Principles of complex oncotherapy and surgical oncology.
Methods of surgical reconstruction and oncological rehabilitation

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Cancer
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Key facts
• Cancers figure among the leading causes of morbidity and mortality worldwide, with approximately 14 million new cases and 8.2 million cancer related deaths in 2012 (1).
• The number of new cases is expected to rise by about 70% over the next 2 decades.
• Among men, the 5 most common sites of cancer diagnosed in 2012 were lung, prostate, colorectum, stomach, and liver cancer.
• Among women the 5 most common sites diagnosed were breast, colorectum, lung, cervix, and stomach cancer.
• Around one third of cancer deaths are due to the 5 leading behavioural and dietary risks: high body mass index, low fruit and vegetable intake, lack of physical activity, tobacco use, alcohol use.
• Tobacco use is the most important risk factor for cancer causing around 20% of global cancer deaths and around 70% of global lung cancer deaths.
• Cancer causing viral infections such as HBV/HCV and HPV are responsible for up to 20% of cancer deaths in low- and middle-income countries (2).
• More than 60% of world’s total new cases occur in Africa, Asia and Central and South America. These regions account for 70% of the world’s cancer deaths (1).
• Cancer is a generic term for a large group of diseases that can affect any part of the body.
Top 10 cancers in Hungary (2010)

- Bronchus & lung
- Breast
- Colon
- Prostate
- Bladder
- Rectum
- Pancreas
- Stomach
- Kidney, except renal pelvis
- Malignant melanoma of skin

ASR (W) rate per 100,000
Mortality
Incidence

Male

- Larynx
- Kidney, except renal pelvis
- Malignant melanoma of skin
- Rectum
- Bladder
- Colon
- Stomach
- Bronchus & lung
- Breast
- Corpus uteri

Female

- Breast
- Colon
- Corpus uteri
- Pancreas
- Ovary
- Rectum
- Malignant melanoma of skin
- Stomach
- Cervix uteri
- Bronchus & lung
Treatment of cancer

Cancer treatment programmes

• “The main goals of a cancer treatment programme is to cure or considerably prolong the life of patients and to ensure the best possible quality of life to cancer survivors.

• The most effective and efficient treatment programmes are those that:
  a) are provided in a sustained and equitable way;
  b) are linked to early detection; and
  c) adhere to evidence-based standards of care and a multidisciplinary approach.”
Principles of complex oncotherapy

• „The goal of cancer treatment is first to eradicate the cancer.

• If this primary goal cannot be accomplished, the goal of cancer treatment shifts to palliation, the amelioration of symptoms, and preservation of quality of life while striving to extend life.

• One of the challenges of cancer treatment is to use the various treatment modalities alone and together in a fashion that maximizes the chances for patient benefit.

• Cancer treatments are divided into four main types: surgery, radiation therapy, chemotherapy (including hormonal therapy and molecularly targeted therapy), and biologic therapy (including immunotherapy and gene therapy).

• The modalities are often used in combination, and agents in one category can act by several mechanisms.

• Surgery and radiation therapy are considered local treatments, though their effects can influence the behavior of tumor at remote sites.

• Chemotherapy and biologic therapy are usually systemic treatments.

• Oncology, the study of tumors including treatment approaches, is a multidisciplinary effort with surgical-, radiotherapy-, and internal medicine–related areas of expertise.”

Surgical Oncology

• „Over the past 4 decades cancer care has undergone a revolution.
• No longer is surgery the only treatment for most solid malignancies but adjuvant therapies with highly focussed radiotherapy, targeted molecular therapies and multimodal chemotherapy are the standard of care.
• These multimodal treatment regimes have had a great impact on cancer survival rates, as have improved diagnostics.
• Today, general surgeons can no longer work in isolation and must be part of a multidisciplinary team.
• The surgeon must be more than just a technician and must understand the contributions made by other disciplines and how this may impact on the type and timing of surgery: he/she must be a Surgical Oncologist. ”
Why now?

- Increasing incidence of malignancies
- Biological hypothesis
- Population screening
- Modern evidence based oncology >> better overall survival (OS)
- Social improvements >> better OS >> need of better quality of life
- Sophisticated extended- as well minimal-invasive operative techniques, according to multidisciplinary stage based but individual surgery
- High-technology
- Industrial competition
Characteristics of a Surgical Oncologist

- Specialized- or superspecialized education and training
- Special exams (UEMS/EBSQ surgical oncologist, breast surgeon)
- Specialized comprehensive centers
- Multi- and interdisciplinarity (core member of MDTs)
- Quality control
- Clinical trials
- Education
The European Union of Medical Specialists (UEMS) and the European Board of Surgery Qualification (EBSQ)
The role of surgery in the treatment of cancer patients can be divided into six areas: (1) definitive surgical treatment for primary cancer, selection of appropriate local therapy, and integration of surgery with other adjuvant modalities; (2) surgery to reduce the bulk of disease (e.g., ovarian cancer); (3) surgical resection of metastatic disease with curative intent (e.g., pulmonary metastases in sarcoma patients, hepatic metastases from colorectal cancer); (4) surgery for the treatment of oncologic emergencies; (5) surgery for palliation; and (6) surgery for reconstruction and rehabilitation. In each area, integration with other treatment modalities can be essential for a successful outcome.
Principles in Surgical Oncology

1. Radicality („en block”)  
   1.1. Primary tumour  
   1.2. Metastases  
2. Monoblock surgery  
   2.1. Lymphogenic spreading  
   2.2. Haematogenic spreading  
3. “No touch isolation technique”  
   3.1. Surgical approach (minimal-invasive surgery)  
   3.2. Surgical technique  
   3.3. Surgical instruments (laser)  
4. Structure and function sparing  
   4.1. Organs of non vital importance  
      - neoadjuvant-/adjuvant therapy  
   4.2. Organs of vital importance  
      - neoadjuvant-/adjuvant therapy  
5. Reconstruction of function and aesthetic, quality of life
Extended primary and salvage surgery with reconstruction

**Prerequisites**
- **Operability** (general condition of the patient)
- **Resecability** (complete removal of the cancer)
- **Reconstruction** (restoration of structure and function)
Characteristics of Surgical Oncology

• Evidence based medicine, guidelines
• Multidisciplinary care
• Comprehensive centers
• Integration of continuous development of basic sciences (eg. molecular genetics, medical and radiological oncology)
• Therapeutic and palliative surgical oncology
• Psycho-oncological care
• Specialised international societies (eg. ESSO, EUSOMA)
• Quality indicators based on international consesus
• Regular audit of the results
Evidence based medicine, guidelines

Németh: Radiotherapy, Medicina, 2004
The role of the oncological team in cancer patient management

1. Determination of the diagnostic algorithm
   1.1. Evaluation of the available findings
   1.2. Completion of the available findings
       - necessary? (has any therapeutic impact?)
       - for what purpose? (what information does it yield?)
       - sensitivity and specificity of the examination of choice? (CT, MRI, PET CT, etc.)
       - in what order, where?

2. Determination of the therapeutic algorithm
   - determination of the necessary therapeutic components
     (surgery, radiotherapy, medical therapy)
   - type of the components (surgical, radiotherapeutic, drug)
   - order of the components
   - time of the delivery of the components
   - site of the delivery of the components

3. Control of therapy: what, how, when, where?

4. Rehabilitation – palliation
Multidisciplinary team (MDT) decision making
(eg. Multidisciplinary Breast Cancer Team)
Policy statement on multidisciplinary cancer care.


Abstract

BACKGROUND: Cancer care is undergoing an important paradigm shift from a disease-focused management to a patient-centred approach, in which increasingly more attention is paid to psychosocial aspects, quality of life, patients' rights and empowerment and survivorship. In this context, multidisciplinary teams emerge as a practical necessity for optimal coordination among health professionals and clear communication with patients. The European Partnership for Action Against Cancer (EPAAC), an initiative launched by the European Commission in 2009, addressed the multidisciplinary care from a policy perspective in order to define the core elements that all tumour-based multidisciplinary teams (MDTs) should include. To that effect, a working group conference was held in January 2013 within the EPAAC Work Package 7 (on Healthcare) framework.

METHODS: The consensus group consisted of high-level representatives from the following European scientific societies, patient associations and stakeholders: European CanCer Organisation (ECCO), European SocietY for Radiology & Oncology (ESTRO), European Society for Medical Oncology (ESMO), European Society of Surgical Oncology (ESSO), International Society of Geriatric Oncology (SIOG), European Association for Palliative Care (EAPC), European Oncology Nursing Society (EONS), International Psycho-Oncology Society (IPOS), European Cancer Patient Coalition (ECPC), EuropaColon, Europa Donna - The European Breast Cancer Coalition, Association of European Cancer Leagues (ECL), Organisation of European Cancer Institutes (OEICI), EUSOMA - European Society of Breast Cancer Specialists, European Hospital and Healthcare Federation (HOPE) and EPAAC Work Packages 5 (Health promotion and prevention), 7, 8 (Research), 9 (Information systems) and 10 (Cancer plans). A background document with a list of 26 core issues drawn from a systematic review of the literature was used to guide the discussion. Five areas related to MDTs were covered: care objectives, organisation, clinical assessment, patients' rights and empowerment and policy support. Preliminary drafts of the document were widely circulated for consultation and amendments by the working group before final approval.

RESULTS: The working group unanimously formulated a Policy Statement on Multidisciplinary Cancer Care to define the core elements that should be implemented by all tumour-based MDTs. This document identifies MDTs as the core component in cancer care organisation and sets down the key elements to guide changes across all European health systems.

CONCLUSION: MDTs are an essential instrument of effective cancer care policy, and their continued development crucial to providing patients the care they need and deserve. While implementation must remain in local hands, European health systems can still benefit from having a basis for an effective multidisciplinary model of cooperation. This policy statement is intended to serve as a reference for policymakers and healthcare providers who wish to improve the services currently provided to the cancer patients whose lives and well-being depend on their action.
Many studies have shown that increasing hospital volume for major cancer surgery also has positive impact on patient survival.

In one study of 5,013 patients in the Surveillance, Epidemiology, and End Results registry of patients high hospital volume was linked with lower mortality for patients undergoing pancreatectomy (P = .004), esophagectomy (P <.001), liver resection (P = .04), and pelvic exenteration (P = .04).

In patients undergoing esophagectomy, operative mortality was 17.3% in low-volume hospitals compared with 3.4% in high-volume hospitals.

For patients undergoing pancreatectomy, the corresponding rates were 12.9% vs. 5.8%.”

DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology 8th., Lippincott Williams & Wilkins
The National Institute of Oncology, Hungary

http://www.oncol.hu

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The main goals of Surgical Oncology

• To perform adequate radical surgery in a multidisciplinary context, according to the treatment plan of the MDT.
• To perform adequate **radical surgery**
  - by the least invasive way
  - to preserve maximal function
  - to produce maximal aesthetic result
  - by the least morbidity and mortality
  - on the most cost effective way
To perform adequate radical surgery - by the least invasive way

- Laparoscopic surgery
- Endoscopic surgery (eg. NOTES Natural Orifice Transluminal Endoscopic Surgery)
- Radioguided Occult Leasion Localisation (ROLL)
- Skin-, Areola-, Nipple Sparing Mastectomies
- Total Mesorectal Exstirpation (TME)
- Video-assisted thoracoscopic surgery (VATS) lobectomy
- **But** Cytoreductive Peritonectomy with Intraperitoneal Hyperthermic Chemotherapy
Laparoscopic stoma operation
Laparoscopic intestinal anastomosis
US guided intraoperative RFA

before

intraoperative

after

2 mins after

4-5 mins after

6-8 mins after
To perform adequate radical surgery - to preserve maximal function

- Sentinel Lymph Node Biopsy (eg. breast cancer, melanoma malignum)
- Neoadjuvant chemo- or radio-chemotherapies (eg. sphincter preserving rectal surgery)
- Intersphincteric rectal surgery
- Isolated limb chemoperfusion (eg. sarcomas)
- Radiofrequency Tumor Ablation (eg. liver metastases)
- Endoscopic mucosal resection (eg. oesophageal, gastric cancer)
- Free jejunal graft for oesophageal reconstruction (microsurgery)
- Onco-vascular surgery
- Oncological bone surgery
The introduction of surgical lasers in Hungary
(from 1980)

Advantages:
- „no touch” technique: ablative, sterile, atraumatic
- No bleeding, wound surface covered by coagulum: ablative, protected from superinfection
- Absolute targeting accuracy
- Short surgical intervention time
- Only pathological tissue is removed
- Oedema-free surgical margin
- Painless wound
- Quick and undisturbed wound healing
- Minimal or no cicatrization
- Preserves structure, function and aesthetic quality
- Can be repeated in case of relapse


Laser surgeries preserving aesthetic qualities
(6137 skin lesions of the head and neck - first in Hungary)

A) Coagulation.
B) Healed laser wound over the elbow joint
C) Healed laser wound over the I. MCP joint

A) Before surgery (rhinophyma)
B) Surgical site after CO2 laser vaporization and excision
C) Postoperative healed condition
Structure- and function preserving laser surgeries
(423 oral cavity, 518 pharynx, 848 larynx - first in Hungary)

Lower lip leucoplachia
A) Before surgery  B) After vaporization and coagulation  C) Healed surgical site

T₂ oropharyngeal
A) Before surgery  B) After surgery  C) Healed surgical site

Papillomatosis
Before surgery  After surgery

Residual laryngeal tumour
Before CO₂ surgery  After surgery
To perform adequate radical surgery - to preserve maximal aesthetics

• Breast Conserving Surgery
• Oncoplastic breast conserving surgery
  - volumen replacement, displacement
• Skin-, Areola-, Nipple Sparing Mastectomies
• Immediate / delayed postmastectomy breast reconstructions
To perform adequate radical surgery - by the least morbidity and mortality

- Sentinel Lymph Node Biopsy
- Double stapling technique for low anterior rectal resections
- Radiofrequency Tumor Ablation
- Transanal endoscopic microsurgery (TEM)
- VATS lobectomy
- Robotic surgery
DaVinci Robotic Surgery
To perform adequate radical surgery - on the most cost effective way

- Cases detected by population screening, early stage
- One day breast surgery
- Immediate one stage breast reconstruction
- Gastro-intestinal stanting
- Robotic Surgery
Quality of life in oncological surgery

• Able to reconstruct the missing parts of the human body
• Surgical reconstruction of function
  – Skin and musculo-skeletal, organ failure
• Reconstruction of aesthetic appearance
  restoration or improvement
• Demand of immediate non delayed reconstruction
PALLIATIVE CARE OF CANCER PATIENTS

<table>
<thead>
<tr>
<th>Provides relief from pain and other distressing symptoms;</th>
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<tr>
<td>Affirms life and regards dying as a normal process;</td>
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<tr>
<td>Intends neither to hasten nor to postpone death;</td>
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<tr>
<td>Integrates the psychological and spiritual aspects of patient care;</td>
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<tr>
<td>Offers a support system to help patients live as actively as possible until death;</td>
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<tr>
<td>Offers a support system to help the family cope during the patient’s illness and in their own bereavement;</td>
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Reconstruction and Rehabilitation

Surgical techniques are being refined that aid in the reconstruction and rehabilitation of cancer patients after definitive therapy. The ability to reconstruct anatomic defects can substantially improve function and cosmetic appearance. The development of free flaps using microvascular anastomotic techniques is having a profound impact on the ability to bring fresh tissue to resected or heavily irradiated areas. Lost function (especially of extremities) often can be restored by surgical approaches. This includes lysis of contractures or muscle transposition to restore muscular function that has been damaged by previous surgery or radiation therapy.
Strategy of the reconstructive surgery

• **Local flaps**
  - Taken from the direct vicinity

• **Pedicle flaps**
  - Skin and myocutaneous flaps taken from the vicinity
  - Skin flaps taken from more distant regions of the body
  - Transposition flap – tube flap

• **Free transplantation**
  - Full thickness skin graft
  - Split thickness skin graft
  - Transplantation of skin flap and myocutaneous flap
Left inguinal exulcerated soft tissue sarcoma, radical surgical resection and reconstruction with TFL flap
FACIAL COSMETIC UNITS AND JUNCTION LINES
“Just as we can utilize skin lines, wrinkle lines and hair to cover our scars or to minimize their unattractiveness and obviousness, we can choose, whenever possible, to make our defects and our reconstructions fit topographic units.”

*Gary C. Burget (Plastic and Reconstructive Surgery, August 1985)*
ESSENTIAL PARAMETERS OF TISSUE DEFECT

- Size
- Depth
- Condition of the subcutaneous tissue (perichondrium, periosteum, open cavity)
- Free surgical margins
CLOSING TYPES OF FACIAL DEFECTS

- Primary closing without tension and deformity
- Skin grafting
- Local flaps
- Distant flaps composed of more histology types (composite flaps)
RECONSTRUCTION METHODS

• Free skin grafting:
  in cases of superficial defects

• Flaps:
  – If deep-seated tissues are to be covered
  – If the wound base is of „poor quality”
  – If the surface to be reconstructed is exposed to great mechanic force
  – If disturbing contour hiatus would develop
  – If open cavity in body is to be closed
CLASSIFICATION OF FLAPS

- ACCORDING TO THE TISSUES CONSTITUTING THE FLAP:
  - Skin
  - Skin and fascia
  - Skin and muscle
  - Skin, muscle, bone
CLASSIFICATION OF FLAPS

- According to the mobilization method of the flap:
  - advancement flaps
  - rotation flaps
  - transposition flaps
  - subcutaneously pedicled flaps
  - interpolation flaps
  - free flaps
  - combined reconstruction
TEMPORAL DEFECT – full thickness skin graft

donor site
PREAURICULAR DEFECT
advancement flap
PREAMURICULAR DEFECT
advancement flap
TRANSPOSITION FLAPS
DEFECT OF THE INNER PALPEBRA
transposition flap
UPPER LIP DEFECT
subcutaneously pedicled flap
UPPER LIP DEFECT
subcutaneously pedicled flap
INTERPOLATION FLAP
DEFECT OF THE WING OF THE NOSE
interpolation flap
FREE FLAP RECONSTRUCTION
radial forearm flap
Introduction of new techniques for reconstructive surgery in Hungary

Pectoralis major (PM) myocutaneous flap modified by the author – first time in Hungary

   1981-1985: 50 surgeries

Localizations:
- floor of the mouth, mandible, tongue, root of the tongue
- Tonsillolinguinal area, lateral pharyngeal defects
- dorsal pharyngeal wall, circular pharyngeal defects
  (laryngectomy) Intratracheal narcosis

2. Results: based on 248 operations performed from 1981 to 2011
   - To the height of the os zygomaticum:
     • a defect of any size (4-6x8-11x1-6 cm)
     • suitable for closing a defect of any location
   - Excellent viability:
     total necrosis: 0%
     Partial: 5%
   - healing disorder of the donor site: 9%

3. Disadvantages:
   - Excess tissue volume and excess contour in case of a defect not deeper than 1 cm
   - Functional deficiency after the reconstruction of the mandible

Application of PM island flap

Resection of mandible, floor of the mouth, tongue, tonsils, base of the tongue
1. Patient group: 39 patients
   Mean age: 58.2 years (40-73)
   - Localization: tongue, lateral and anterior part of the floor of the mouth
   - Stage: $T_2N_0M_0$ - $T_4N_0M_0$, respectively $T_2N_2M_0$
   - Size of tissue defect: 3-5x2-3 cm

2. Results:
   - **flap necrosis complete:** 0%
   - **partial:** 4%
   - Anatomical-functional-aesthetic restitution
     ad integrum
   - Avoidance of disadvantages concomitant to other techniques

A) Superficial tissue loss on the floor of the mouth
B) Donor site
C) Suturing of nasolabial flap mobilized from two sides to the tissue defect
D) Oral cavity after complete wound healing

Application of bucca transposition flap

1. Patient group: 11 patients
- Localization: oral cavity, lateral-dorsal wall of the oropharynx, soft palate
- Stage: T$_2$-T$_4$N$_0$M$_0$, resp. T$_2$N$_2$M$_0$ (1 recurrence, 1 residuum)
- Size of tissue defect: 4x2-7x3,5x <1 cm
- Postop. irradiation: 50-66 Gy

2. Results:
- **Flap necrosis 0%**

A) Bucca flap transposed to the palate.
B) The transposed buccal flap on day 21.
C) The transposed buccal flap after 3 months

Application of forearm free flaps with microvascular anastomosis for oral cavity defects

1. Patient group: 288 patients, 1993-2011
   - average age: 51 years (26-77), male/female: 10:1
   - location: any site in the head-neck
   - Size of the tissue defect: 4-8x6-10x <1 cm

2. Results:
   - Primary wound healing: 87 %
   - Flap necrosis (initially venous circulatory disturbance):
     - complete 13%
     - partial 2%
   - Acceptable anatomical and functional reconstruction:100 %
     - acceptable: 87%
     - restitutio ad integrum: 7%
   - Complications:
     - Dysphagia 2%
     - Aspiration 2%
     - Wound healing disorder at donor site: 4,5%
     - Secondary wound healing 3%
     - Digital motility disorder 1%

Application of fibula free flaps with microvascular anastomosis for mandible and soft tissue defects

1. Patient group: 1995-2011, 39 patients
   - Mean age: 50.6 years (38-66) male/female: 32:7
   - Localization:
     - different areas of the mandible and surrounding soft tissue
   - Stage: $T_{3(6)-4(33)}^N_{0(8)-1(31)}M_0$

2. Results:
   - Flap necrosis (complete): 18% (venous circulation disorder)
   - Complication of donor area 0%
     - knee and ankle stability is perfect
   - Full recovery: 82%
   - Avoiding laryngo-pharyngectomy
   - Anatomical restitution ad integrum
   - Functional (occlusion, chewing, speech) and aesthetical restitution is satisfactory, dental rehabilitation is possible

ASSESSMENT OF THE THERAPY RESPONSE: SD EARLY SALVAGE SURGERY

Resection of mandible, floor of the mouth, tongue
EARLY SALVAGE OPERATION

Reconstruction: fibula free flap
LATE SALVAGE OPERATION

Progressive disease during radiotherapy
Postmastectomy breast reconstruction
Skin envelope (area, quality)
IMF
NAC
Volume (autologeous, implant)
Soft tissue coverage of the implant
Symmetry
Scars

Areola-sparing mastectomies and immediate breast reconstructions with silicone implants and Ultrapro mesh for lower pole strengthening
Latissimus dorsi myocutaneous flap reconstruction
Combined breast reconstruction: LD myocutaneous soft tissue reconstruction on the right side and delayed-immediate reconstr. with expander and silicone implant on the left side by a BRCA mutation holder very young cancer patient.
The results after symmetrisation


Pedicled TRAM flap reconstruction, after flap delay
Thank You for Your attention!