Principles of surgical oncology, reconstructive surgery and oncological rehabilitation.

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Hungarian Task Force Against Cancer

Content (WHO-Recommendation):

- Primer prevention
- Secunder prevention
- Early diagnostic
- Therapy
- Rehabilitation
- Palliation
- Education
- Public Relation
- Attendance
- Structure of Oncological Providers
- Monitoring, Quality Measurement

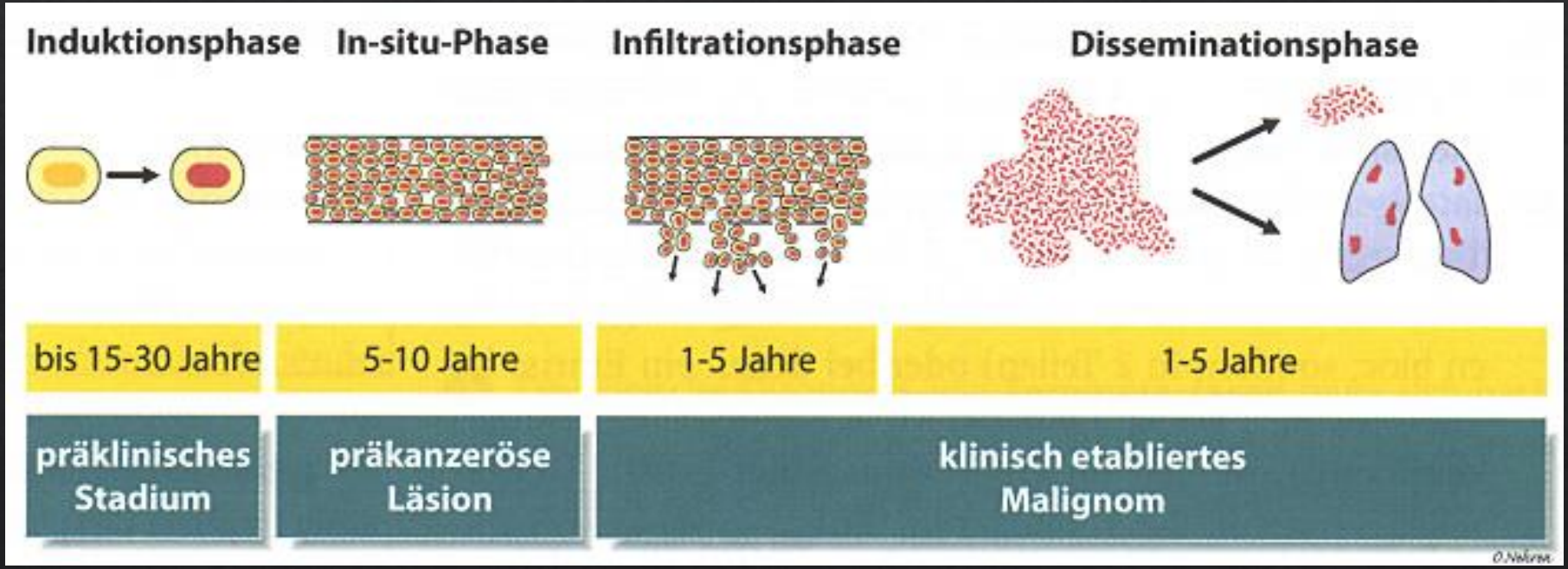
Principles of tumors

- Originated from cells of the body
- Presence and growth of tumors have no advantage for the individuum
- Growth of them are undependent from normal controlling systems
- Without therapy this condition leads into death

Etiology

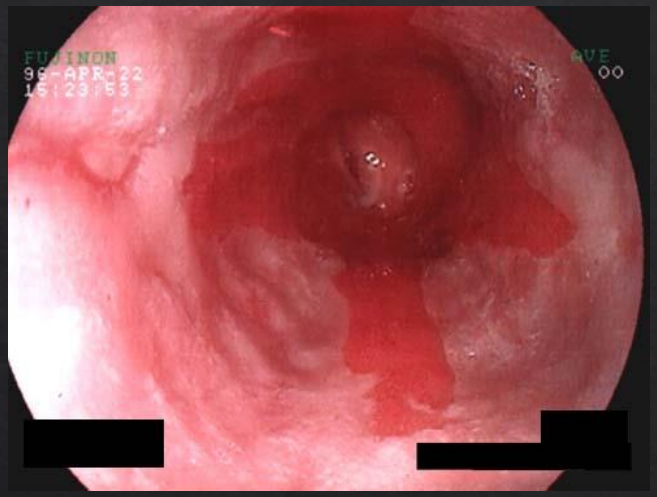
- Physical conditions
- Chemical agents
- Viruses (for example: HCV, HPV)
- Precancerosus conditions
- Genetical factors

4-stage idea for tumor growth



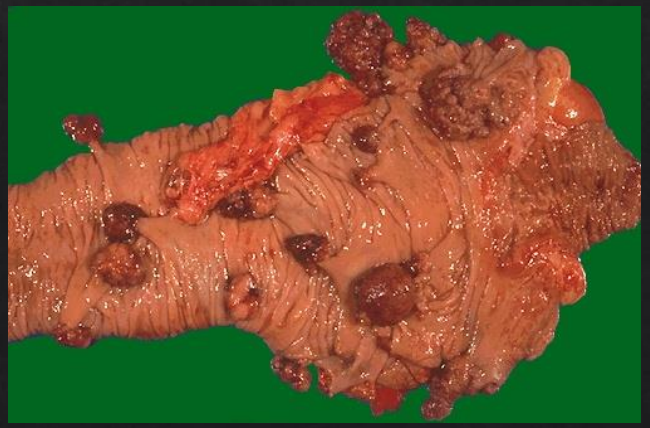
Precancerosus condition

Conditions that (may) lead to cancer growth



Barrett-metaplasia

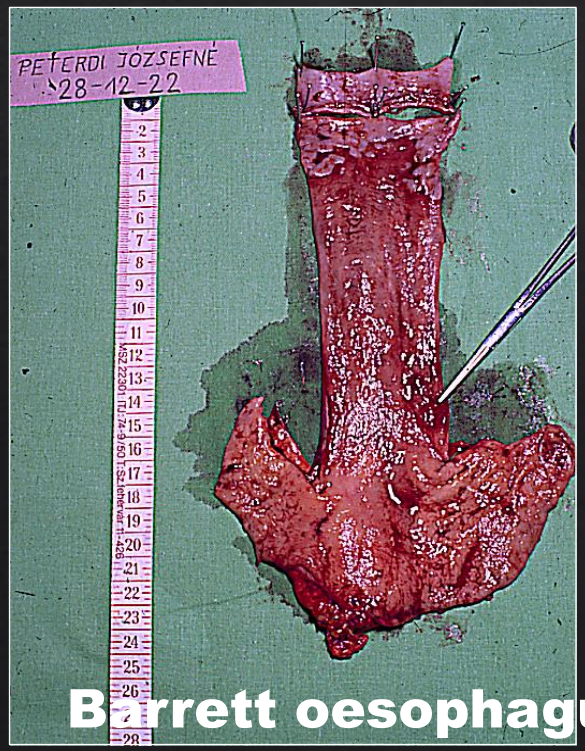
Polyposus coli



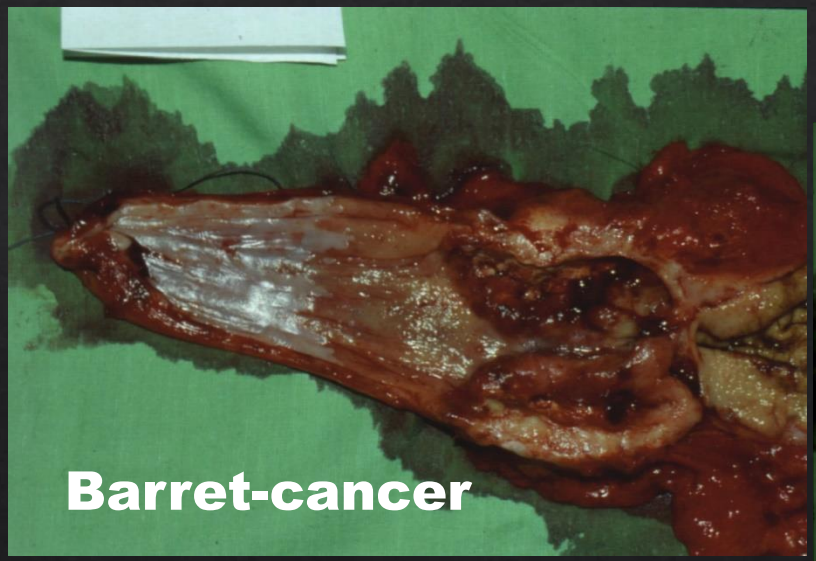
Cervicalis Intraepithelialis neoplasia (CIN)

Precancerous laesion

Histologically verified condition, which may lead with a higher probabilty (or even sure way) to malignant tumor.



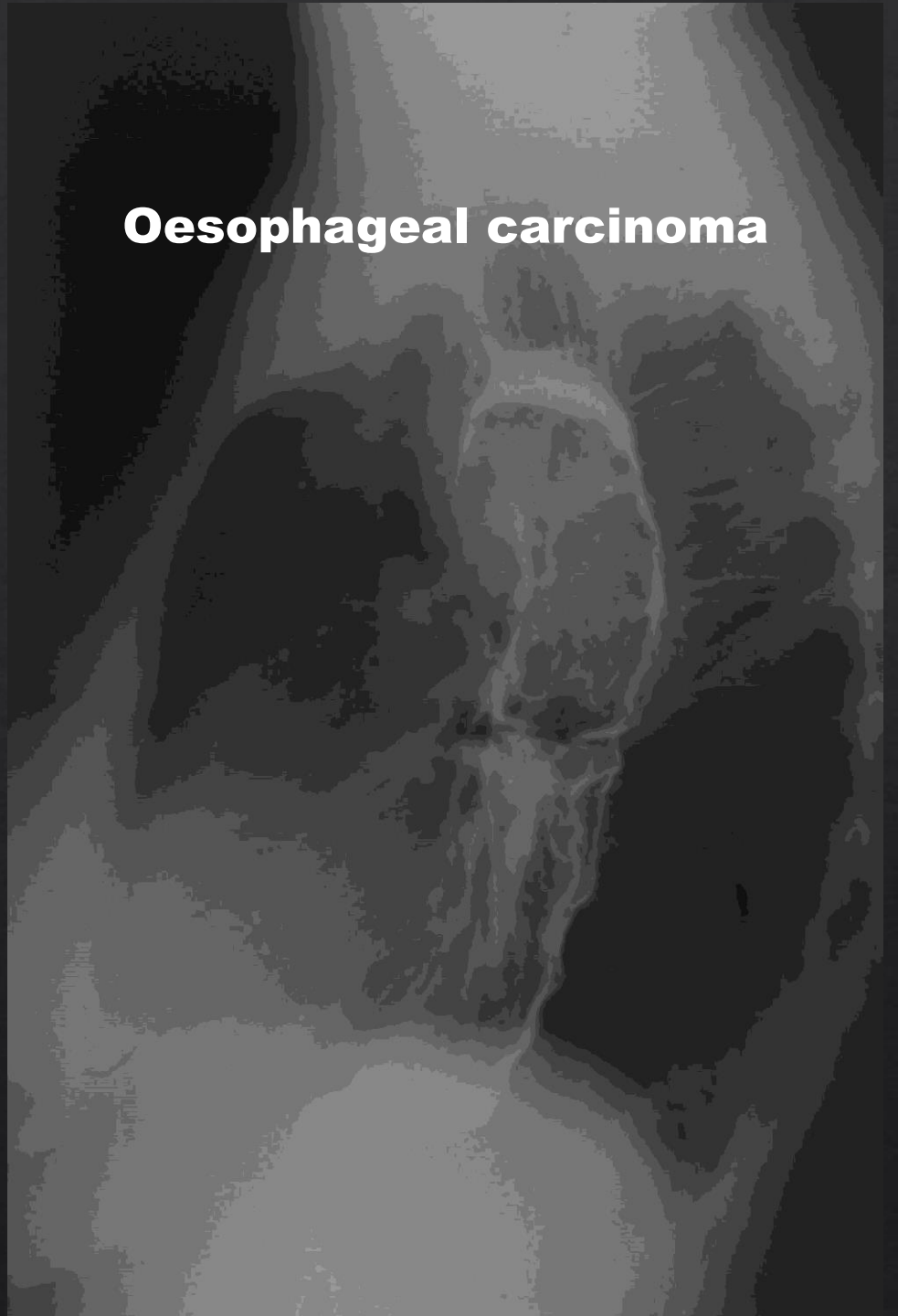
Barrett oesophagus



Barret-cancer

Familiar colon polyposis


Gastric ulcer


Oesophageal carcinoma

Anal carcinoma (HPV)

What are the questions of the clinicans?

Is there a malignancy in the body? What is the histology?

Staging?

1. Where is the tumor situated?
2. What are the borders of the tumor?
3. Is it infaltrating the neighbourhood?
4. Is there local or distant metastasis?

Grading?

1. Which grade of differentiation the tumor have?
2. Grade of atypia?
3. Mitotic rate per window in histological report?

Other prognostic factors?

1. Free margin?
2. Invasion into blood or lymphatic vessels?
3. What is the rate of spreading?
4. Vasculra pattern of tumors?
5. Proliferations markers?
6. Immunhisztochemical prognostic factors?

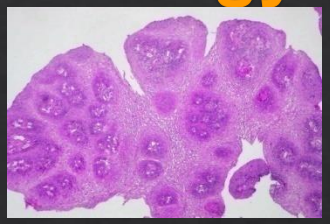
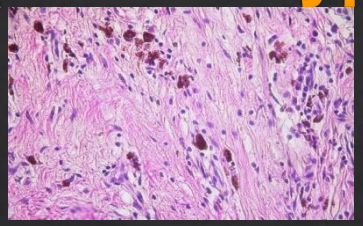
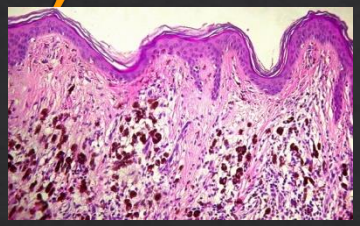
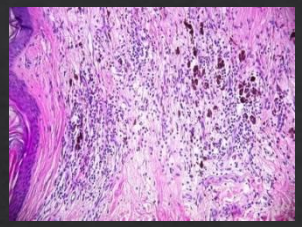
Tumorbiological conditions?

1. Is it a hereditary tumor?
2. Genetical abnormalities?
3. Predictive factors?
4. Resistency for therapy? (hormonstatus, receptorstatus)
5. Metabolic rate of the tumor?
6. Oxigenisation of the tumor?
7. Viral factors influencing the tumor?

Relaps?

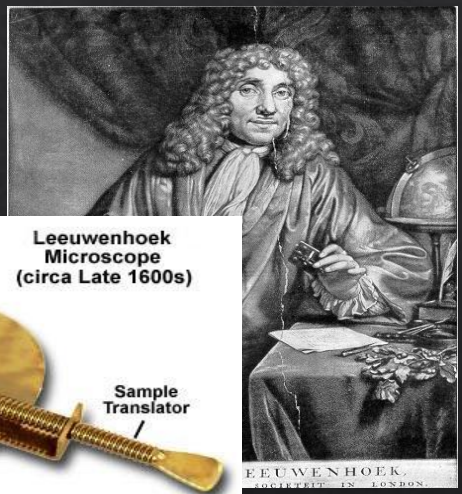
1. Staging?
2. Grading?
3. Tumorbiology?

Pathology (classic type)

Morphology

- Cytology
- Core biopsy
- Intraoperativ frozen section (resection margins and lymph node involvement)
- Hystological verification (morphology and immunohystochemical fenotype)
- Specific genetical abnormalities from morphology?



- **Pathological staging (pT, pN)**
  - Tumor size
  - Presence of metastases in amount and place
- **Patological grading**
  - Differentiation
  - Atypia of the nucleus
  - Mitotic activity
- **Other pathological prognostic factors**
  - Integrity and size of free margin
  - Infiltration pattern of tumors: Expansiv – infiltrativ; vessel, lymphatic vessel, perineural growth
  - Proliferation markers: Ki67 proliferation index, DNS cytometry
  - Immunhystochemical prognostic factors: ER, PR status, Tp53 pozitivness

Molecular pathology

- Support pathological report
  - Genetical analysis (lymphomas, sarcomas)
  - Viral DNA proof
- Predictive factors
  - Ploidia (DNS cytometry, kromosoma number)
  - Clonal examinations (lymphomas)
  - Génmutations (hereditary tumors)
- Prognostic factors
  - Geneexpression
    - Tissue microarray, mRNS microarray
  - Geneamplification (for example: breast cancer, neuroblastoma)
  - Microsatellita instability (pl. CRC)
  - Onkogene mutations (pl. EGFR, KRAS, BRAF)
- Targeted anticancer therapy
  - Breast cancer, lung cancer, colorectal cancer, GIST, lymphoma, melanoma malignum, etc.

Staging

1. Physical exam: relevant exams
2. Anatomical imaging (static or dynamic informations)
   - X-ray
   - angiography (DSA)
   - multilayer digital technologies
     - US
     - CT-MDCT
     - MRI (1,5T>)
3. Pathological staging
   - section: tumor size and stage
   - hystology: presence of malignoma
   - molecular path exams (verifications of diagnosis)
     - viral verification
     - genetic pattern (lymphomák, szarkómák)
4. Functional imaging (molecular imaging)
   - metabolic activity
   - izotop diagnostic tools (SPECT, PET, PET-CT)
   - MRSI, dyn MR, DMR, perf. CT/MR, organ specific. KA-MR

Grading

1. Rate of differentiation: - hystology
2. Rate of atypia: - hystology
3.

Pathologic prognostic factors

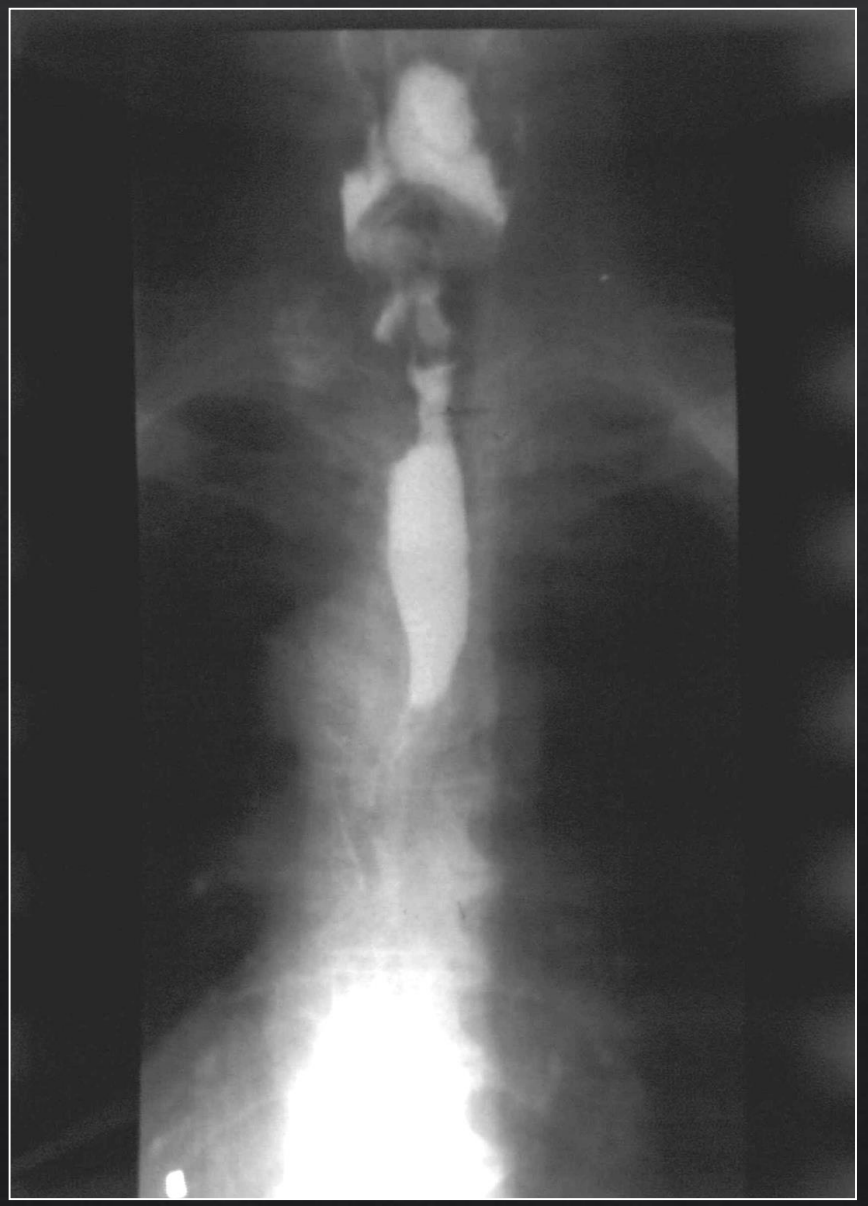
1. Free margin: - hystology
2. Vascular invasion: - hystology
3. Vascular pattern, angiogenesis:
   - hystology
4. - Immunhystochemistry
   - endothel marker
   - proliferation markers:index, DNS cytometry (PET-CT, MRSI)
   - dyn CT/MR, perfusion CT/MR, USD, Ka-US
5. Growth speed and pattern: - hystology
6. Immunhisztochemical prognostic factors:
   - ER, PR status, Tp 53 pozitivness

Tumor specific symptoms

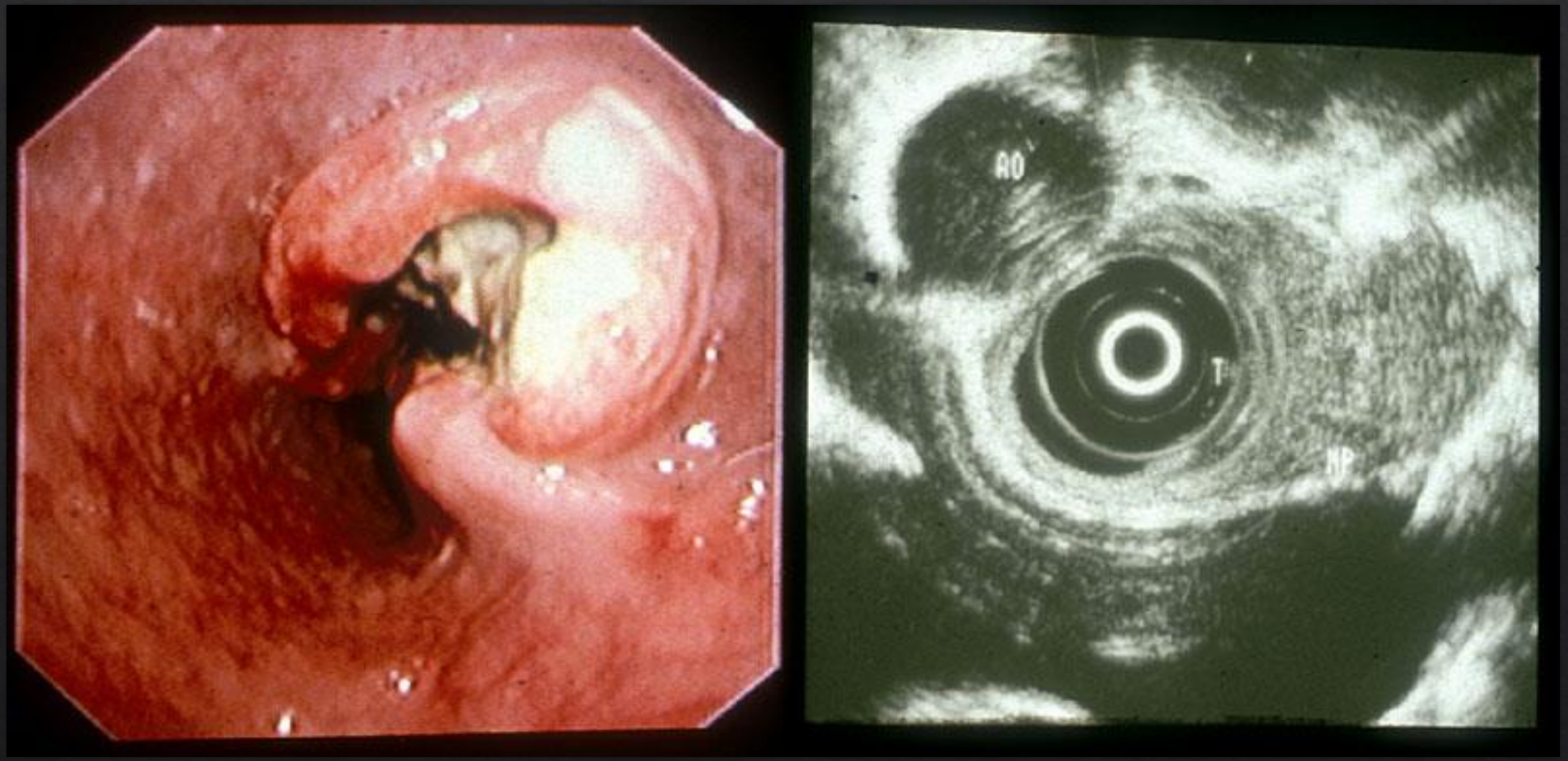
- Changing in habity of stool or urinate
- Non-healing wound
- Unusual bleeding or growth
- Node formations or growth
- Dysphagy
- Lymph node enlargement
- Cough

Radiology

Oesophageal carcinoma (upper third)

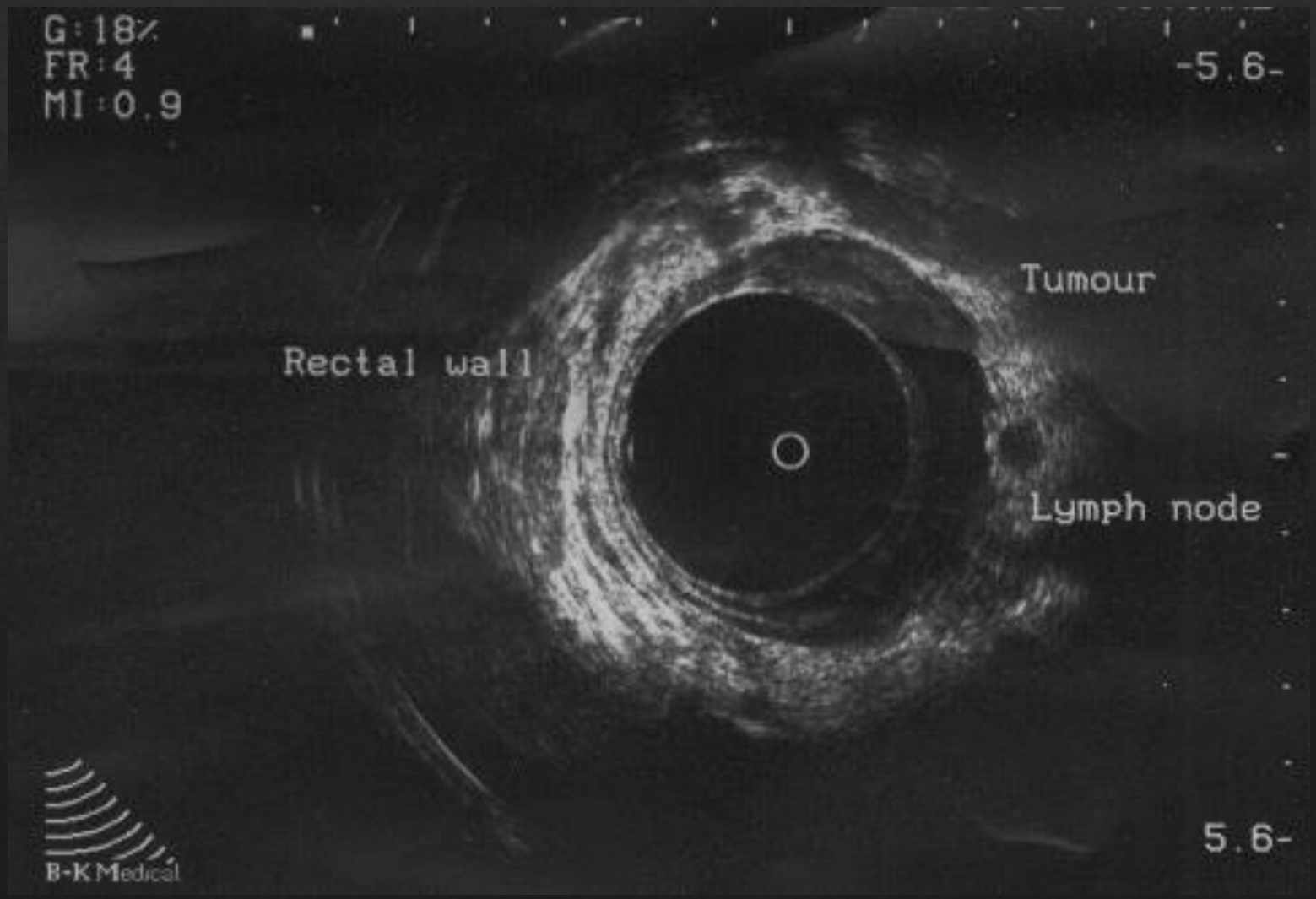


Endoscopy and endoscopic US



Oesphageal carcinoma

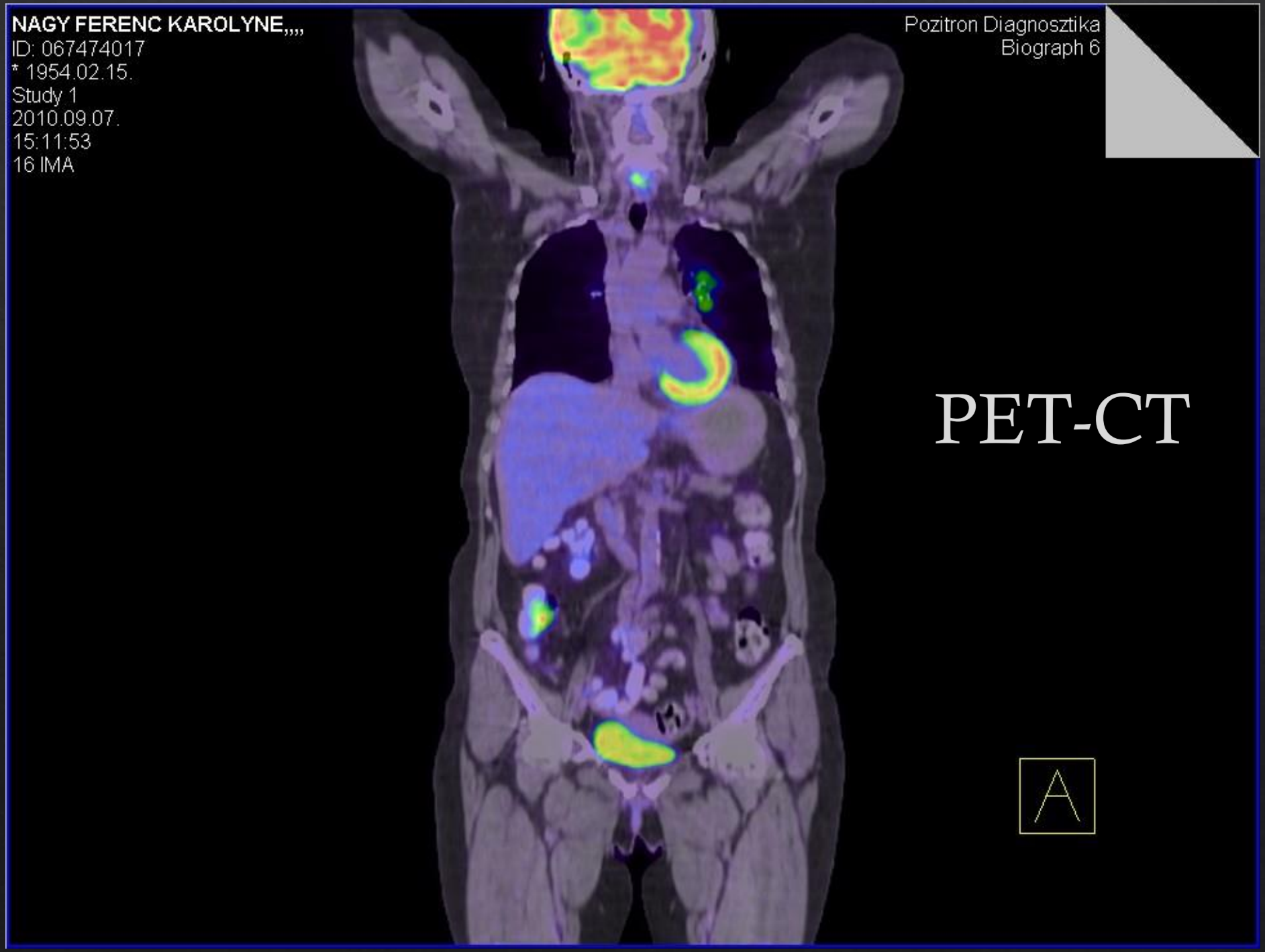
Endorectal US



CT

Liver tumor

PTE ÁOK
SEBÉSZETI KLINIKA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PET-CT
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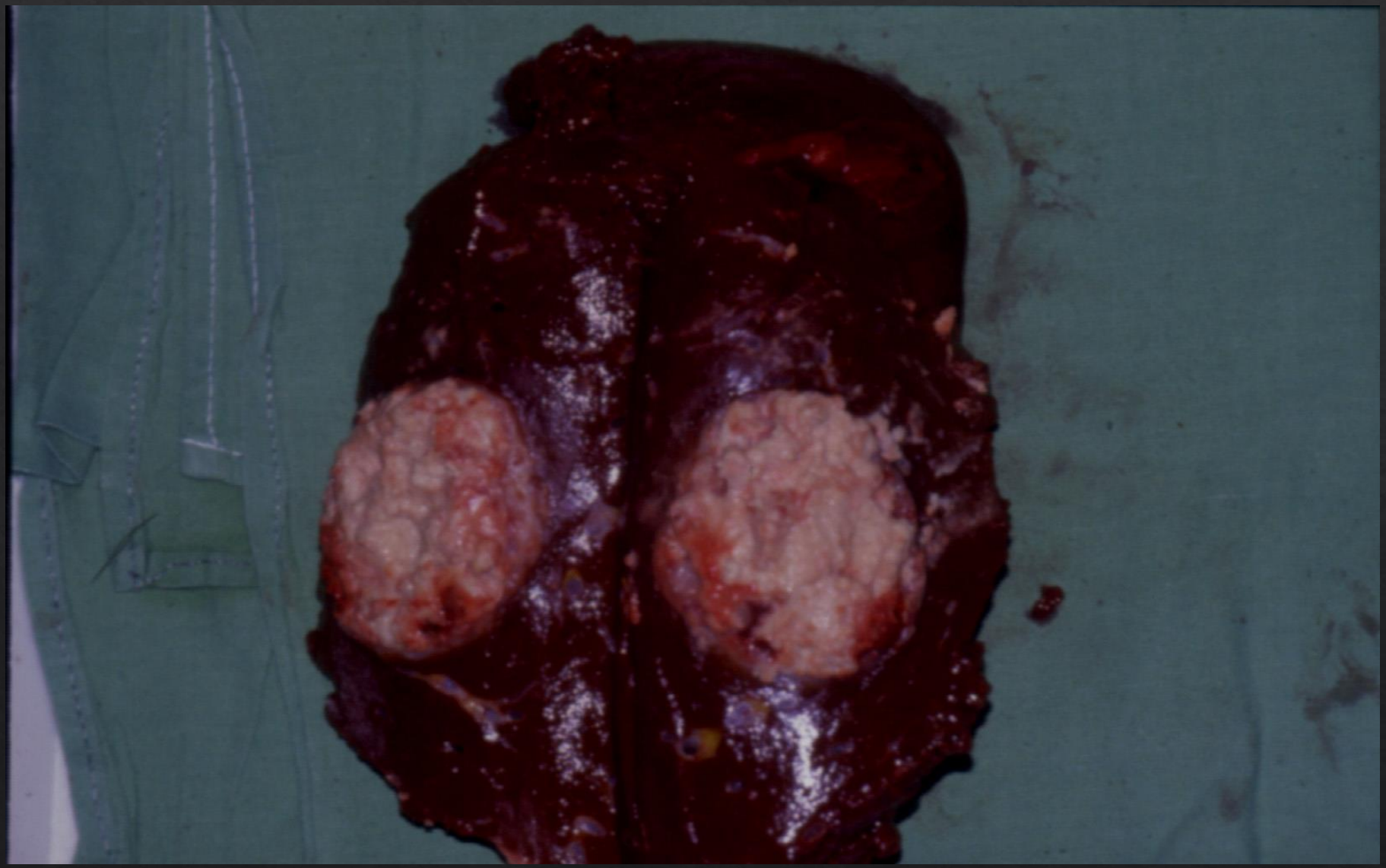
TNM system

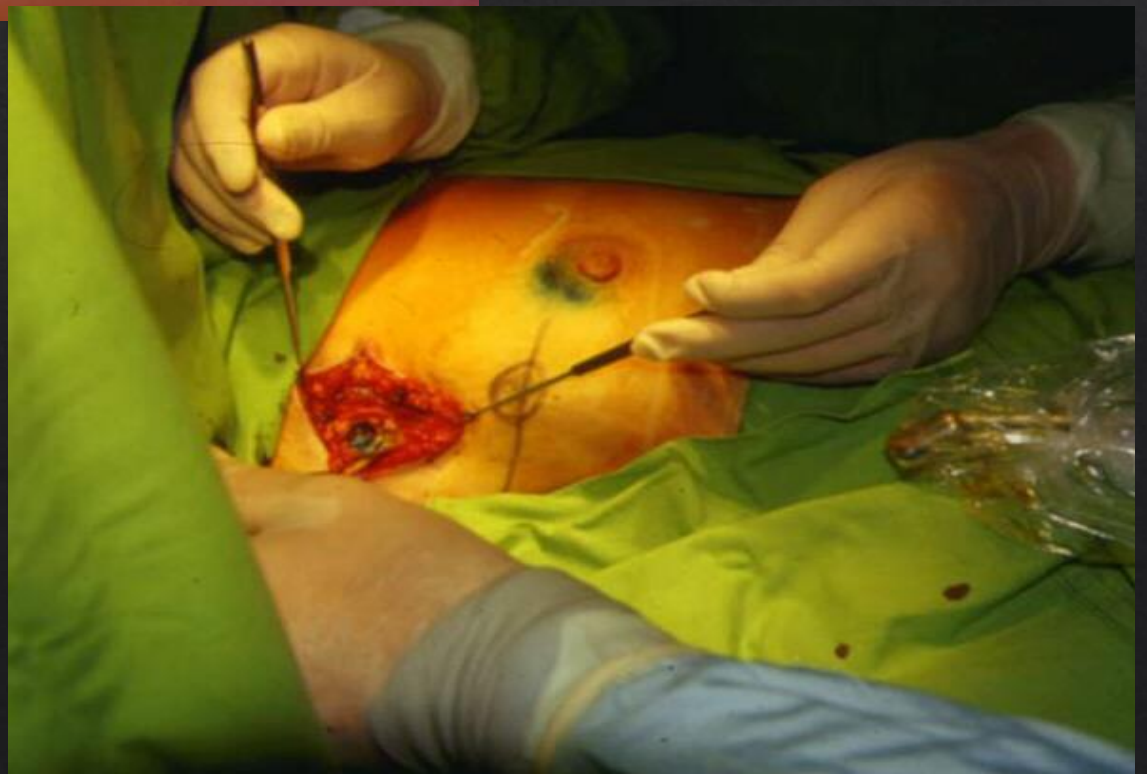
- T tumor size
- N is the regional lymph nodal involvement
- M is the distant metastases

- cTNM- clinical TNM (based on radiology)
- pTNM- patological TNM (hystological proff)
- ypTNM –pathological TNM after therapy

Liver met



Sentinel lymph node biopsy



Multidisciplinary therapy

- Surgery
- Radiotherapy
- Systemic therapy
  - Chemotherapy, Hormontherapy, Immuntherapy, targeted therapy
- Combined (multidisciplinar) therapy:
  - Surgery+radiotherapy (stomach, rectum)
  - Surgery and synchronous radiotherapy (breast)
  - Neoadjuvant therapy: Radio+/-chemo+ surgery (rectum, stomach, oesophagus)
  - Systemic treatment, surgery of metastasis, neoadjuvant radio-chemotherapy, surgery of the primary tumor, adjuvant chemoteherapy (rectumcc+livermetastasis)

MDT team

Consist of:

- medical oncologist
- pathologist
- surgeon
- radiotherapeutist

The role of MDT in oncological patient's care

1. Determining diagnostic algorythm

1.1. Evaluate of the existing reports

1.2. Complementation of existing reports

- Is there a therapeutic cosequency?
- What is the goal?
- Sensitivity and specificity of chosen examination? (CT, MRI, PET CT)
- Sequence of diagnosis?
- Where to do?

2. Determining therapeutic approaches

- Therapeutic forms to declare (surgery, irradiation, systemic)
- Sequence of the therapies
- Timing of therapies
- Place of therapies

The role of MDT in oncological patient's care

3. Control of therapy
- What?
- How?
- When?
- Where?

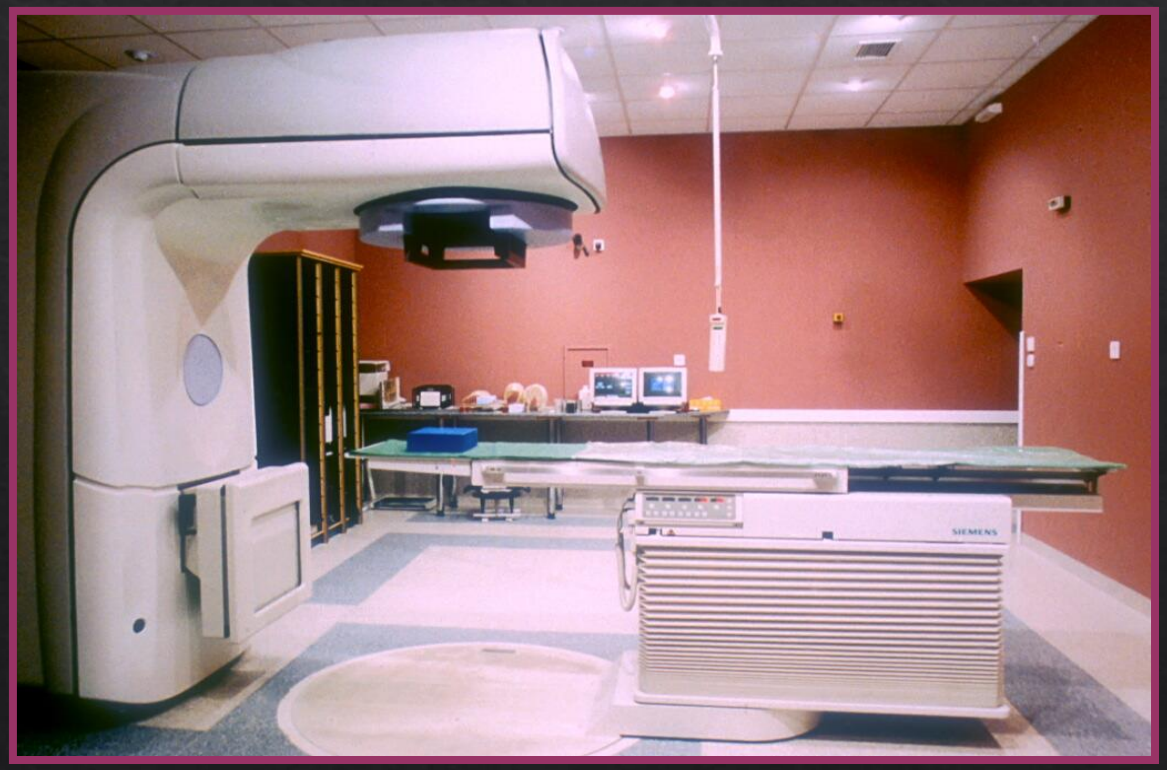
4. Rehabilitation-palliation

4.1. Physical:
- pain management
- reconstructive surgery (breast, face, skin, extremity)
- type
- time
- stoma-care (trachea, GI tract, urogenital tract)
- lymphoedema care
- necrosis and fibrosis of skin or mucosa
- side-effect of chemotherapy

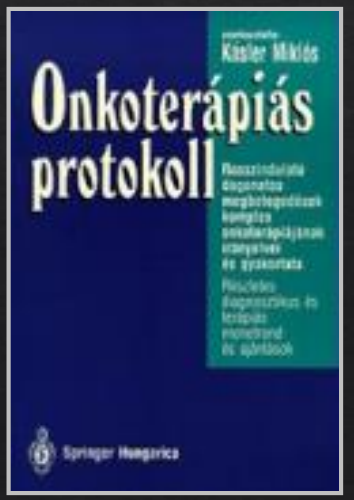
4.2. Emotional

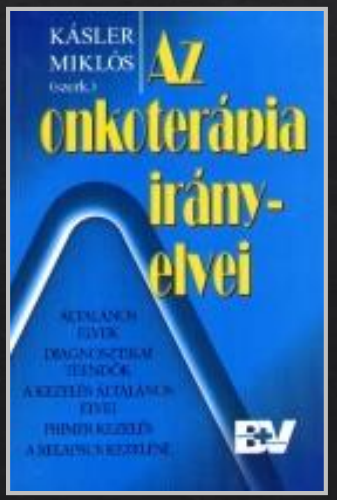
5. Task: laws, permissions
- obligatory
- operational field

KOMPLEX -CARE

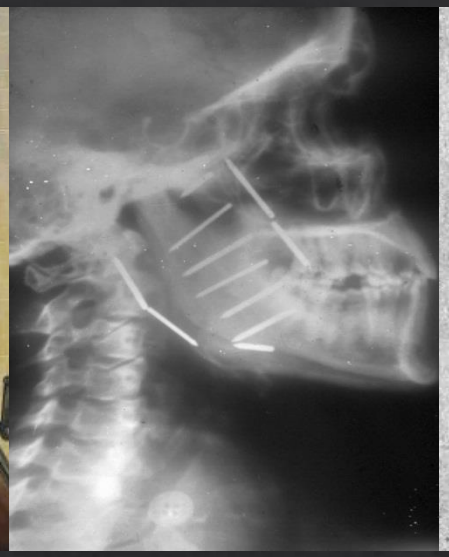


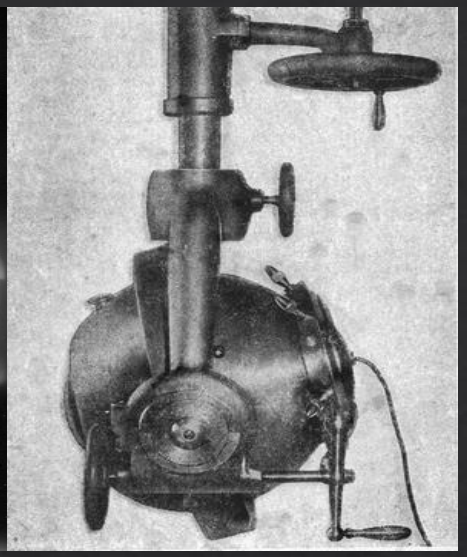
1. Surgery
2. Irradiation
3. Chemotherapy

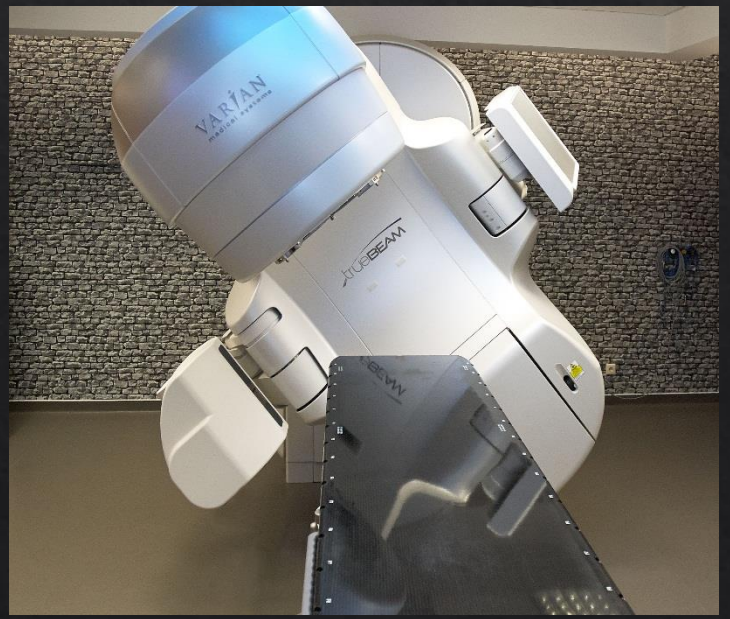




Irradiation







Chemo

1. Cytostatic
2. Targeted
3. Immuno

Chemotherapy

Biological therapy

Oncosurgery

- 1. prophylactic
- 2. diagnostic
- 3. therapeutical
- 4. palliative

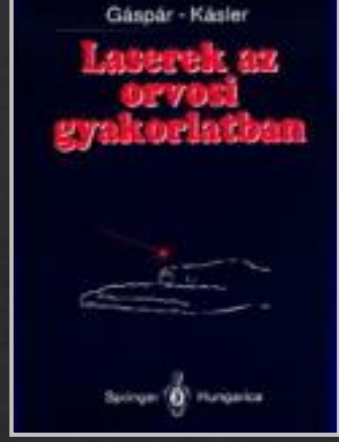
Prophylaktic oncosurgery

- **1. Rectal polyps**
- **2. Hereditary bowel cancer**
- **3. Colitis ulcerosa**
- **4. Hereditary medullar thyroid cancer**
- **6. BRCA-pozitive breast cancer**
- **7. Hereditary ovarial cancer**

Surgery

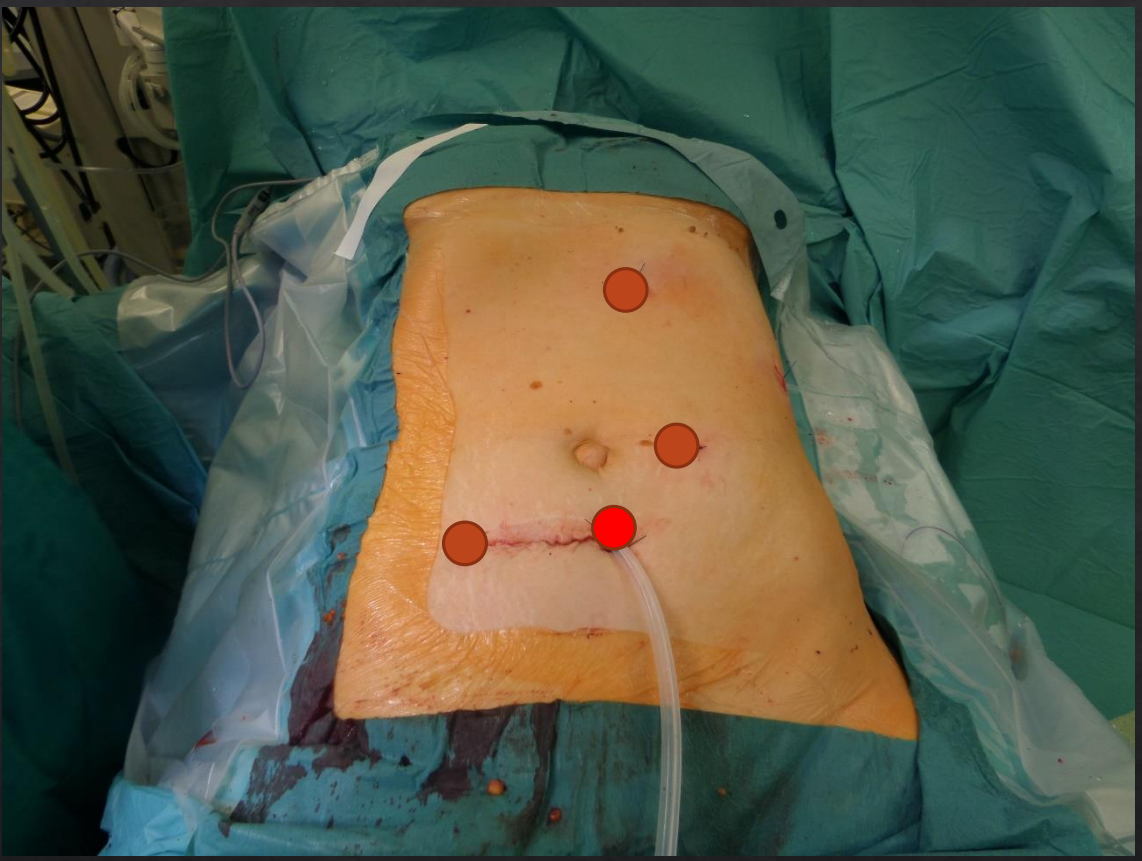
- 1. Curative intent
- Operability – For the patients
- Resecability – For the tumor
- Organ-sparing vs. radicality
- Free surgical margin is essential = R0
- Quality of life
- Reconstruction Immediate /delayed /Oncoplastic surgery
- Minimal Invasive Surgery (MIS) – Laparoscopia, SILS, NOTES, TEM, Robotic-surgery (da Vinci)
- 2. Palliation
- -stoma-formation, bypass (GEA, ileo-transversostomia), vessel-ligature etc.

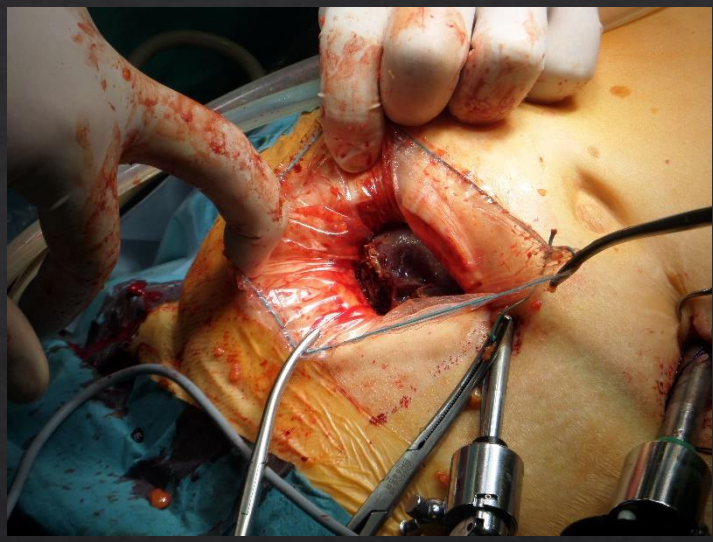
Principles of oncological surgery

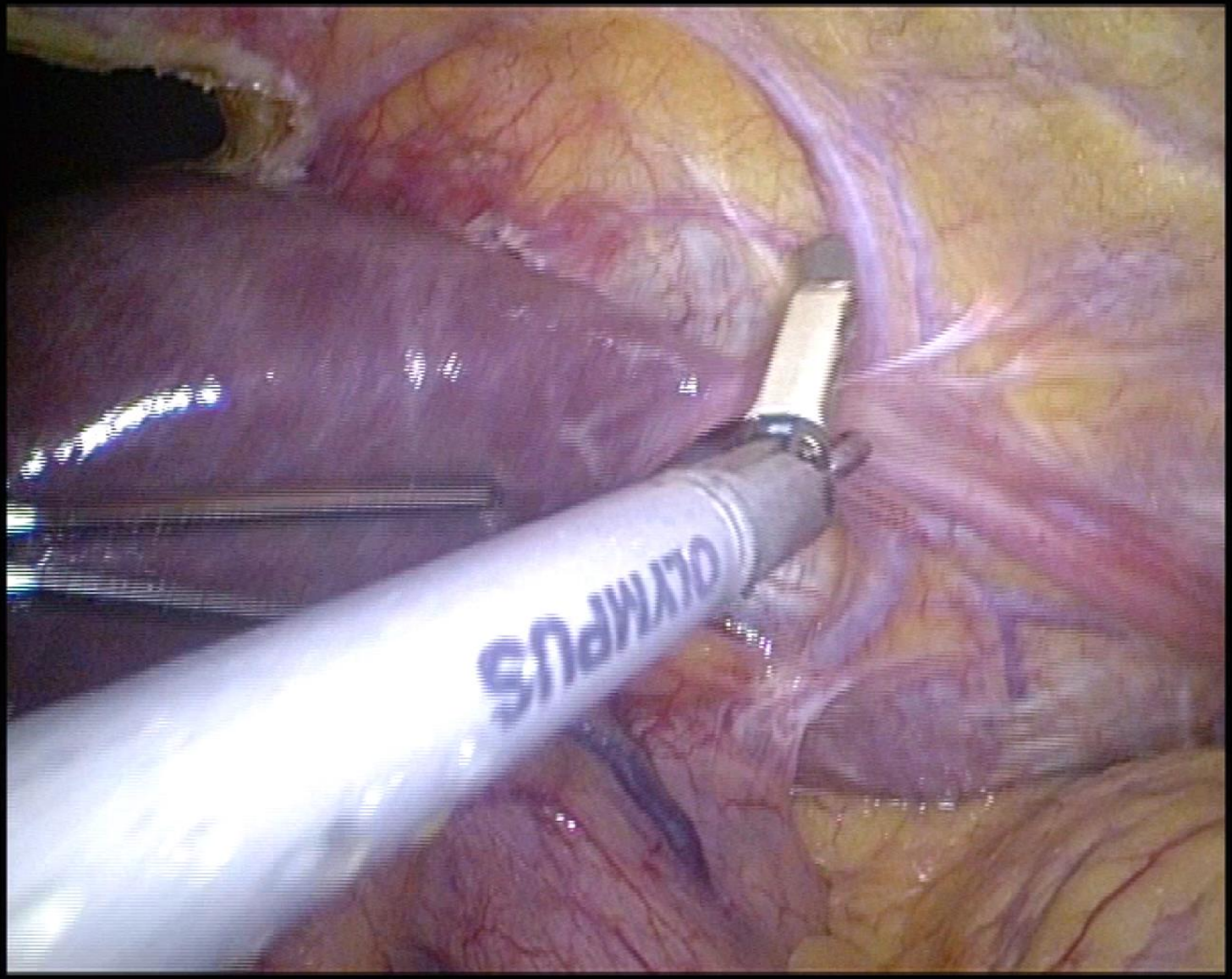


1. Radicality (“en block”)
   - 1.1. Primary Tumor
   - 1.2. Metastases
2. Monoblock Operation
   - 2.1. Lymphogen spreeding
   - 2.2. Hematogen spreeding
3. “No touch technique”
   - 3.1. Access to the operation field (minimal invasiv surgery)
   - 3.2. Operational technique
   - 3.3. Instrumental arsenal (Laser, high-energy sealer device)
4. Unity of structure-function and esthetic
5. Reconstruction of the structure-function (esthetic)

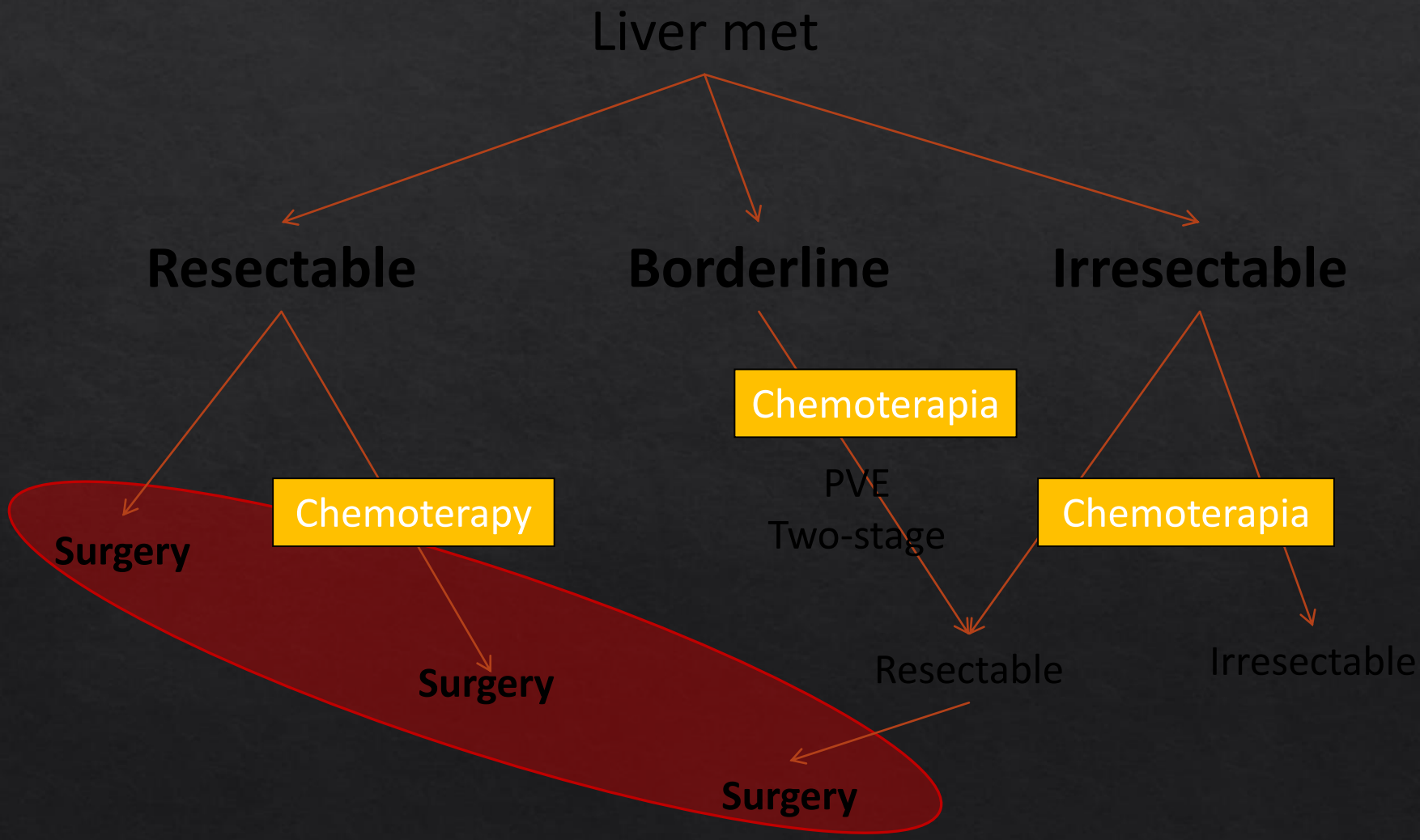
Laparoscopic liver surgery






OLYMPUS

Strategy (CRC liver metastasis)



Evolution of oncosurgery I.

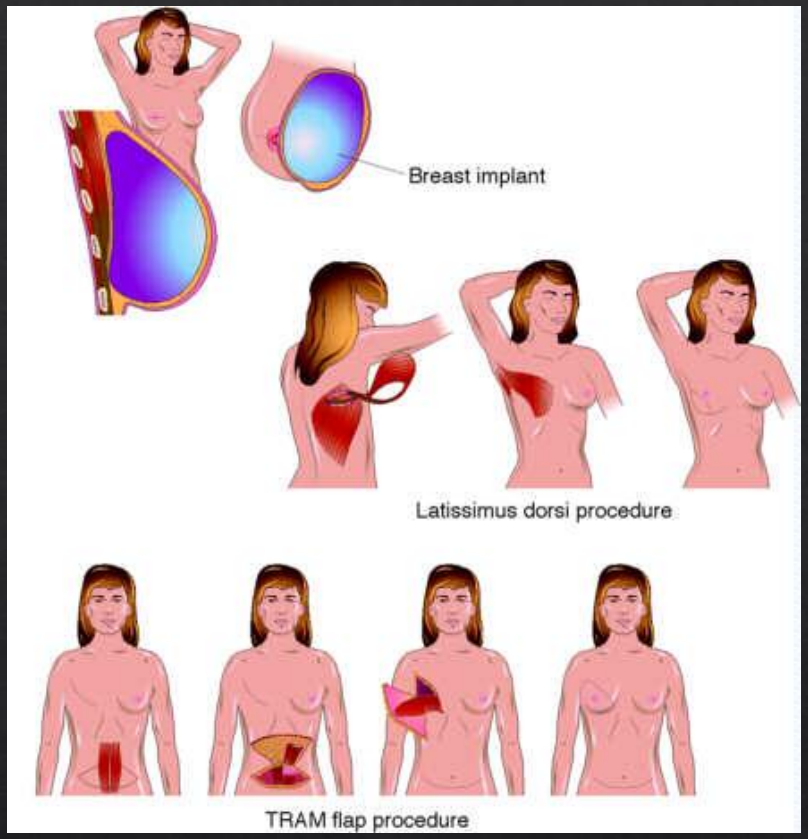
1. Primer Tumor

1.1. Decreased radicality

- Structure
- Function
- Estheticum

1.2. Komplex Terapy

- Radiation therapy
- Chemo



2. Metastases

2.1. Regional Metastasis

- Sentinel lymp node biopsy
- Block-dissection

2.2. Resection of mets

- Systemic control over the disease, metastases are resectable
- Met is soliter, or situated in one region
- „high risk” patients
- Mutlidisciplinary approach!

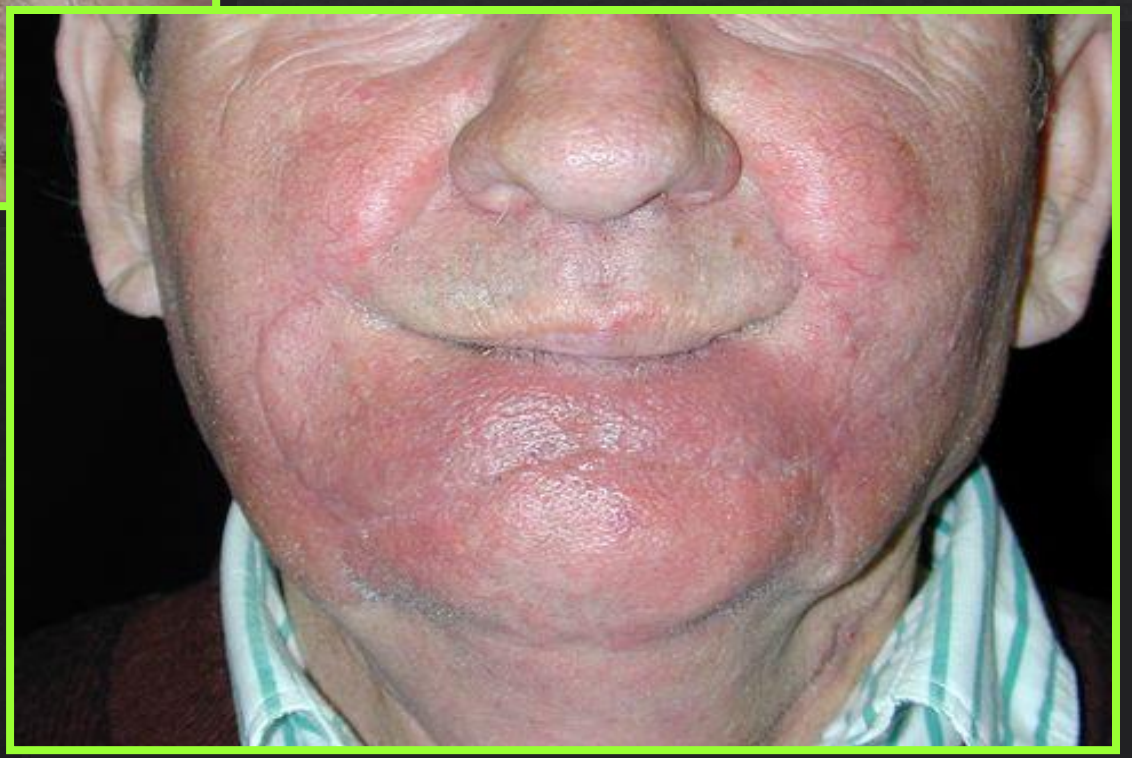
Evaluation of oncosurgery II.

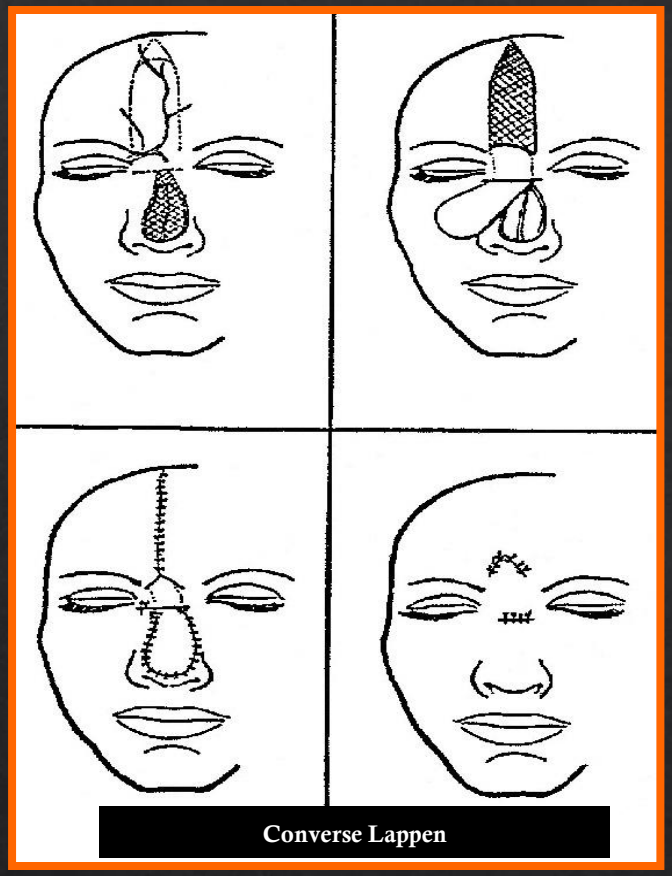


3. Reconstruction

- 3.1. Site
  - 3.1.1. Head-neck region
  - 3.1.2. Breast
  - 3.1.3. Skin, neuronal, muscle
  - 3.1.4. GI tract
- 3.2. Principles
  - 3.2.1. Improvement of QoL (body, soul, function-esthetic)
  - 3.2.2. Replacement with similar organs
  - 3.2.3. Immediate reconstruction
- 3.3. Type of reconstruction
  - 3.3.1. Autologous transplantation
    - flaps (neighbourghood or distant)
    - Fasciocutan flap
    - Myocutan flap
    - Osteomyocutan flap
    - Other visceral organ
  - 3.3.2. Heterogenous tranplantation
    - Prothesis
    - Expander


Lower limb reconstruction with local flap

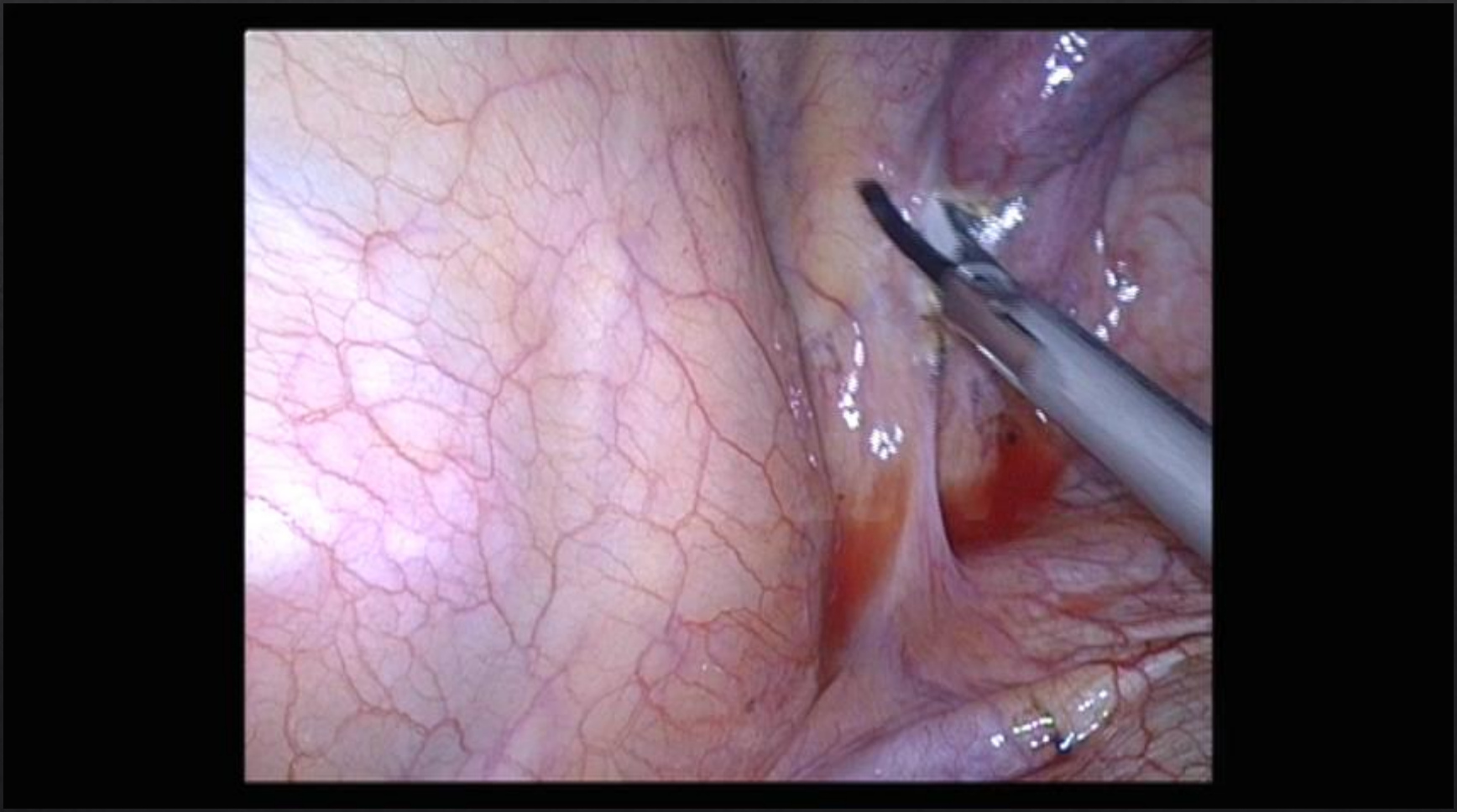




Converse Lappen

Converse Flap

MI Oesophagus (Thorax)



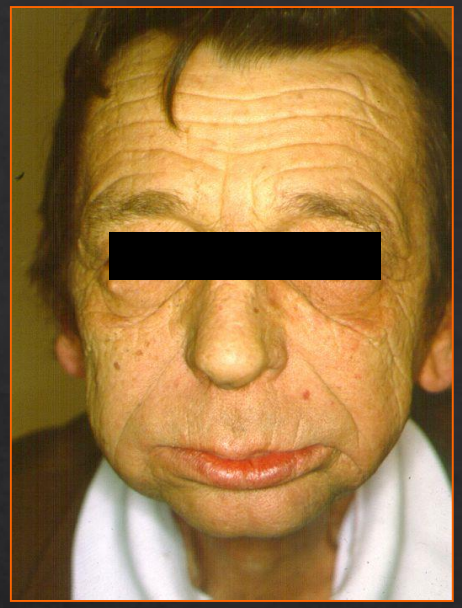
Oesophagus replacement with stomach

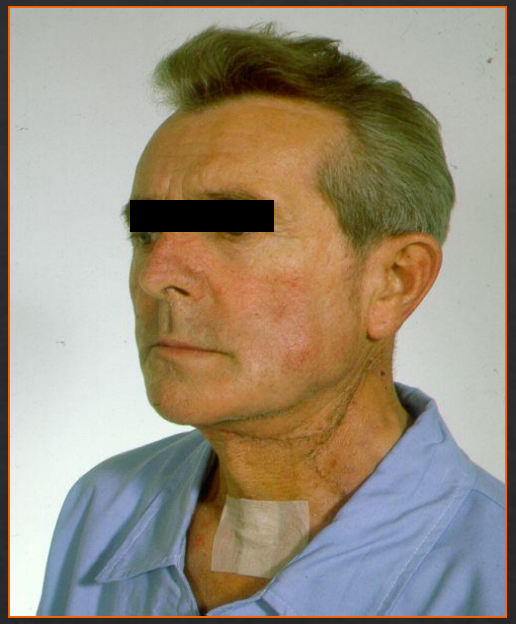
Free transplantation

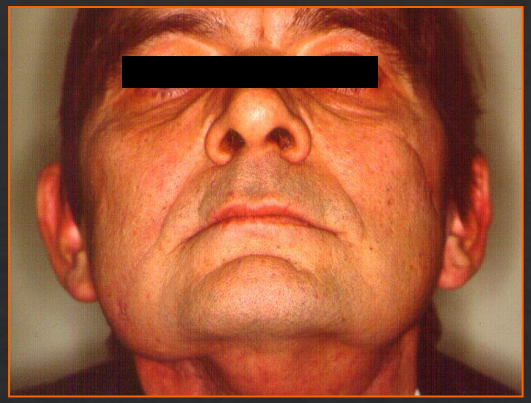
Types:

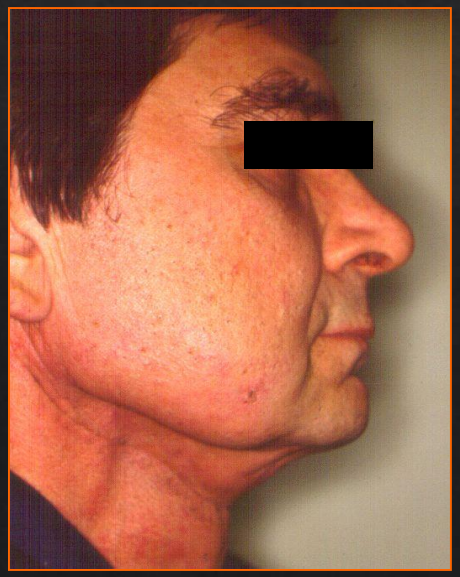
- Skin
- Half-thick skin
- Free jejunal interpositum with microvascular anastomosis
- Myocutan (osteomyocutan, osteocutan) flap transplantation with microvascular anastomosis

Skintumor – Half-thick skin transposition

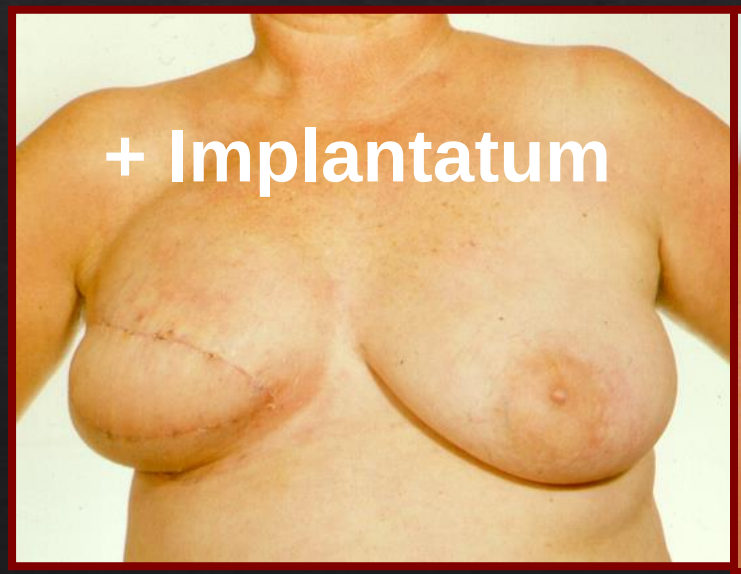




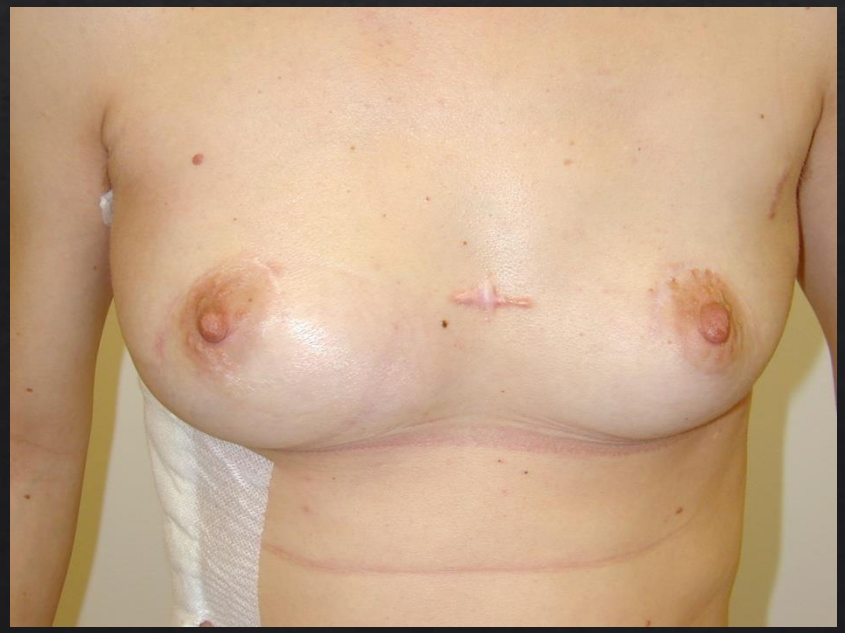


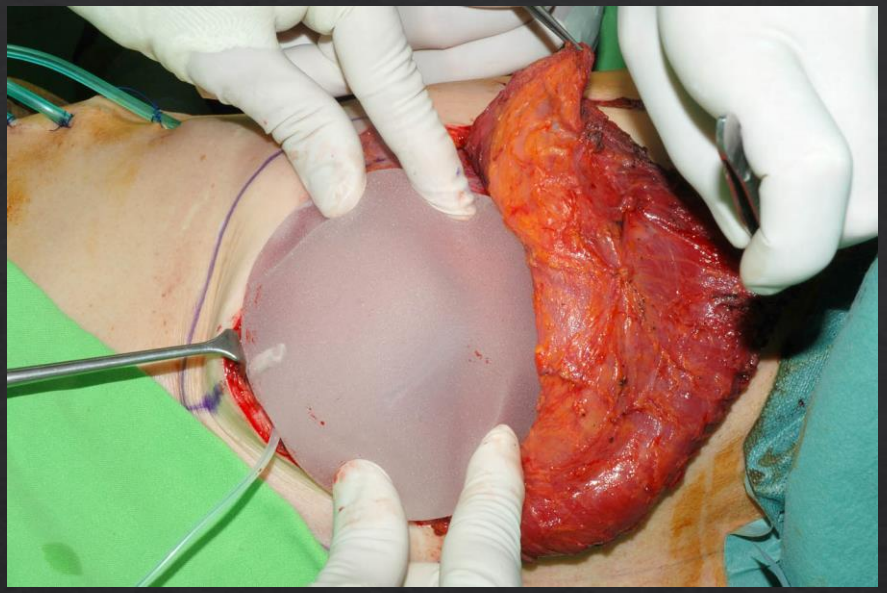


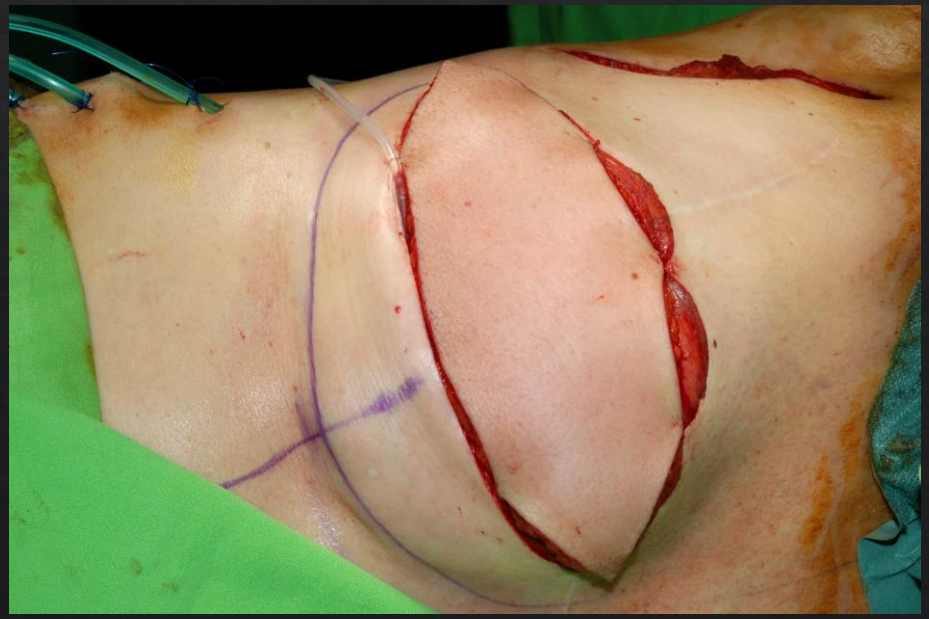
Latissimus dorsi musculocutan flap



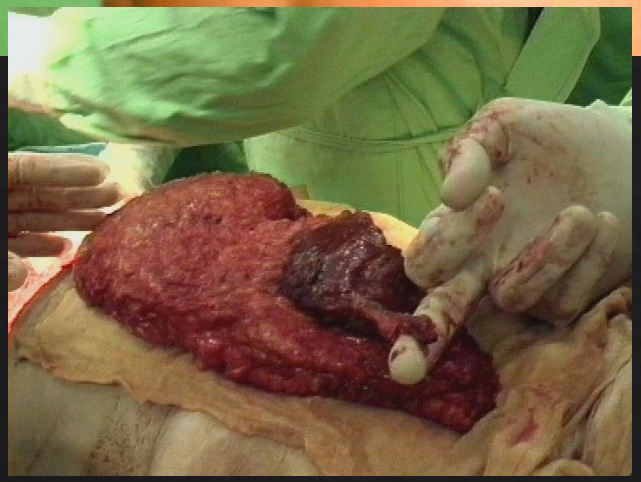
Latissimus dorsi musculocutan flap



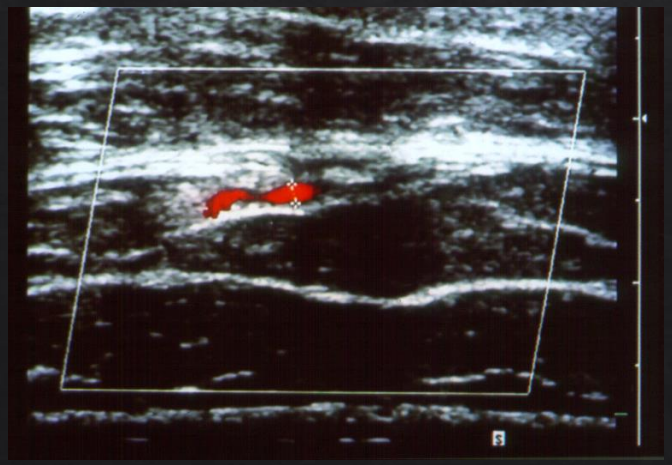


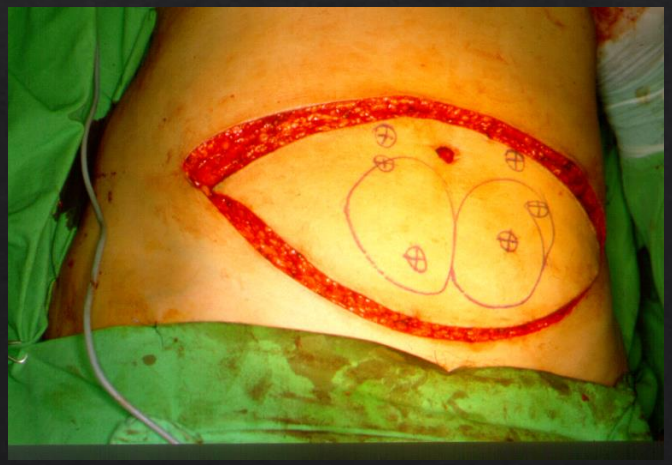


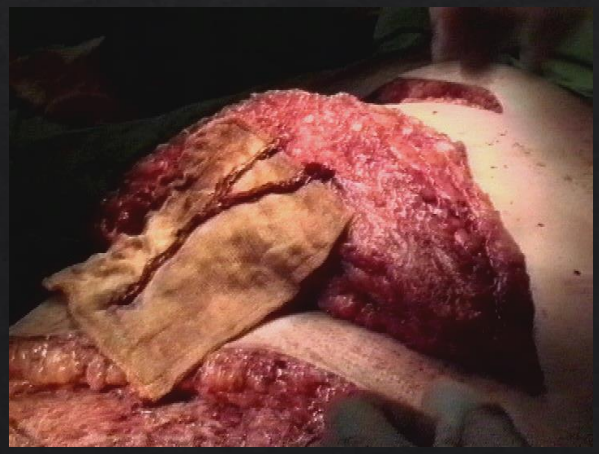
Free TRAM flap



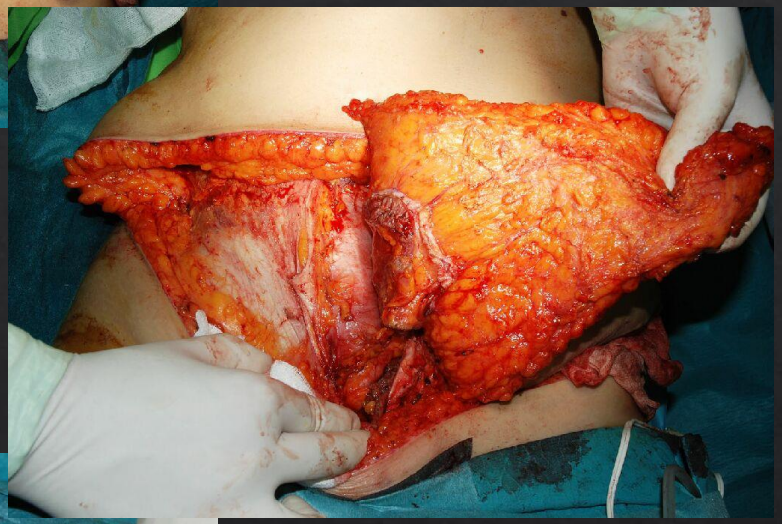
Free DIEP flap

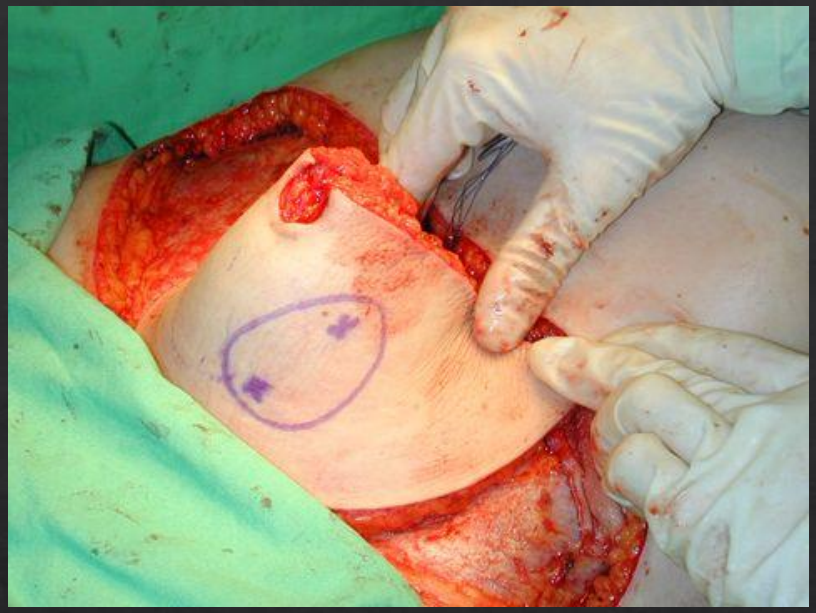






DIEP





Expander, Implantatum

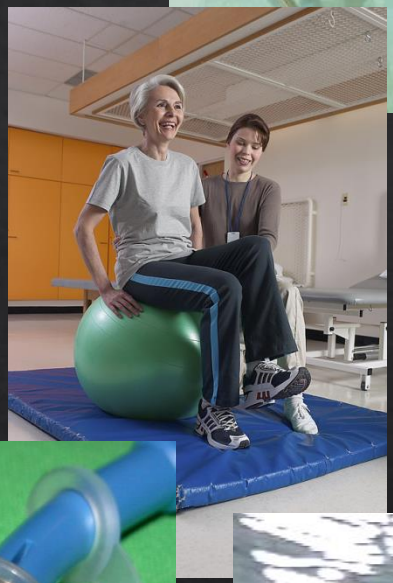
Rehabilitation

Goal:

- **familiar and economical rehabilitation**
- **quality of life improvement**

Type:

- **Somatic**
  - Pain
  - Operations
  - Stoma
  - Voice
  - Mobilitate
  - Side effect of irradiation
  - Side effect of chemo
- **Spiritual**
  - Group-therapy
  - Individual therapy



Palliation

Years and decades

Goal: Improving or keeping the QoL

- Patient
- Family

- Complication, pain
- Physical condition
- Spiritual condition
- Social condition

Hospice

- Terminal care

Thank You for Attention!