

BRACHYTHERAPY PLAN EVALUATION : INTRACAVITARY & INTERSTITIAL APPLICATIONS

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WHAT TO EXPECT?

- How to do
- Useful tips
- How do I do it
- What are the variations or compromises

BROAD COMPONENTS OF PLAN EVALUATION

- DISPLAYING AND INTERPRETATION OF DOSE DISTRIBUTIONS
- PRESCRIPTION AND SCORING OF PLANS
- SUMMARY

QUANTITATIVE

DVH- WHY DVH

- HUGE INFO TO ASSESS
- QUANTIFICATION IS TOUGH VISUALLY
- DIFFICULT TO UNDERSTAND DOSE AND ANATOMY IN 3D
- DOSE IS A SUUROGATE FOR THE CLINICAL OUTCOME

DVH PROBLEMS

- INSENSITIVE TO SMALL HOT AND COLD SPOTS
- SHAPE OF DVH ALONE CAN BE MISLEADING
- DVH CALCULATED ONLY FOR DEFINED VOI

SO

- QUALITATIVE PLUS QUANTITATIVE

GYNAECOLOGICAL CANCERS

- Cervix
- Endometrium

ACHIEVABLE AND ACCEPTABLE

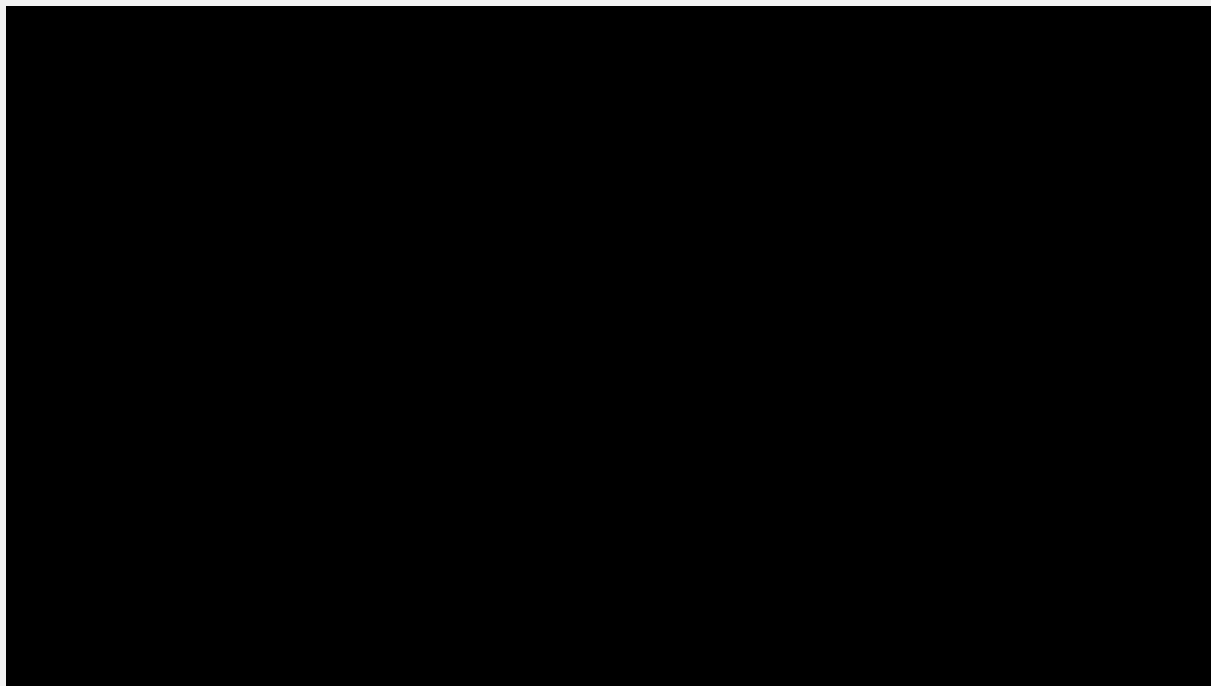
volume			Planning aim	Prescribed dose
CTV _{HR}	D ₉₀	EQD2 ₁₀	≥ 85Gy	
BLADDER	D _{2CC}	EQD2 ₃	≤ 90Gy	
RECTUM	D _{2CC}	EQD2 ₃	≤ 70Gy	
SIGMOID	D _{2CC}	EQD2 ₃	≤ 70Gy	

EBRT-45Gy/25Fr/5Fr/WK PLUS HDR BRACHY 6.5GyX4Fr

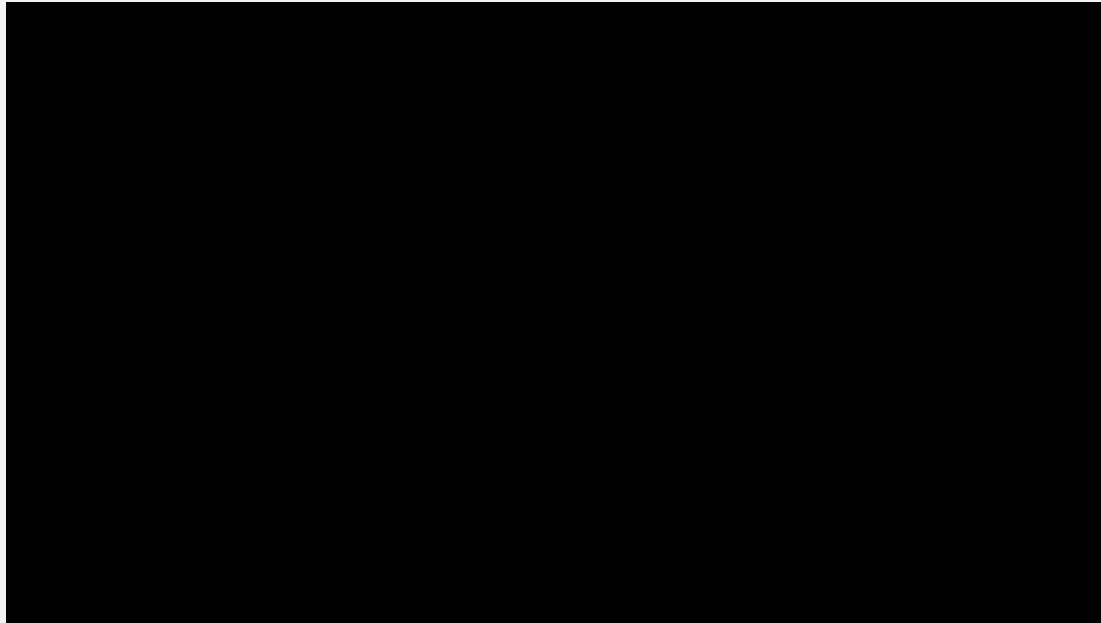
STEP WISE PLAN EVALUATION IN OUR DEPT

- ICBT
- ISBT

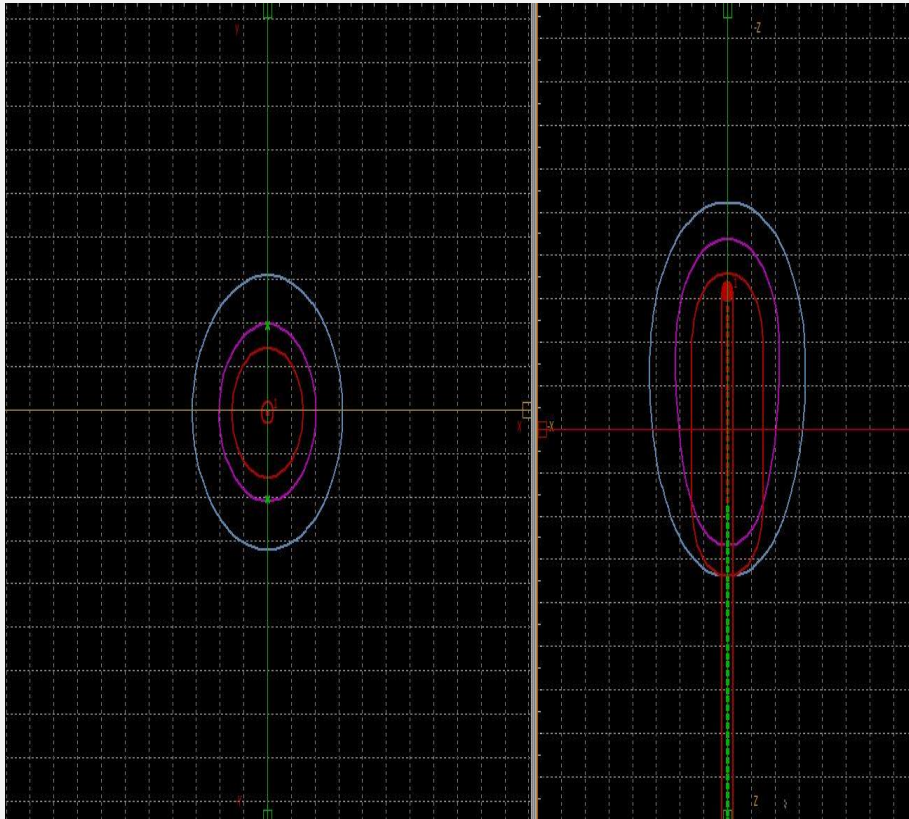
ICBT



ISBT



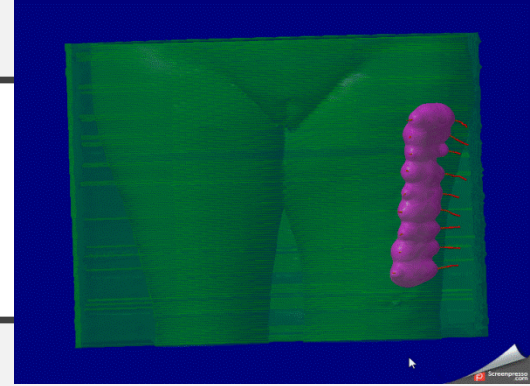
VAGINAL SORBO



Things to watch out for

- Dose: 5.5Gyx2-4Fr
- Prescription at 5mm from surface
- Length and diameter of the sorbo is individualised.
- Introitus should always be watched out as reactions will be severe if included by mistake.

SOFT TISSUE SARCOMA



Things to watch out for

- Dose -3.5Gyx10Fr or as boost 3.5Gyx4-6Fr
- Prescription to covering isodose or volume
- Hyperdose sleeve- avoid confluent areas
- Skin -100%should not go as necrosis is a possibility
- Watch for NVB while prescribing

HEAD AND NECK CANCER

- Lip
- Tongue
- Nasopharynx

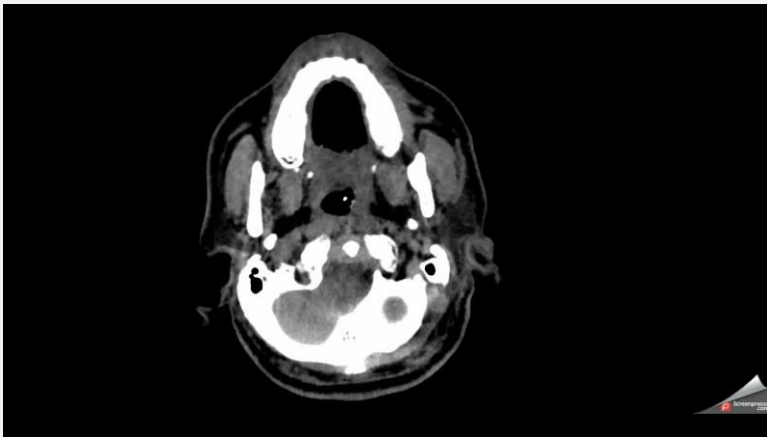
LIP

Things to watch out for

- 3.5Gyx10Fr or 3.5Gyx4-6Fr
- Prescription to volume or covering isodose
- Implant will be the volume
- Hyperdose sleeve should be a minimal area with no confluence
- 200% < 2cc
- Away from bone and skin

TONGUE

Things to watch out for



- 3.5Gyx10Fr or 3.5Gyx4-6Fr
- Prescription to volume or covering isodose
- Implant will be the volume
- Hyperdose sleeve should be a minimal area with no confluence
- 200%<2cc
- Away from bone and skin

NASOPHARYNX

Rotterdam applicator



Things to watch out for

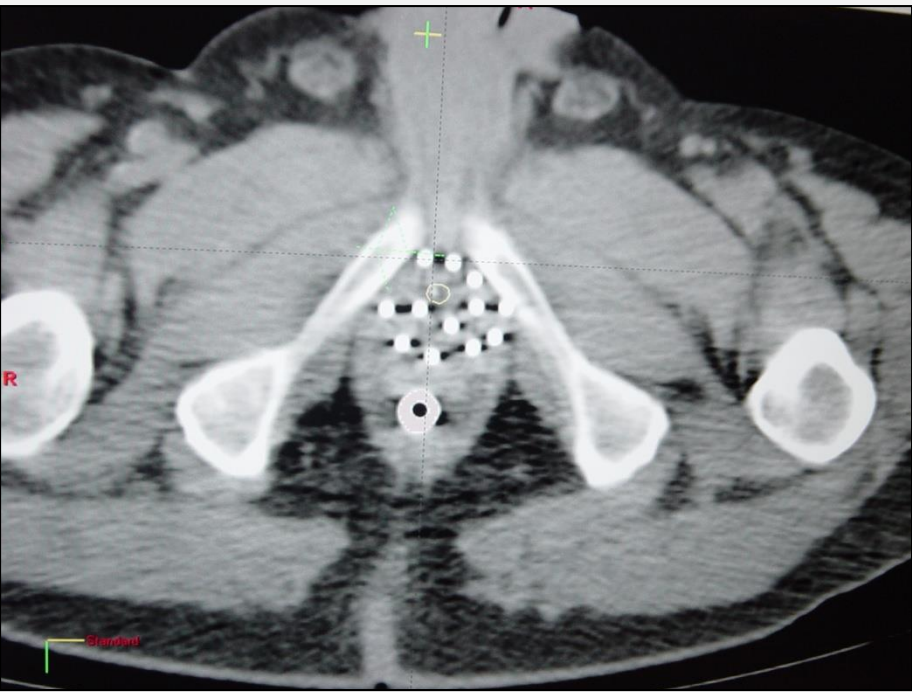
- Based on external radiation dose
- Or if salvage then appropriate dose

DNR IN HEAD AND NECK CANCER

- DOSE NONUNIFORMITY RATIO

$V_{100}/V_{150} < 0.4$ USUALLY

PROSTATE CANCER



GEC/ESTRO recommendations on high dose rate afterloading brachytherapy for localised prostate cancer: An update

Peter J. Hoskin^{a,*,1}, Alessandro Colombo^{b,1}, Ann Henry^{c,1}, Peter Niehoff^{d,1}, Taran Paulsen Hellebust^{e,1},

Radiotherapy and Oncology 107 (2013) 325–332

OAR CONSTRAINTS

- Rectum: D2 cc \leq 75 Gy EQD₂
- Urethra:
 - o D0.1 cc = \leq 120 Gy EQD₂
 - o D10 \leq 120 Gy EQD₂
 - o D30 \leq 105 Gy EQD₂

RECURRENT PROSTATE

36 Gy in 6 fractions [44].

21 Gy in 3 fractions [45].

30 Gy in 2 fractions to peripheral zone after 30–40 Gy external beam [46].

PERSONAL PRACTICE

- HDR 11.5Gy x 2 fractions
- EBRT 50 Gy / 1.8 – 2.0 Gy / FRACTION
- Max. urethral dose \leq 125% MPD
- MPD allowed to indent few mm anteriorly
but still covered by 80% isodose
- Higher doses to posterolateral portions (anatomic rationale)
150-200%
- Rectal dose \leq 75%

OUR EXPERIENCE

TOTAL –ICBT-5 I 5 AND ISBT 298

Brachytherapy 19 (2020) 457e461

CTV _{HR}	D ₉₀	EQD2 ₁₀	76-88Gy
BLADDER	D _{2CC}	EQD2 ₃	66-76Gy
RECTUM	D _{2CC}	EQD2 ₃	62-66Gy
SIGMOID	D _{2CC}	EQD2 ₃	58-62Gy

FOR READING

- Brachytherapy 11(2012) 47-52
- Radiotherapy & Oncology 78(2006) 67-77
- Radiotherapy & Oncology 68(2003) 269-276

THANK YOU