GYN GEC-ESTRO/ICRU 89
Target Concept

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Historical difficulties in communicating results of cervical BT due to different traditions (60 Gy reference volume, point A…, midline block)

- CTV according to GTV at diagnosis?
- CTV according to GTV at BT?

Building the tower of Babel (confusion of languages)
Brueghel, 16th century (1563)
Vienna, Museum of Fine Arts

We need a common language!
ICRU RELEASES REPORT NO. 89
Prescribing, Recording, and Reporting Brachytherapy for Cancer of the Cervix

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Anlagen: 2016 05 25 ICRU Report 89 ~1.pdf (238 KB) [In Browser öffnen]

The PDF copy of ICRU Report 89 is now available on OUP’s website http://jicru.oxfordjournals.org/

I have attached the Press Release for your use at the World Congress meeting in San Francisco. As soon as I receive the “final” PDF file from OUP I will email it to you.

When I receive my hardcopies I will mail them out to the committee membership.

Thank you.
Laura
Purpose of the ICRU/GEC ESTRO Report 89

To provide common concepts and terms for

* volumes, in particular initial/residual GTV
  initial/adaptive CTV and OAR (3D/4D)
* radiobiological variations (equi-effective dose)
* dose volume parameters (3D/4D)
* the process from planning aims to prescription
* dose point parameters (2D)
* different levels of clinical practice (level 1, 2, 3)
ICRU report 89 (258 pages)

Prescribing, Recording, and Reporting Brachytherapy for Cancer of the Cervix

Chapter (1) – Introduction
Chapter (2) – Prevention, Diagnosis, Prognosis, Treatment and Outcome
Chapter (3) – Brachytherapy Techniques and Systems
Chapter (4) – Brachytherapy Imaging for Treatment Planning
Chapter (5) – Tumor and Target Volumes and Adaptive Radiotherapy
Chapter (6) – Organs At Risk and Morbidity-Related Concepts and Volumes
Chapter (7) – Radiobiological considerations
Chapter (8) – Dose and Volume Parameters for Prescribing, Recording, and Reporting Brachytherapy, Alone or combined with External Beam Therapy
Chapter (9) – Volumetric Dose Assessment
Chapter (10) – Radiographic Dose Assessment
Chapter (11) – Sources and Absorbed-Dose Calculation
Chapter (12) – Treatment planning
Chapter (13) – Summary of The Recommendations

Appendix A: 9 Comprehensive Clinical Examples (various clinical/technical scenarios)
Target volume concepts

**High Risk CTV:**
GTV at time of brachytherapy
In all cases includes:
- GTV + whole cervix
- Presumed tumour extension in adjacent tissues
  - Clinical assessment
  - Residual grey zones on MRI

**Intermediate Risk CTV:**
GTV at time of diagnosis
In all cases includes:
- HR-CTV
- Integrates initial GTV
SAFETY MARGINS:
1-1.5 cm cranially
0.5 cm antero-posteriorly
1 cm laterally

NO SAFETY MARGINS
Target volume concepts

High Risk CTV (IB1):

GTV at time of brachytherapy

In all cases includes:

- Whole cervix
- MRI and clinical assessment

NO SAFETY MARGINS
Stage IB1
Stage IB1
1. Limited disease (tumour size < 4cm)

Definition of GTV

Clinical Examination: macroscopic tumour

MRI Findings:
- High signal intensity zone in cervix
1. Limited disease (tumour size < 4cm)

Definition of HR-CTV:

GTV + whole cervix

GTV
HR CTV

7 mm 11 mm
18 mm 18 mm
18 mm 18 mm
14 mm
24 mm
36 mm
1. Limited disease (tumour size < 4 cm)

Definition of HR-CTV:

GTV + whole cervix

![Diagram showing GTV and HR CTV with dimensions]
1. Limited disease (tumour size < 4cm)

**Definition of IR-CTV**

HR CTV + safety margin  
(area of adjacent significant microscopic tumour load)

5 mm anterior – posterior  
10 mm into parametria
1. Limited disease (tumour size $<4\text{cm}$)

**Definition of IR-CTV**

HR CTV + safety margin
(area of potential adjacent significant microscopic tumour load)

- 5 mm anterior–posterior
- 10 mm into parametria
- +/- additional 5 mm
- 10 mm into the corpus
- 10 mm into the vagina
Adaptive MRI based planning concept

Dimopoulos et al. IJROBP 2006
Dimensions (cm):
Width: 7
Thickness: >5
Height: >5
Vaginal inv.: 0.5
(right fornix)

Findings at time of diagnosis

Dimensions (cm):
Width: 3.5
Thickness: 2
Height: 2
Vaginal inv.: 0

Findings at time of brachytherapy

Fig. 5.1
Various patterns of tumor response and adaptive CTV

Residual GTV
Residual pathologic tissue

Adaptive CTV

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Fig. 5.4
Overview of adaptive target concept in cervix cancer

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Fig. 5.9-11
Initial GTV, Residual GTV, Residual Pathologic Tissue

infiltrative outer half
→ grey and bright zones

expansive with spiculae + infilt. part
→ grey zones in the PM

expansive with spiculae
→ no pathologic tissue in the PM
Target volume concepts

High Risk CTV (IB2):

Residual GTV at time of brachytherapy (bright (MRI))

In all cases includes:

- Whole cervix
- (intra-uterine GTV extension)

NO SAFETY MARGINS
Stage IB2
Stage IB2
Stage IB2
Stage IB2: initial clinical examination

**Dimensions (cm):**
- **Width:** 6
- **Thickness:** 5
- **Height:** 5

**Infiltrating**
- Cervix
- Vagina
- Parametrium
- Rectum or Bladder

**Exophytic**
Stage IB2: initial MRI
Stage IB2: at the time of brachytherapy

Dimensions (cm):

Width: 2.5
Thickness: 2
Height: 2.5
Stage IB2 : at the time of brachytherapy
Stage IB2
Stage IB2
Stage IB2
High Risk CTV (IIB):

Residual GTV at time of brachytherapy
Residual pathologic tissue at time of brachytherapy

In all cases includes:
- Whole cervix
- Residual GTV (clinical and MRI)
- Residual pathologic tissue (clinical and MRI (grey zones)) located within the initial GTV

NO SAFETY MARGINS
Overview of adaptive target concept in cervix cancer

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Fig. 5.9-11
Stage IIB: initial clinical examination

**Dimensions (cm):**

- Width: 5
- Thickness: 5
- Height: 5
- Fornix involved 1
Stage IIB : initial MRI
Stage IIB: at the time of brachytherapy

**Dimensions (cm):**
- Largeur: 3
- Epaisseur: 3
- Hauteur: 3
- Env. vaginal: 1
Stage IIB: MRI at the time of brachytherapy
Tumor at time of diagnosis.
Stage IIB
Stage IIB
High Risk CTV (IIIB):

Residual GTV and Residual pathologic tissue at time of brachytherapy

In all cases includes:
- Whole cervix
- Residual GTV (clinical and MRI)
- Residual pathologic tissue (clinical and MRI (grey zones)) located within the initial GTV

NO SAFETY MARGINS
Overview of adaptive target concept in cervix cancer

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Fig. 5.9-11
Stage IIIB: initial clinical examination

Dimensions (cm):
Width: 6
Thickness: 4
Height: 4
Stage IIIB: initial MRI

40 mm

45 mm

62 mm
Stage III B: at the time of brachytherapy

**Dimensions (cm):**
- Width: 4.5
- Thickness: 3
- Height: 3
Stage IIIB: MRI at the time of brachytherapy
Stage III B
Stage IIIB
Stage IIIB
Stage IIIB
Stage IIIB
HR and IR-CTV
Extent at diagnosis and degree of remission

Complete remission

Good partial remission

Poor partial remission

No remission

Initial tumour extension
Residual disease

HR-CTV
IR-CTV
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0.5cm antero-posteriorly
1cm laterally
GYN GEC ESTRO and ICRU RECOMMENDATIONS
From 2D to 3D/4D

Historical difficulties in communicating results of cervical BT due to different traditions (60 Gy reference volume, point A..., midline block)

• CTV according to GTV at diagnosis: IR CTV
• CTV according to GTV at BT: HR CTV

We have a common language: GEC ESTRO/ICRU
We should apply as much as possible
Gyn GEC ESTRO Recommendations are applicable for Gyn BT in general (vagina, endometrium, vulva, recurrent tumours)

Clinical examples

1. Limited disease (tumour size < 4cm)
2. Large tumour, sufficient response
3. Large tumour, insufficient response
1. Limited disease (tumour size < 4cm)

Definition of GTV

Clinical Examination:
macroscopic tumour

MRI Findings:
- High signal intensity zone in cervix
1. Limited disease (tumour size < 4cm)

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HR CTV

GTV

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5 mm anterior –posterior
10 mm into parametria

GTV
HR CTV
IR CTV

10 mm into the corpus
10 mm into the vagina

+/- additional 5 mm
Clinical examples

1. Limited disease (tumour size < 4cm)
2. Large tumour, sufficient response
3. Large tumour, insufficient response
2. Large tumour - sufficient response

**INITIAL clinical findings:**
- St.p. Conisation, Cervix to the right
- Invasion of:
  - Right and dorsal fornix
  - Right PM to middle 1/3
- Left PM free

**Clinical findings at BT:**
- No macroscopic residuum in vagina
- Residuum in:
  - Right PM - inner third
Clinical examples

1. Limited disease (tumour size < 4cm)
2. Large tumour, sufficient response
3. Large tumour, insufficient response
3. Large tumour-insufficient response

- **Initial findings:**
  - No invasion of vagina
  - Distal involvement of right parametrium (clinical)
  - Proximal invasion of the left parametrium

- **Findings at brachytherapy:**
  - Residual disease right parametrium middle third
  - No invasion of left parametrium
3. Large tumour-insufficient response

GTV<sub>D</sub>

GTV<sub>B</sub>

HR-CTV

IR-CTV
Gyn GEC ESTRO Recommendations are applicable for Gyn BT in general (vagina, endometrium, vulva, recurrent tumours)