DIPARTIMENTO ONCO-EMATOLOGICO E DI MALATTIE INFETTIVE

U.O.C. RADIOTERAPIA

Dir.: Dr. Luciano Armaroli

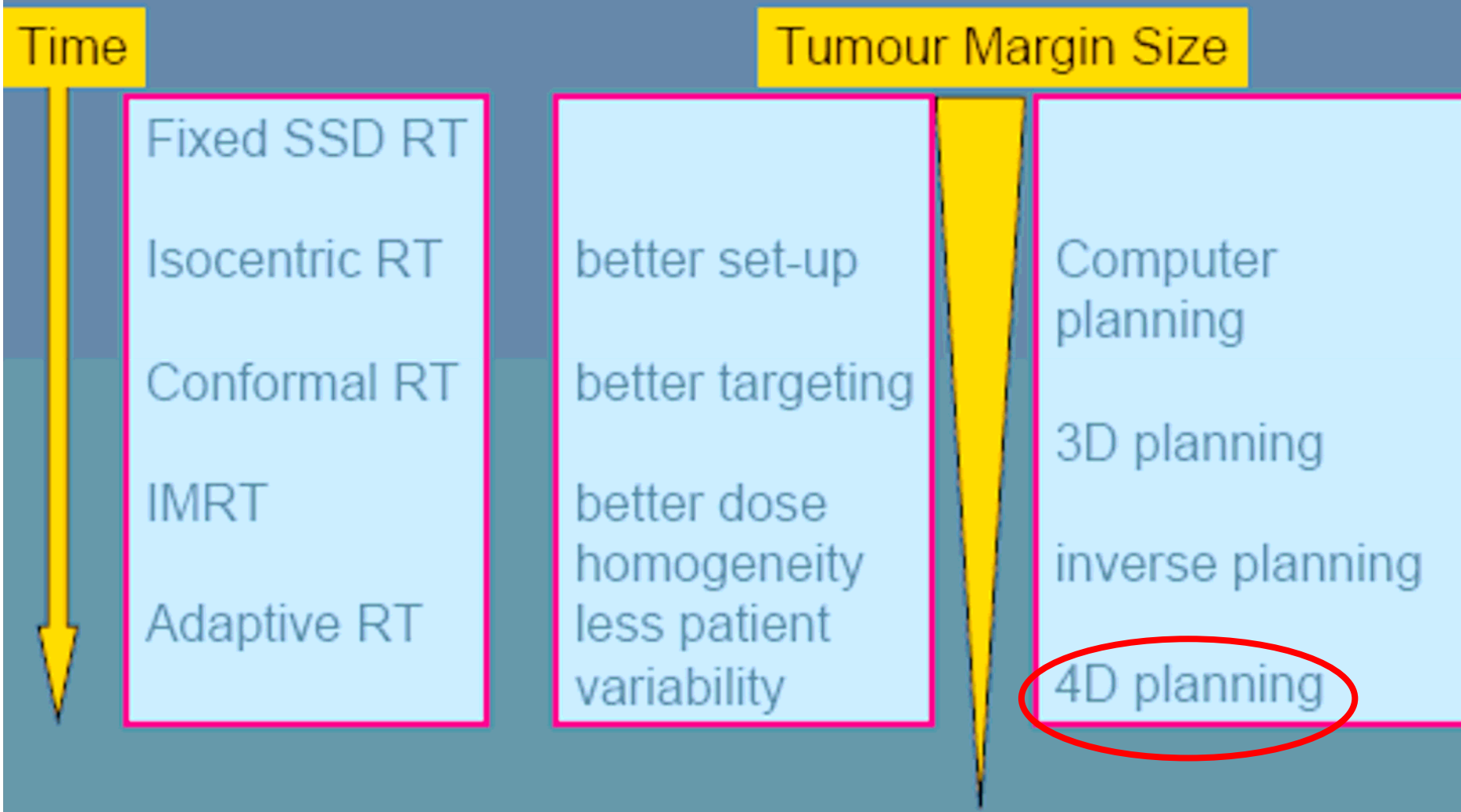
Nuove acquisizioni:

TOMOTERAPIA

IORT

O.R.I.A. 4/6/2008

Evolution of Radiotherapy



EORTC Radiotherapy Group Consensus Meeting on **High Dose/High Precision** in Radiotherapy, **Geneva**, Switzerland, January 15-16, **1993**. ...

Per **RT conformazionale**:

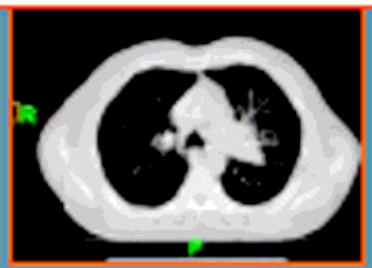
- TC
- 3d TPS
- Riproducibilita' con:
  - ✓ SISTEMI DI IMMOBILIZZAZIONE
  - ✓ EPID (VERIFICA RADIOGRAFICA DELLA POSIZIONE)

The adaptive radiotherapy loop

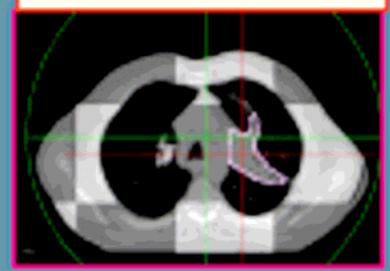
Patient data acquisition

Treatment plan optimization

Pre-treatment verification



Adjustment (if required)

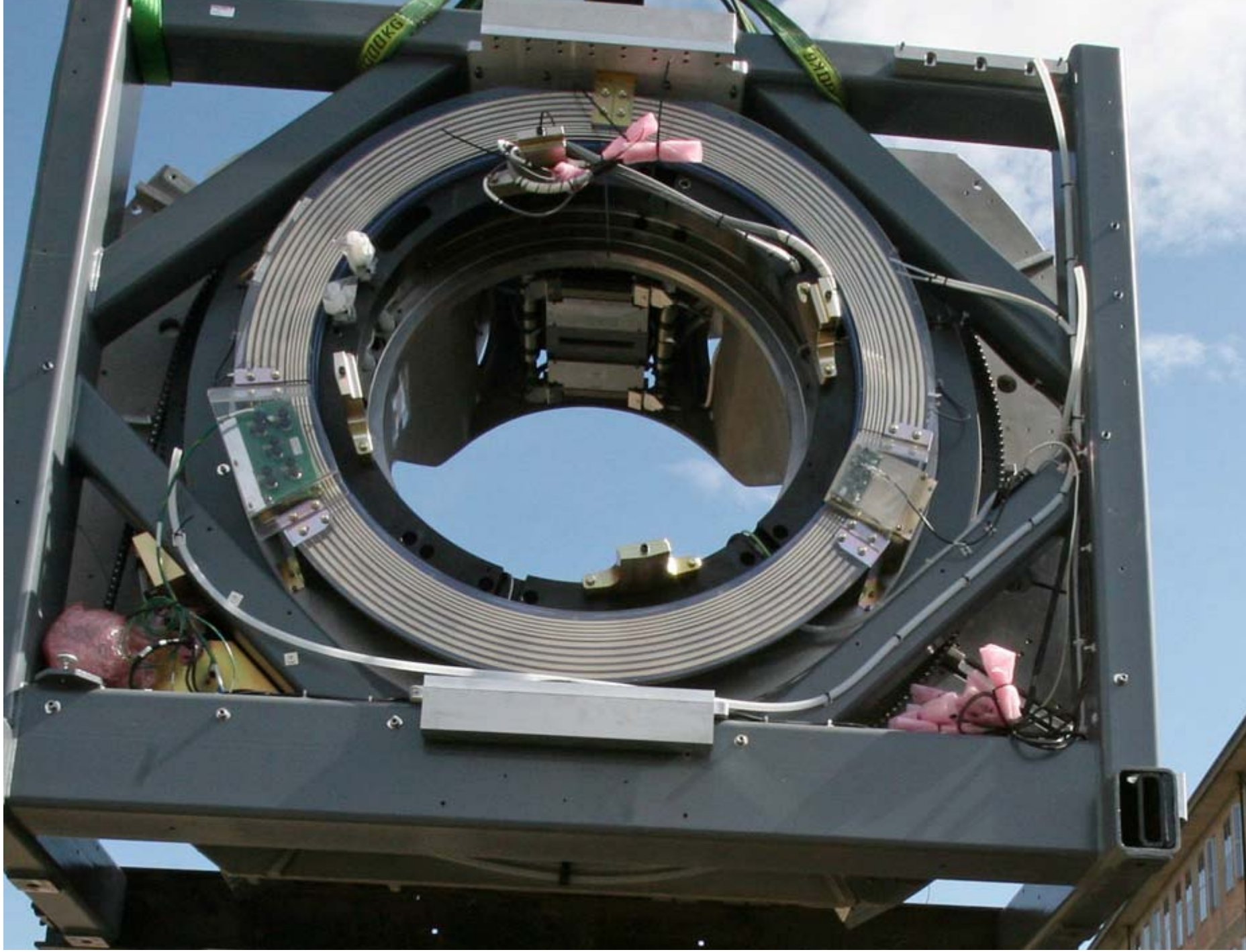


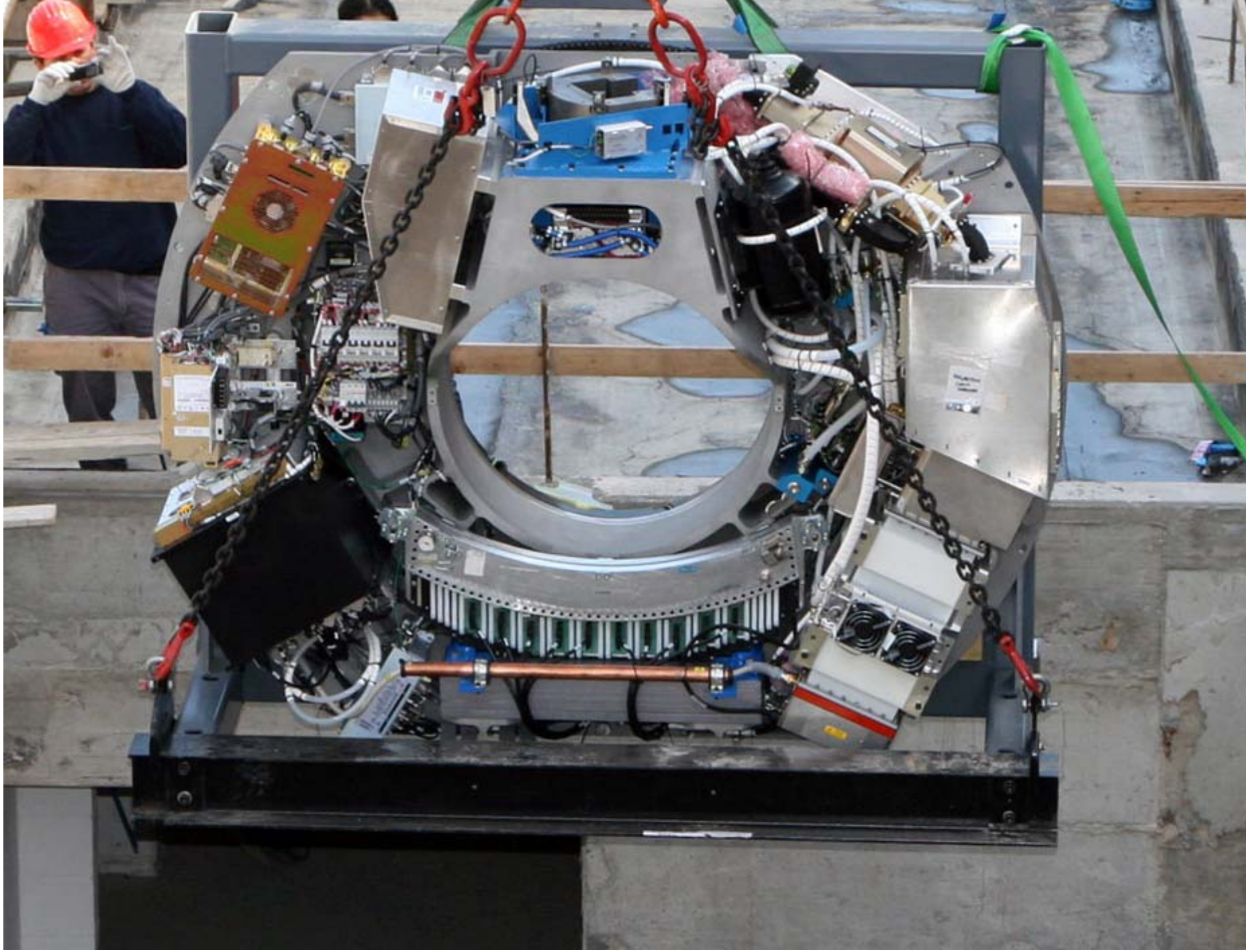
Treatment

Verification

Assessment of delivery

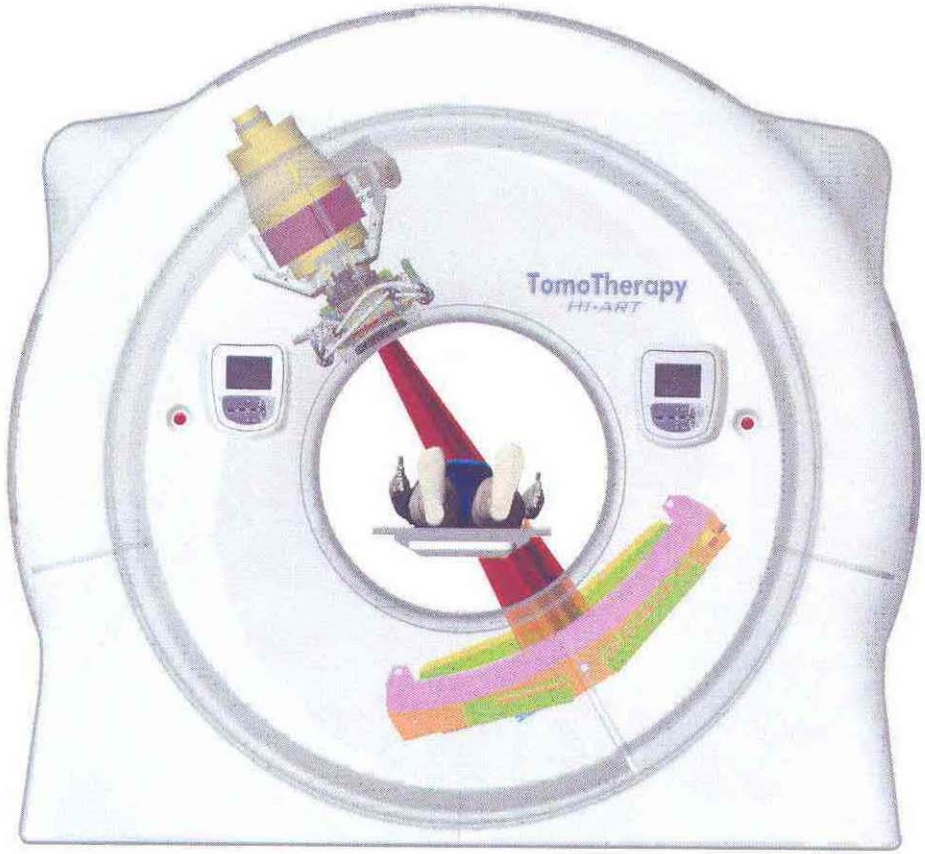
ok





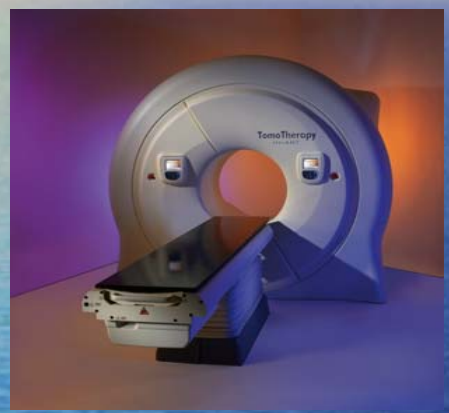
Tomo Features Summary

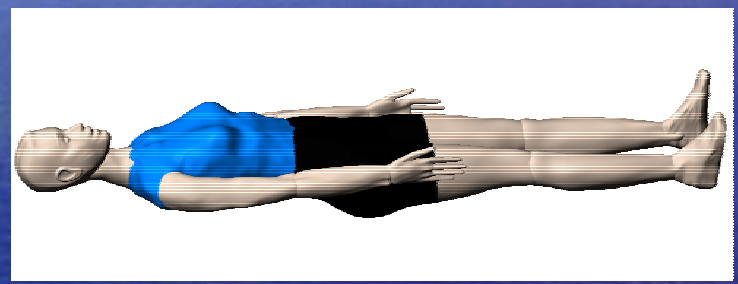
- Integrated, stand-alone system.
- Linac mounted on CT gantry.
- 6 MV helical IMRT.
- Constant gantry rotation rate and couch velocity.
- Field size 40 cm x {1 cm, 2.5 cm, or 5 cm}.
- Binary MLC's.
- Increased shielding for highly modulated delivery.



Tomotherapy Hi-ART
(Highly integrated Adaptive RadioTherapy)

Helical Tomotherapy: CT scanner a megavoltaggio, specificamente designato per erogare trattamenti IMRT





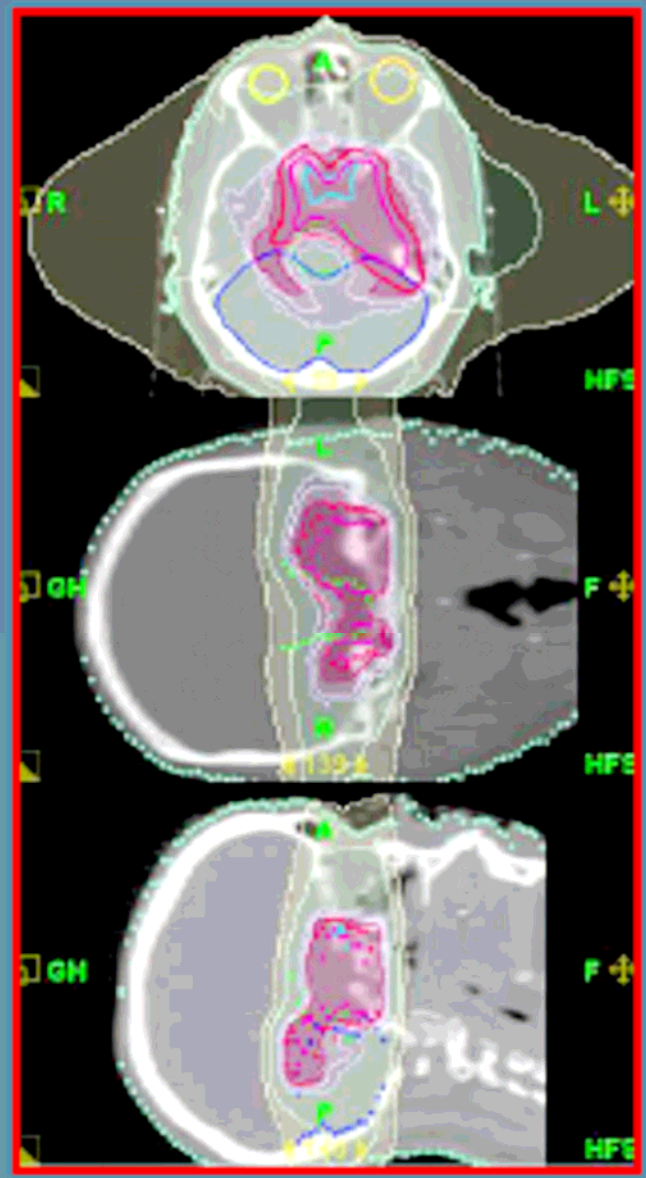
IMRT
sistema IMRT dedicato

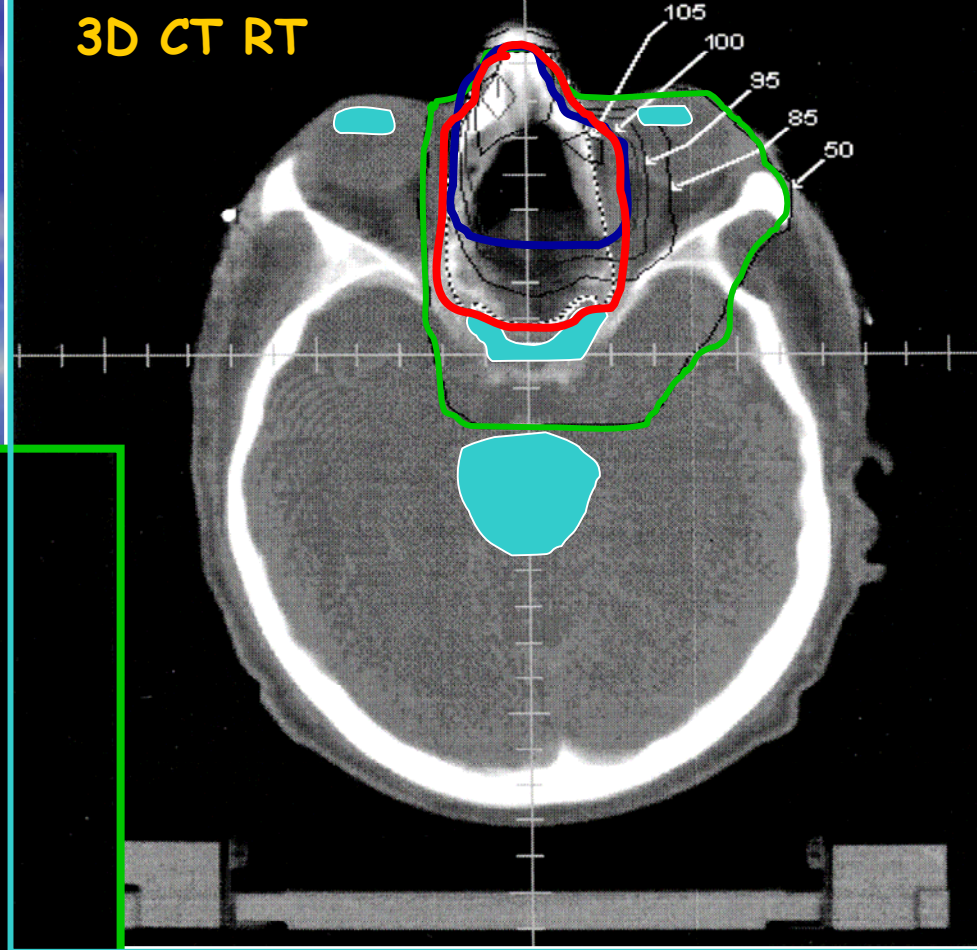
IGRT:
Sistema integrato Image Guided che permette l' acquisizione di immagini MVCT utilizzando la stessa sorgente di trattamento

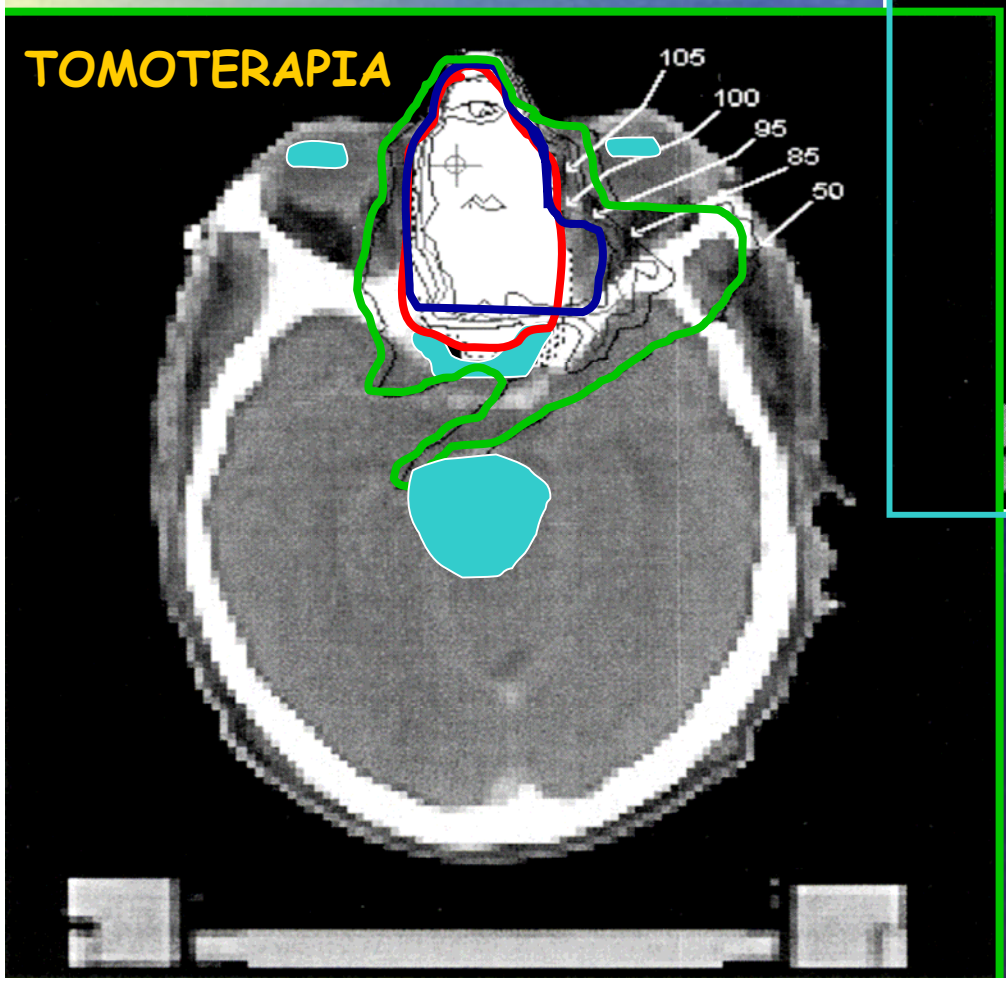
INTEGRAZIONE

Tomotherapy

- "arc" type dose distribution
- excellent avoidance of normal tissues
- Dose "conforms" to target
- "Hit the tumor and miss the patient"
- Online cross sectional (MVCT) imaging for positioning and organ motion correction



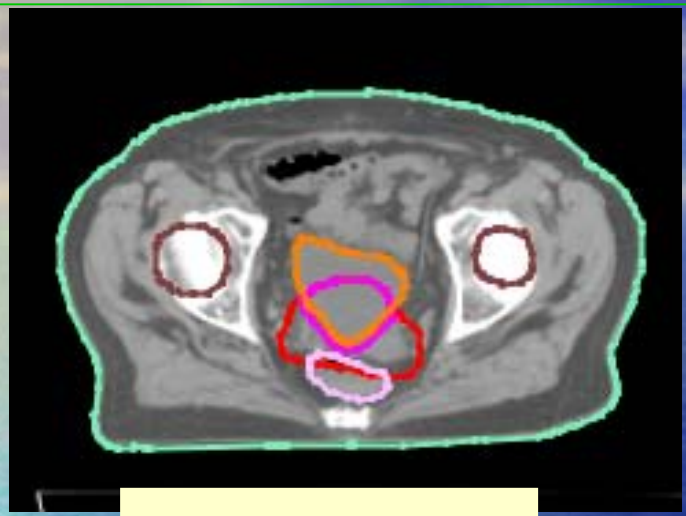




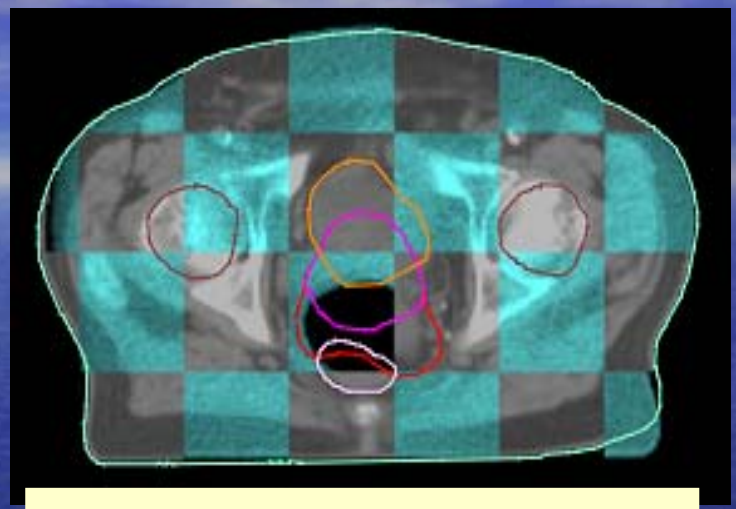
G.STORME et Al.

Cancer/Radiother. 2000,4:433-42

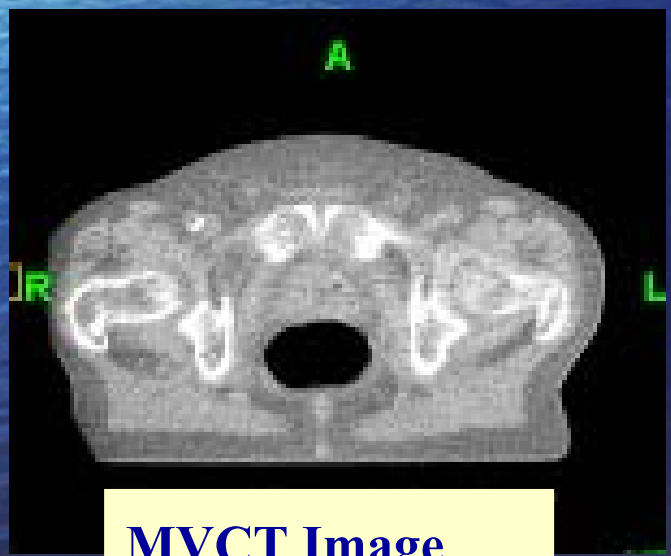
Irradiazione prostata: allineamento "TARGET" e distribuzione di dose



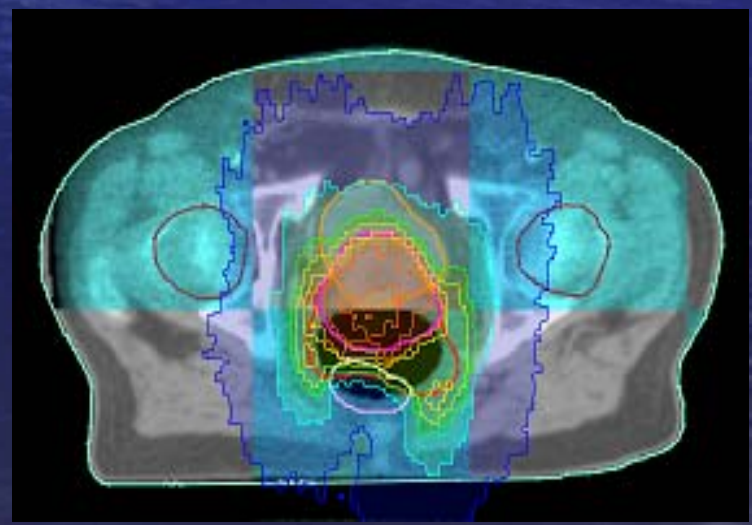
KVCT Image



KVCT/MVCT Images



MVCT Image



CLINICA

- ✓ Significant reduction of acute toxicity ..in WPRT of prostate ca. treated with HT

  Radioth. Oncology 84(2007) 164-170

- ✓ Evidence of limited motion of prostate ..assessed by daily MVCT of HT

  Intl.Journ.Radiation Onc.Biol.Phys. 2008 in press

CLINICA

- Ca. della Prostata:

✓ Dose ad anse intestinali ridotta <30-35 Gy per WPRT (sec. Classi di rischio NCCN /Roach 3)

Radioth. Oncology 84(2007)164-170

✓ MVCT con BM riduce < 4% la necessita' di correzione con DV (purche' retto vuoto..

Intl.Journ.Radiation Onc.Biol.Phys.
in press

CLINICA

✓SIB for nasopharynx ca. with HT

Strahlenter. Onkol. 2007, 9

✓Significant improvement in normal tissue sparing and "target" coverage for H&N by HT

Radioth. Oncology 78(2006) 276-282

CLINICA

- Ca. del Rinofaringe:

- ✓ Riduzione D_m alle parotidi (25 Gy vs 30 Gy) e laringe (27.6 vs 48.9)
- ✓ "Copertura" maggiore PTV (98 vs 95%)
- ✓ Dose integrale a IV >6%
- ✓ Slot/paz (inclusa MVCT)= equivalente

Strahlenter Onkol 2007, 9

- H&N: (con SIB)

- ✓ Ridotta dose a parotidi (-6 Gy), MS e mandibola, maggiore copertura PTV
- ✓ Dose integrale a IV>10%

Radioth. Oncology 78(2006) 276-282

AZIENDA UNITÀ SANITARIA LOCALE REGGIO EMILIA

CRO AVIANO

TOMOTERAPIA

Aviano 15-19 Ottobre 2007

Gruppo I°

TSRM C. Monteduro
Dr.ssa D. Ramundo
TSRM G.Tagliavini

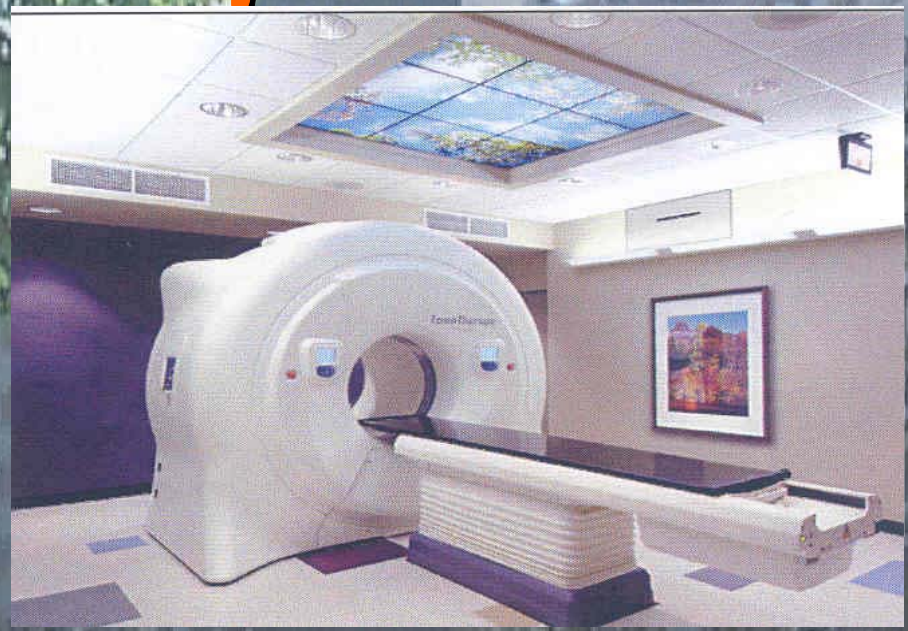
TOMOTHERAPY

Oncologisch Centrum
Dienst Radiotherapie
UZ
BRUXELLES *18-24 Nov. 2007*

Dr. L.Armaroli
TSRM E.Abbati
TSRM N.Moretti

Stage di TOMOTERAPIA

26-29febbraio 2008



IRCCS San Raffaele - Milano

TSRM C. Daolio

Dr. P. Maifredi

TSRM R. Raffaelli

TSRM R. Saccani

Tomoterapia

Clínica " La Milagrosa" Madrid.

Madrid 21-24 Aprile 2008

Dr. L. Armaroli

TSRM: E.Abbati, B.Codeluppi, N. Moretti

Rosselli S.

grupo imo

instituto madrileño de oncología

APBI
(Accelerated Partial Breast Irradiation)

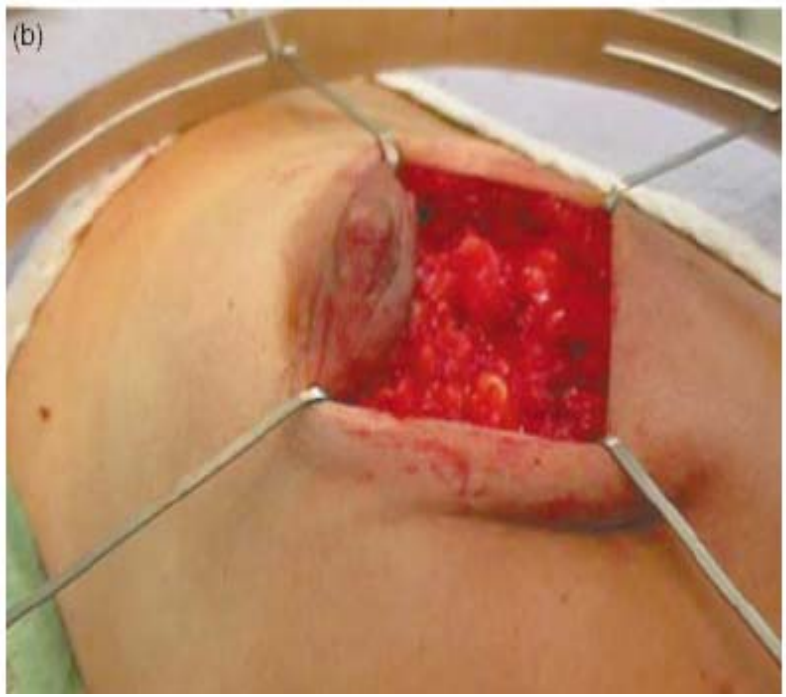
- EBRT (external beam radiotherapy)
- IORT (intra-operative radiotherapy)
- BRACHYTHERAPY (after-remote loading)

(A) LIAC/INFO & TECH (UDINE)

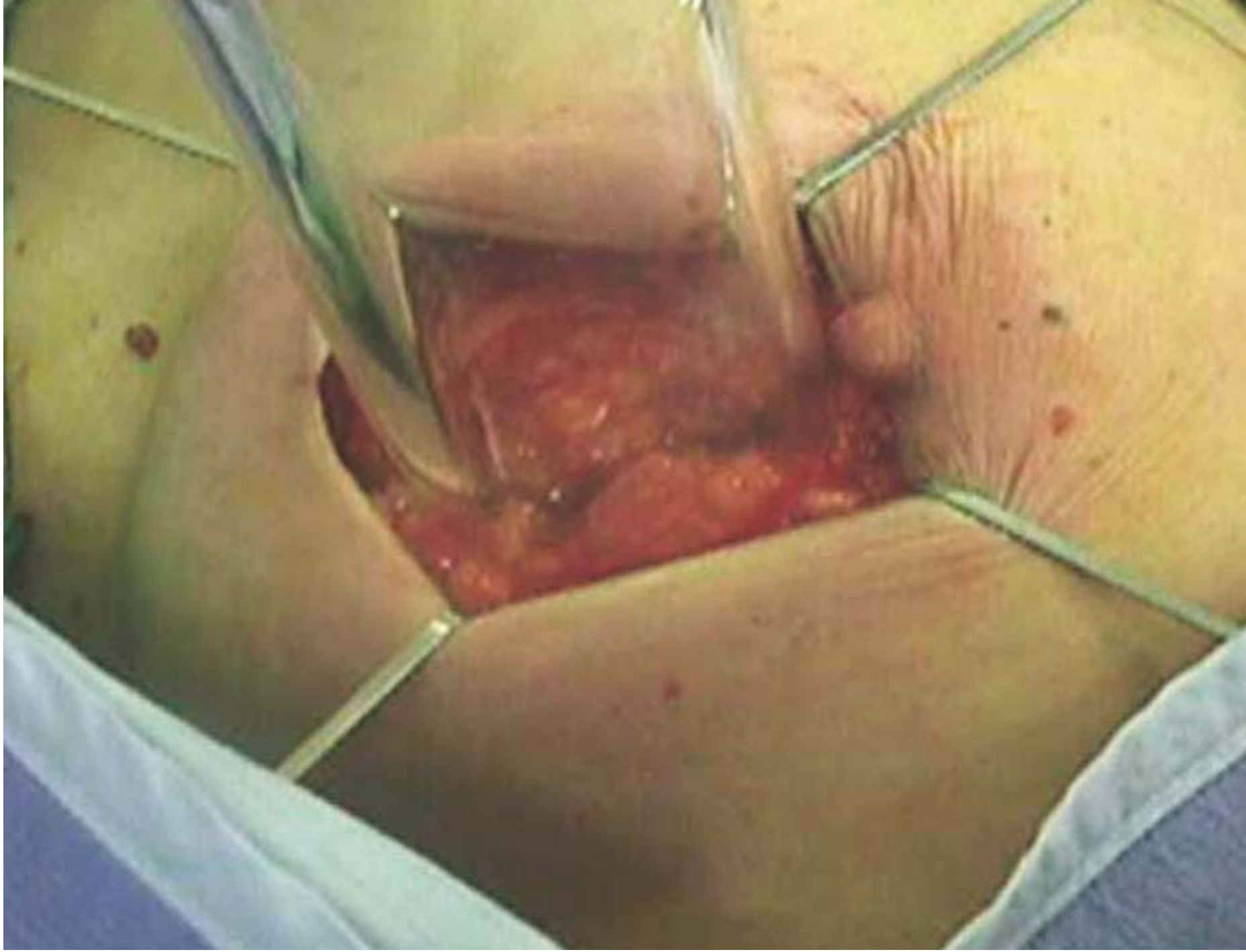
(B) NOVAC 7/HYTESIS (LATINA)


(a)


(a)


(b)


(b)



Isodose curves

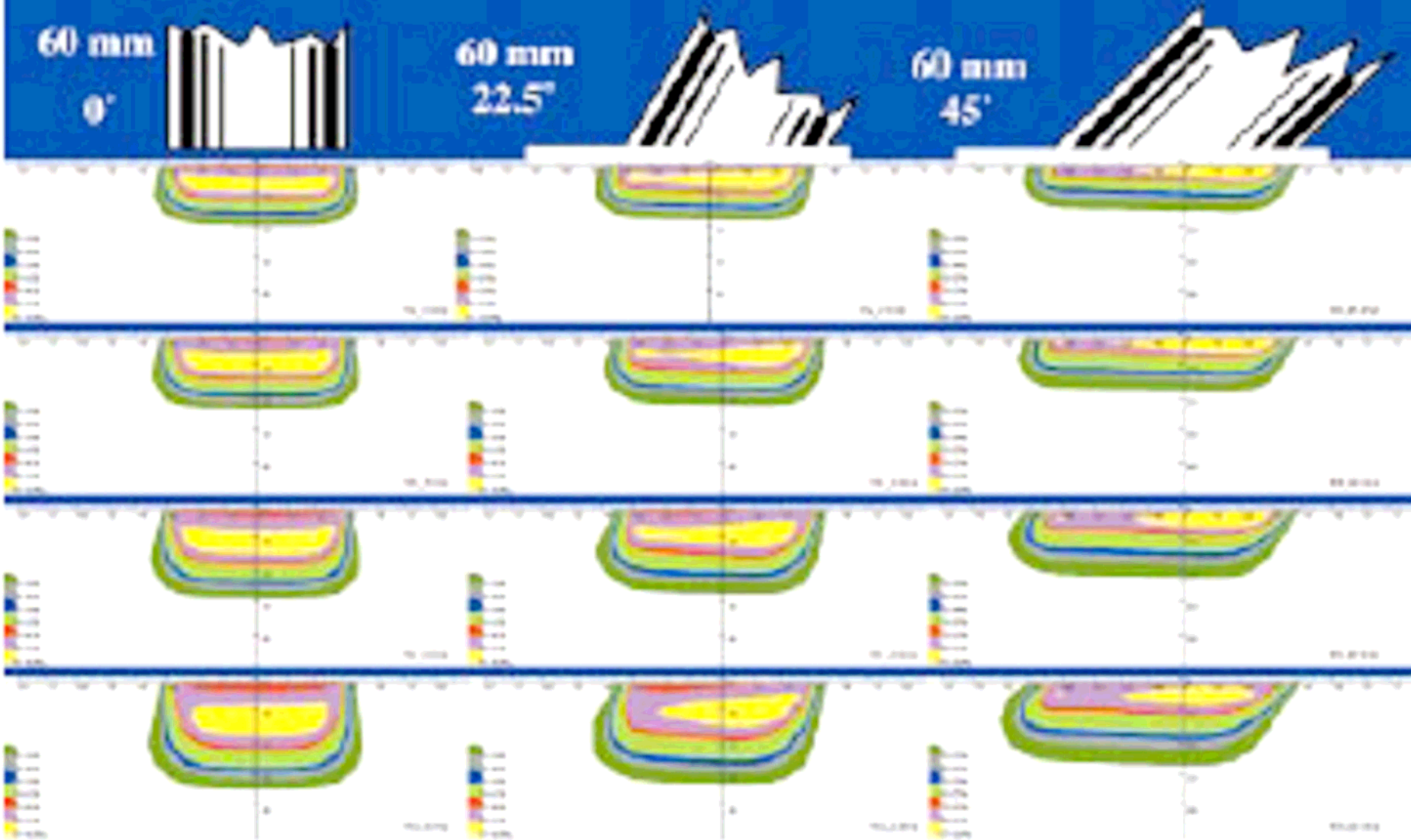
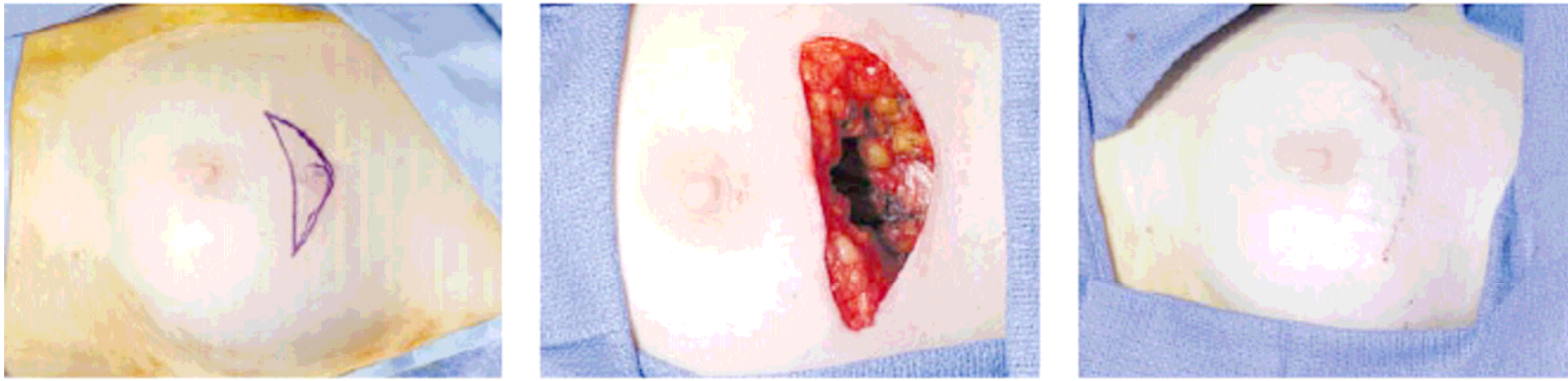


Fig. 2. Applicators range in size from 1.5 to 5 cm.

The lack of pretreatment pathology review: IORT is routinely delivered before the surgical pathology results are known. As a result, radiotherapy might be given inappropriately to some patients, particularly when inadequate surgical margins necessitate re-excision or conversion to mastectomy. This risk may be reduced by proper patient selection (such as excluding patients with extensive intraductal cancer or infiltrating lobular cancer), by improved preoperative assessment of extent of disease with the use of contrast-enhanced magnetic resonance imaging, and by intraoperative assessment of surgical margins. Alternatively, IORT may be given at a second operation after breast-conserving surgery and definitive pathology evaluation of the surgical specimen.

D.R. Holmes et al. / The American Journal of Surgery 194 (2007) 507–510



(a)

(b)

Figure 4. High dose rate remote afterloading IORT. (A) Wide excision with removal of the fascia of the pectoralis major muscle. (The thir photograph in this sequence shows the closed incision, following completion of the quadrantectomy and IORT procedures.) (B) The H.A.M applicator is inserted into the cavity with the deep margin resting on the pectoralis major muscle. Once the applicator is in position in the lumpectomy cavity, catheters are connected in the appropriate sequence.