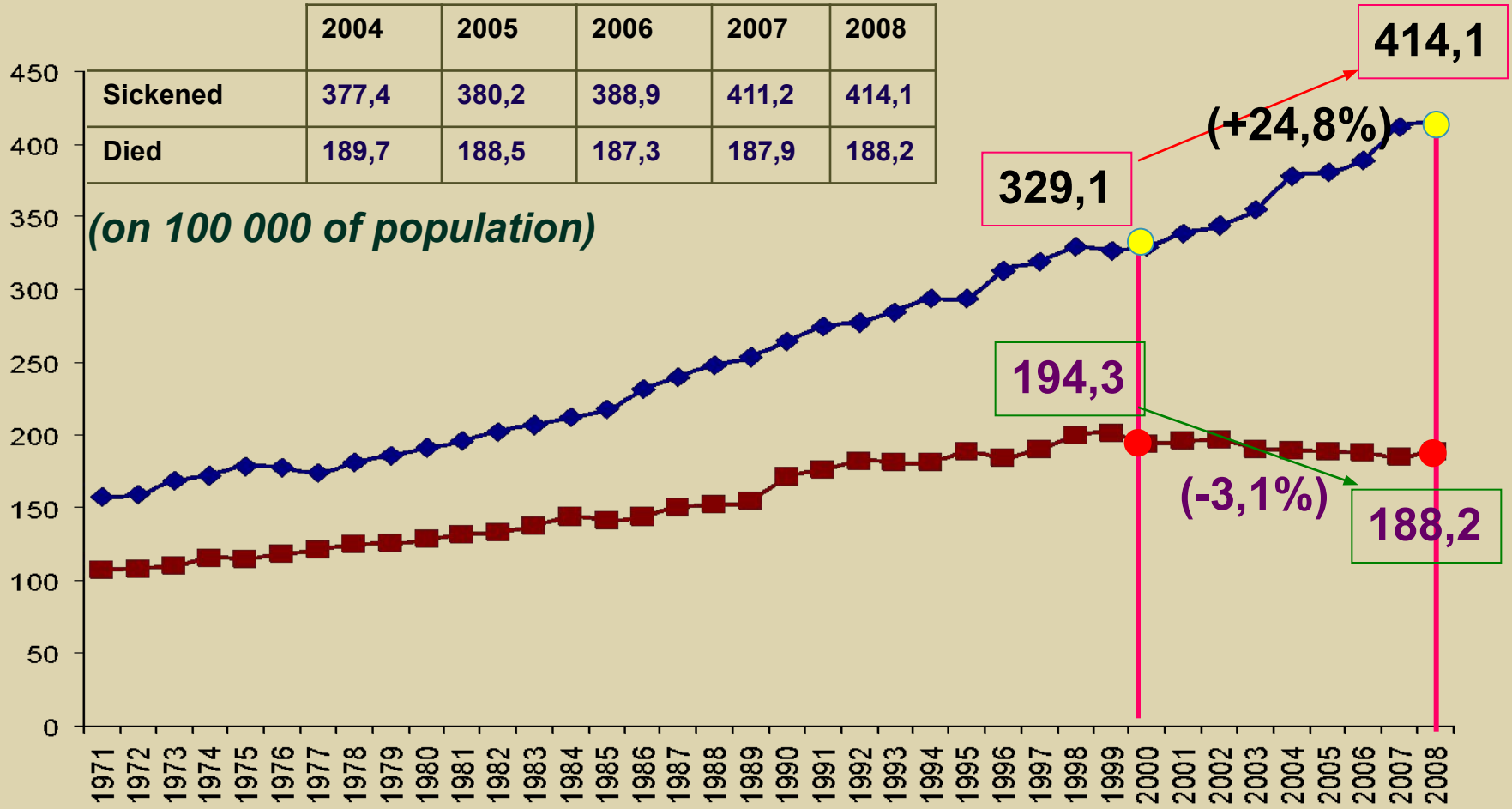
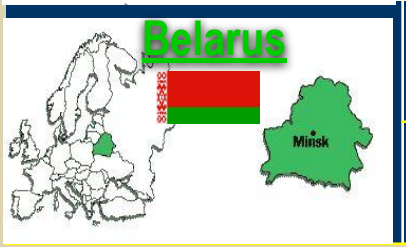
	2004	2005	2006	2007	2008
Sickened	377,4	380,2	388,9	411,2	414,1
Died	189,7	188,5	187,3	187,9	188,2

(on 100 000 of population)



Data of the Cancer-Register. Data of the National Committee on Statistics of Belarus

Correlation of the Died due to Malignant Neoplasms to the Number of the Sickened (2004)

Region	Number of the sickened	Number of the died	Number of the died/ Number of the sickened
Europe 	2 886 800	1 711 000	59%
European Union 	2 060 400	1 161 300	56%
Belarus 	32 798	17 892	55% (2004)
	38 655	18 234	47% (2008)

Annals of Oncology 16: 481-488, 2005
Belarusian Cancer-Register, 2008

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