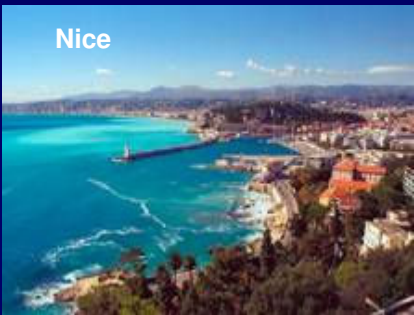


Innovative technology is the best way to improve radiotherapy for cancer patients



Centre Antoine Lacassagne



Nice



Hospitiaux de Lyon

J.P. GERARD
Nice - France

CERN - 04/02/2010

DISCLOSURE

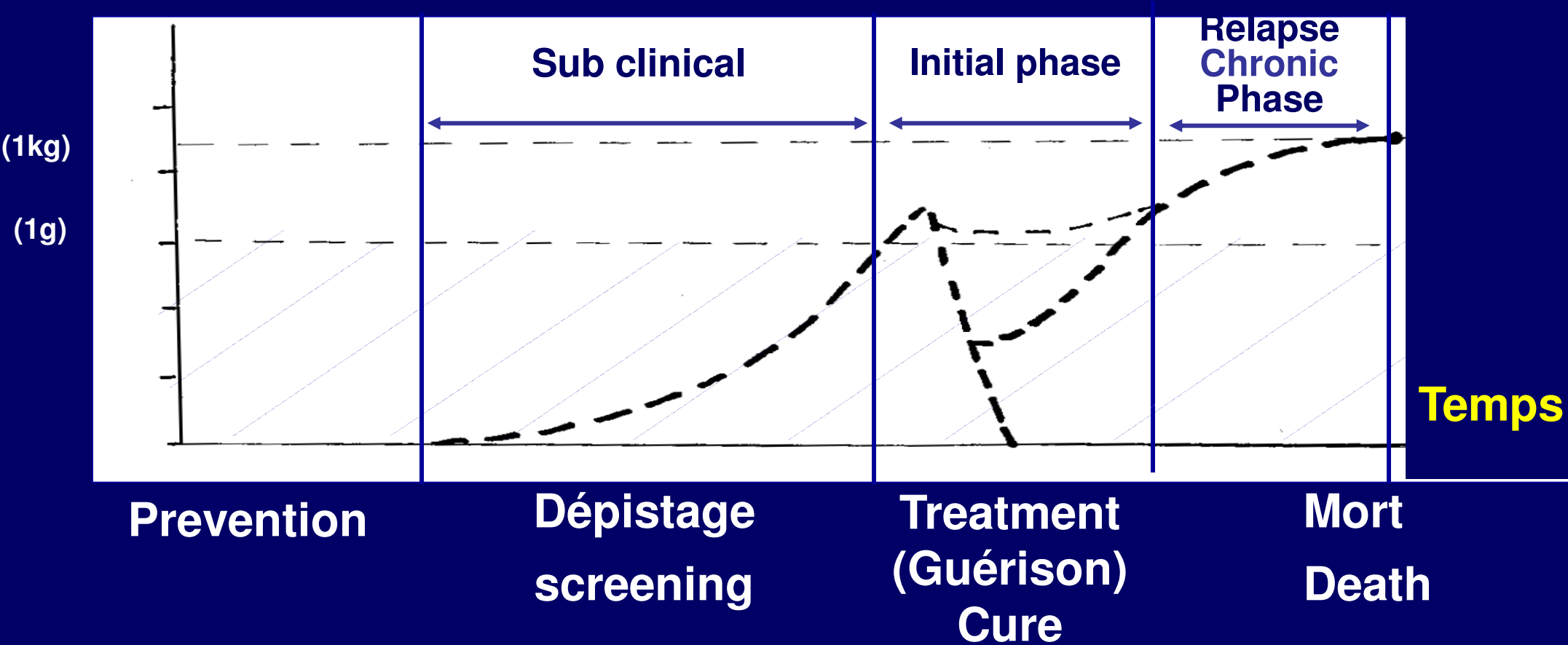
Ariane Medical SystemsTM (UK)

"Papillon 50"

J.P. GERARD

Medical Advisor

Cancer Nb Cells



Espérance de vie – Life expectancy

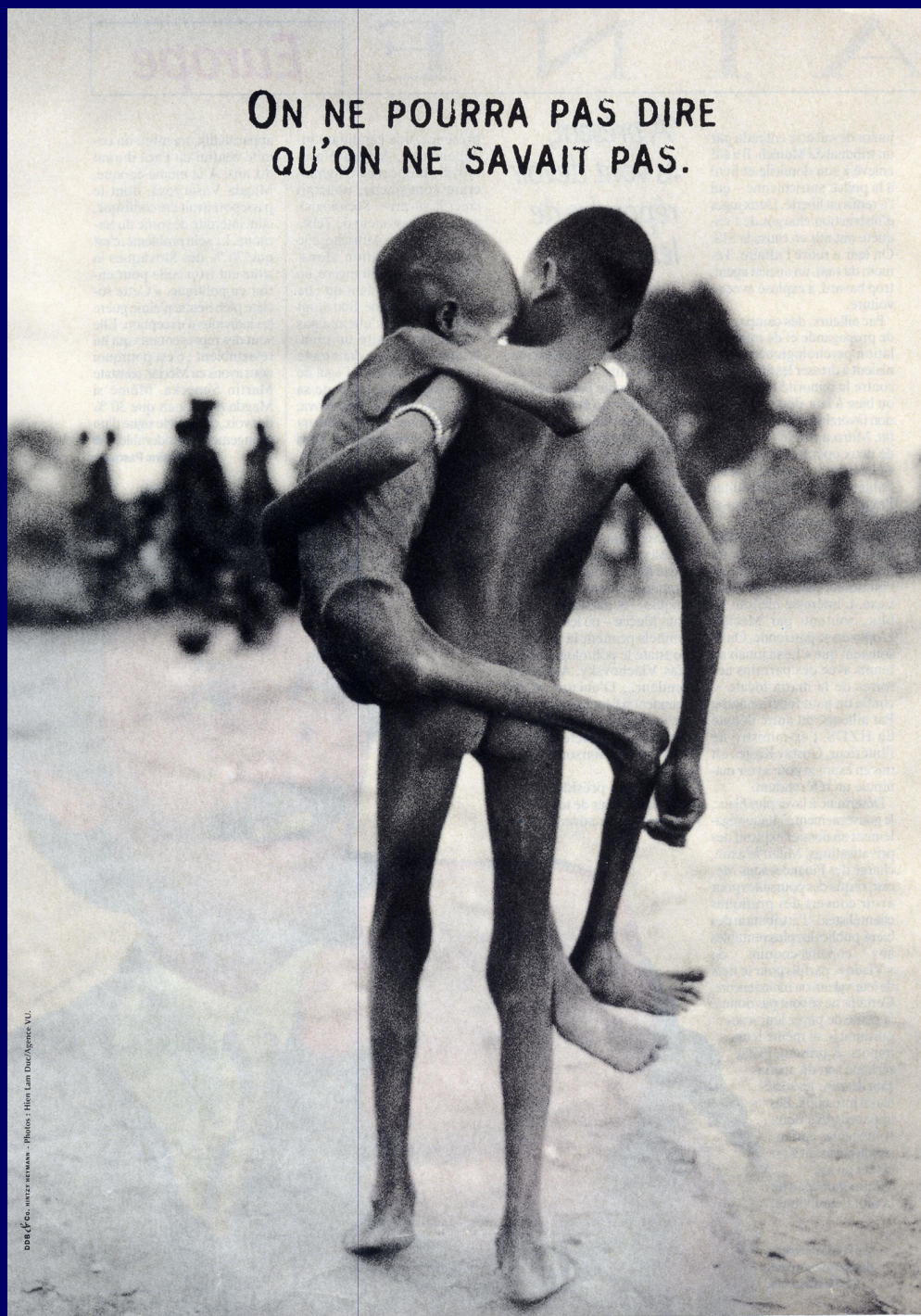
- France = **81 ans** Japon = 82
 - USA = 78 Sierra Leone = **41** (F =1789)
 - France Sud = 82 France Nord = 80
 - France 1940 = 59 ans (+22)
- = Espérance de vie sans handicap (x 2)**
- = mort évitable < 75 ans France = 1er**

Facteur de risque sanitaire (OMS) (cause de maladies) - Diseases factors

| | | | | |
|---------|-----------------------------------|------------|---|-----|
| France | - Tabac | 13% | } | 1/3 |
| | - HTA | 11% | | |
| | - Abus d'alcool | 10% | | |
| | - Excès de poids | 8% | | |
| | T.S. | 5 millions | | |
| Afrique | - dénutrition | 15% | | |
| | - carence (vit., Fer) | 10% | | |
| | - eau non potable | 6% | | |
| | - pratique sexuelle dangereuse | 10% | | |

1987

ON NE POURRA PAS DIRE
QU'ON NE SAVAIT PAS.



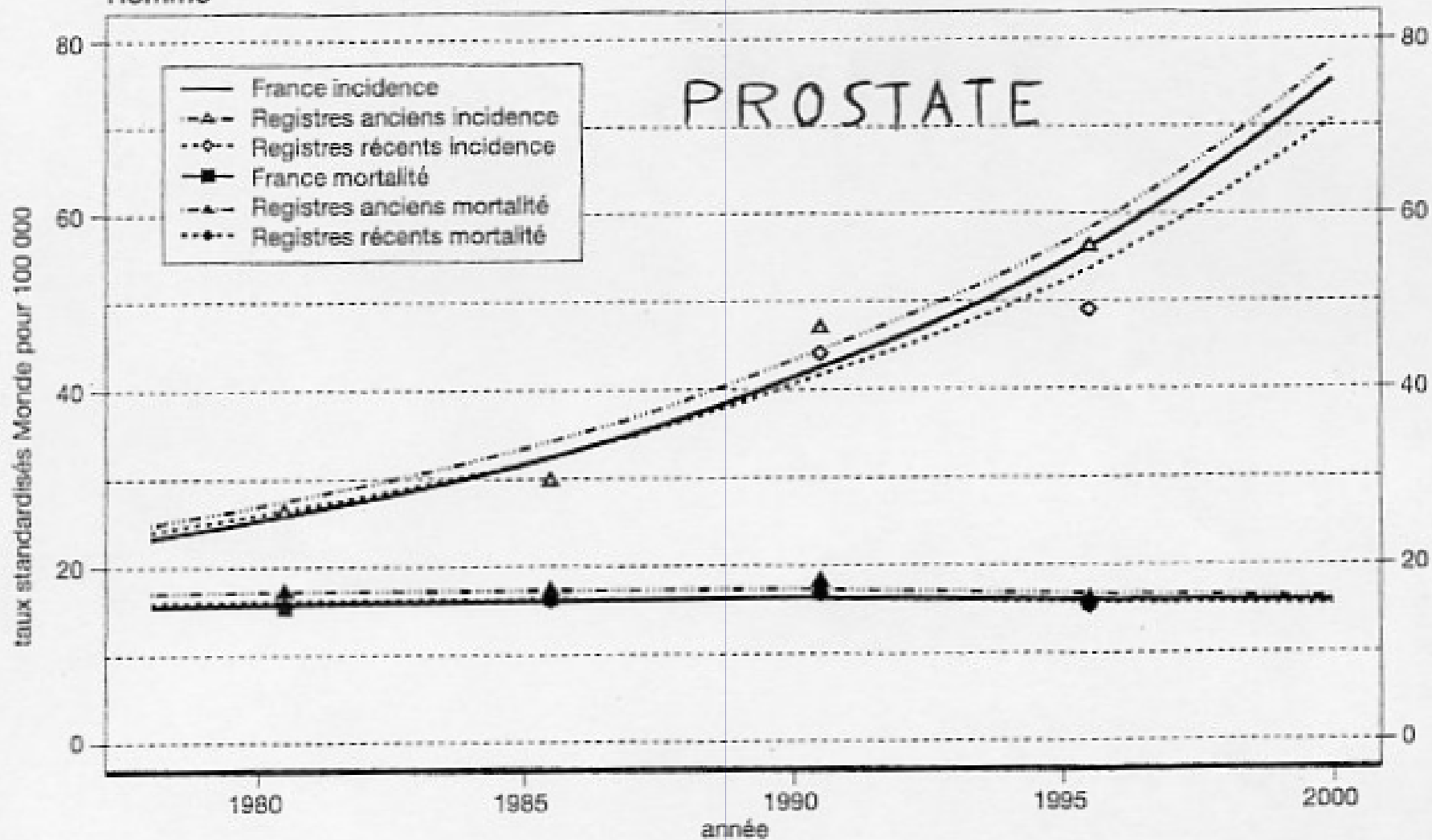
© 1987, Foca, Metz, Arzawa - Photos: Hien Lam Duc/Agence VU.

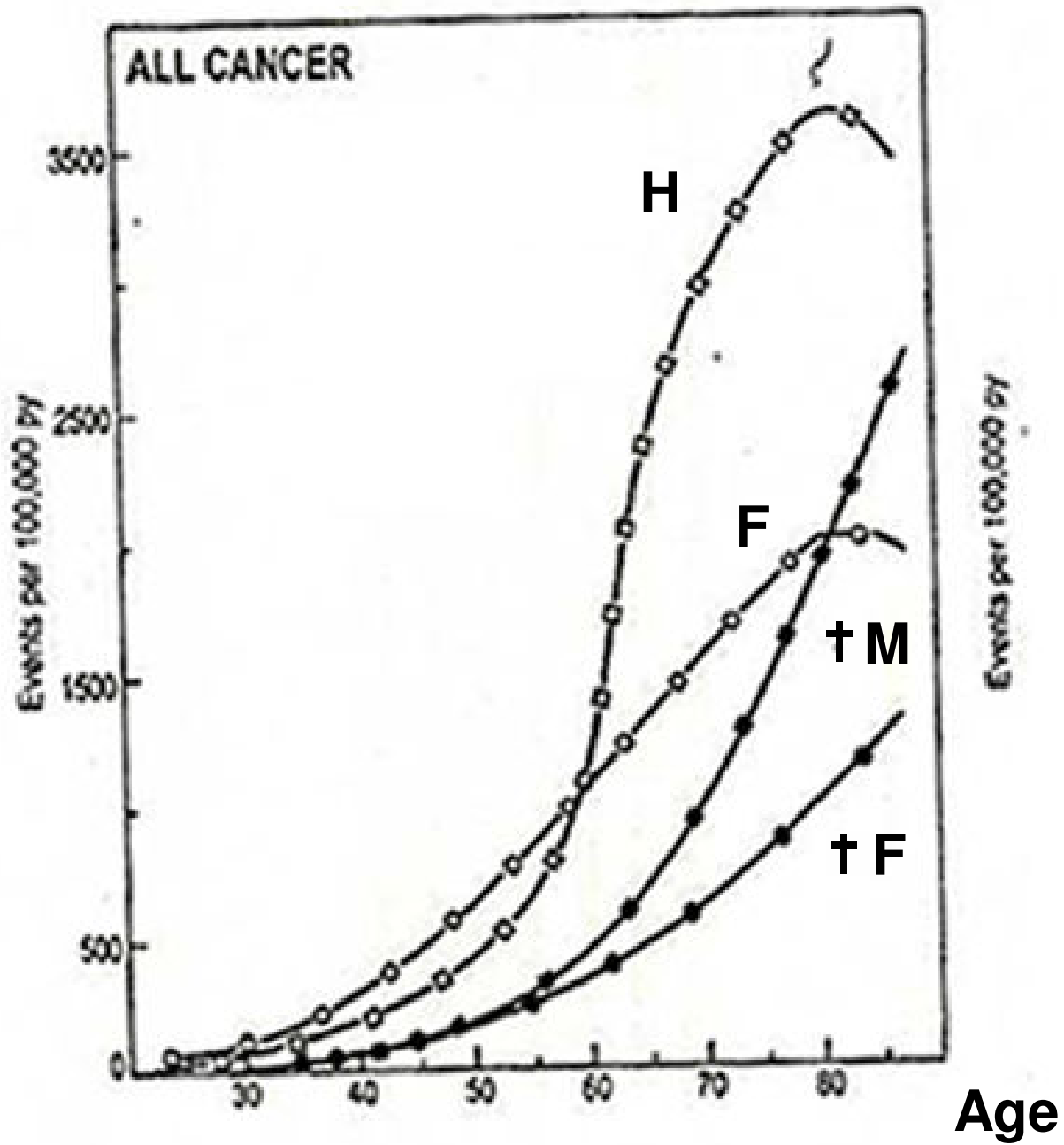
INCIDENCE - MORTALITE (France)

| | 1980 | 2009 |
|-------------------------------|--|---------------------------|
| Incidence | 170 000 | 320 000 |
| Mortalité | 125 000 | 146 000 (150/2003) |
| Augmentation # 100% | { - population = 25% - vieillissement = 20% - "risque" Kc = 55% | |

Incidence et Mortalité Homme

PROSTATE





GUERISON : "Survival (relative) 5 ans"

| | Hommes | | | | Femmes | | | |
|----------|--------|----|----|----|--------|----|----|----|
| | F | UK | I | EU | F | UK | I | EU |
| Colon R | 56 | 45 | 51 | 48 | 61 | 47 | 53 | 51 |
| Poumon | 13 | 8 | 10 | 10 | 16 | 8 | 11 | 10 |
| ORL | 27 | 40 | 32 | 31 | 44 | 49 | 48 | 48 |
| Prostate | 72 | 52 | 59 | 62 | | | | |
| Leucémie | 48 | 36 | 32 | 37 | 58 | 38 | 31 | 38 |
| Sein | | | | | 80 | 72 | 79 | 75 |

Eurocare - 1990 - 94

Guérison = CURE : 40%

ll 09-01-08-

A

M

me Victor Hugo

Docteur - Prophète,
un quart de siècle depuis notre
rencontre à de'ou Béarol!

Cancer survival in five continents: a worldwide population-based study (CONCORD)

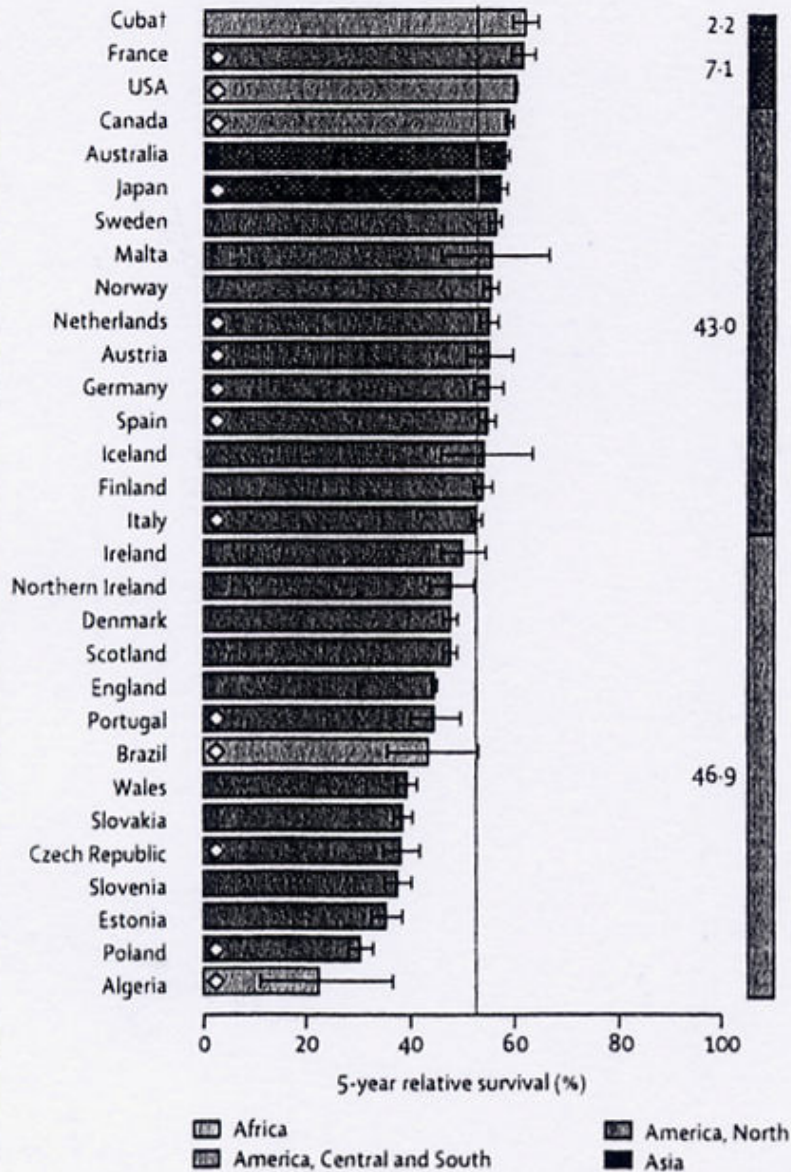
*Michel P Coleman, Manuela Quaresma, Franco Berrino, Jean-Michel Lutz, Roberta De Angelis, Riccardo Capocaccia, Paolo Baili, Bernard Rachet, Gemma Gatta, Timo Hakulinen, Andrea Micheli, Milena Sant, Hannah K Weir, J Mark Elwood, Hideaki Tsukuma, Sergio Koifman, Gulnar Azevedo e Silva, Silvia Francisci, Mariano Santaquilani, Arduino Verdecchia, Hans H Storm, John L Young, and the CONCORD Working Group**

Summary

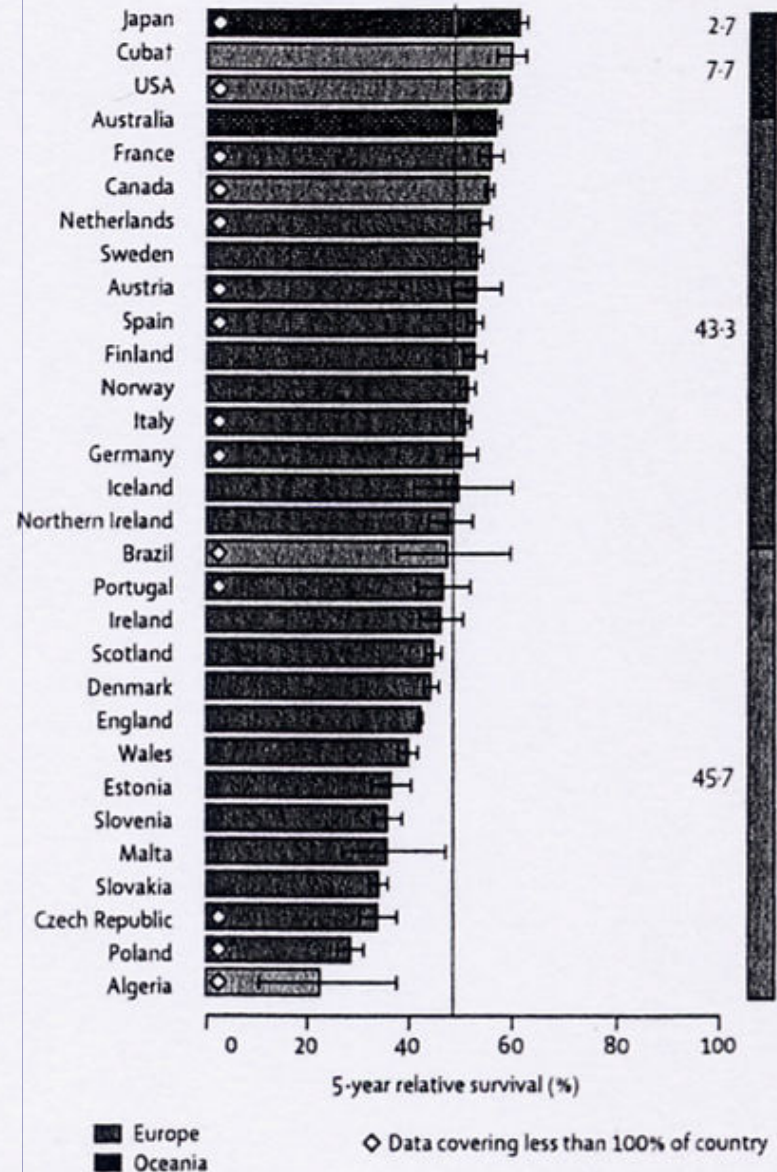
Background Cancer survival varies widely between countries. The CONCORD study provides survival estimates for 1.9 million adults (aged 15–99 years) diagnosed with a first, primary, invasive cancer of the breast (women), colorectum, or prostate during 1990–94 and followed up to 1999, by use of individual tumour records from 101 population-based cancer registries in 31 countries on five continents. This is, to our knowledge, the first worldwide analysis of cancer survival, with standard quality-control procedures and identical analytic methods for all datasets.

Coleman - Lancet Oncol 2008 July

Femmes



Hommes



Cancer colorectal – survie relative 5 ans

Radiothérapie - 2010 - "3C"

Curatif

320.000 nouveaux cancers

45% guérison (140.000) RXT = 40%

Conservateur

oeil – larynx – sein – vessie

anorectum – membre

Coût – Efficience

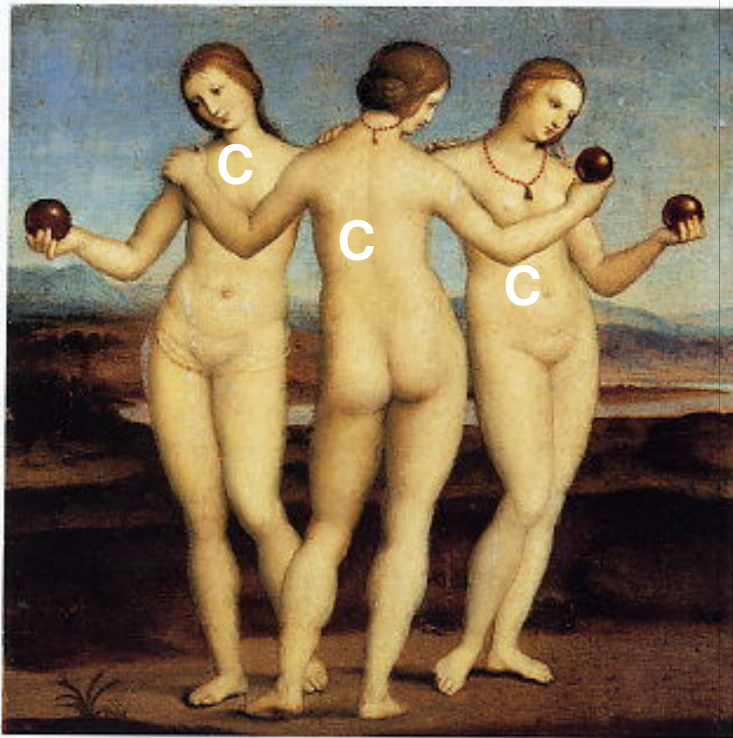
ONDAM : 160 M^d Euros

cancer : 16 M^d E – **RXT : 1.2 M^d E**

Professeur
Jean-Pierre GÉRARD

En collaboration avec
Paul DREYFUS

GUERIR LE CANCER SANS MUTILER



Sous le patronage de la Ligue Nationale contre le Cancer et de son Comité Départemental du Rhône

EDITIONS
HORVATH

Radiotherapy

C : Cure

C : Conservative

C : Cost effective

The New York Times

Founded in 1851
 ANNOUNCED BY THE PUBLISHER, 1896-1902
 EDITOR: CATHERINE BROWN, 1902-1910
 DAVID E. BROOKS, 1910-1912

Study Supports Limited Surgery for Breast Cancer

By JANE E. BRODY

Surgery that spares most of the breast can be as effective as radical mastectomy in treating women with early breast cancer, according to a major study done in Italy and published yesterday in *The New England Journal of Medicine*.

The study, considered the best to date examining two such procedures, has thus far shown no difference in cancer recurrence or survival between women who had a partial mastectomy followed by radiation therapy and women who underwent the older, more disfiguring operation.

Although previous studies suggested this, the new study is the only large-scale, well-controlled study to show it. The researchers concluded that "radical mastectomy appears to involve unnecessary mutilation" in patients with early breast cancer.

The findings, which support the growing trend toward more conservative surgery for breast cancer, apply only to women whose cancers are very small at the time of diagnosis. Such women, though now seen more frequently than in the past as a result of educating patients, self-examination and the use of mammography, still represent only about 14 percent of breast cancer patients.

In another study in the same issue of the *Journal*, American researchers reported the first clear-cut evidence that older breast cancer patients whose disease has spread beyond the breast can

benefit greatly from postoperative chemotherapy. Previous studies had shown such benefits primarily to patients under the age of 50.

Together, the two studies present further evidence that survival of breast cancer patients depends less on the local therapy chosen than on additional treatments given patients with more advanced disease. They also demonstrate that there is no one treatment for breast cancer; rather, therapy must be tailored to the individual, depending on the type of breast cancer, its size, extent and location, as well as the patient's physical and mental condition.

According to Dr. Bernard Fisher, a breast cancer specialist at the University of Pittsburgh and director of several major American studies on treating the disease, the Italian study "is very important."

"It's one of a series of studies which indicate the reasonableness of doing conservative surgery," he said, "and it points out the need for further large-scale trials" to evaluate more fully the various treatment approaches for different patients.

For nearly a century, nearly all breast cancer patients, regardless of how early they were diagnosed, were treated by removal of the entire breast, the chest-wall muscles beneath the breast and the lymph nodes under the arm — the so-called Halsted radical mastectomy. This disfiguring operation sometimes resulted in lasting difficulties in movement, limited choices of

clothing and problems with breast reconstruction.

In recent years, however, scattered preliminary studies have suggested that less extensive surgery might be as effective as the radical operation for localized treatment of breast cancer, particularly when the tumor is small. The widely publicized findings prompted many women to request modified surgery and forced breast cancer surgeons to reconsider old dogma.

Today, in the United States, the Halsted radical has given way to a modified operation that spares the major chest muscle but still involves the entire breast and the lymph nodes. A minority of patients have just the lump removed, and usually have weeks of radiation treatment afterwards.

In the Italian study, begun in 1973 by Dr. Umberto Veronesi at the National Cancer Institute in Milan, 765 women whose tumors were smaller than two centimeters, or about three-fourths of an inch, in diameter and whose lymph nodes appeared to be free of cancer were randomly assigned to undergo either radical mastectomy or simply removal of the quarter of the breast that harbored the tumor, plus the lymph nodes in the armpit.

Those in the partial mastectomy group underwent up to six weeks of radiation treatments after surgery. All women in both groups treated since 1979 and found to have cancer spread to the nodes also received postoperative chemotherapy for one year.

Dr. Veronesi and his co-workers reported no differences between the groups in the percentage of patients who sur-

vived free of cancer recurrence for up to seven and a half years after treatment.

"It appears unlikely that a longer follow-up time will introduce further changes," they said, although some surgeons believe a 10-year period is needed to determine the relative effectiveness of breast cancer treatments.

INSIDE

| | | | |
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| Art | C11-D | Music | C14-C17 |
| Books | C11-C16 | News in Review | B1 |
| Bridge | C19 | Obituaries | D16 |
| Business Day | D1-D6 | Op-Ed | A15 |
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| Class | C14-21 | Sports | B4-D |
| Classical | A18 | Theater | C11 |
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| Letters | A13 | Weather | C2 |

News Summary and Index, Page B1

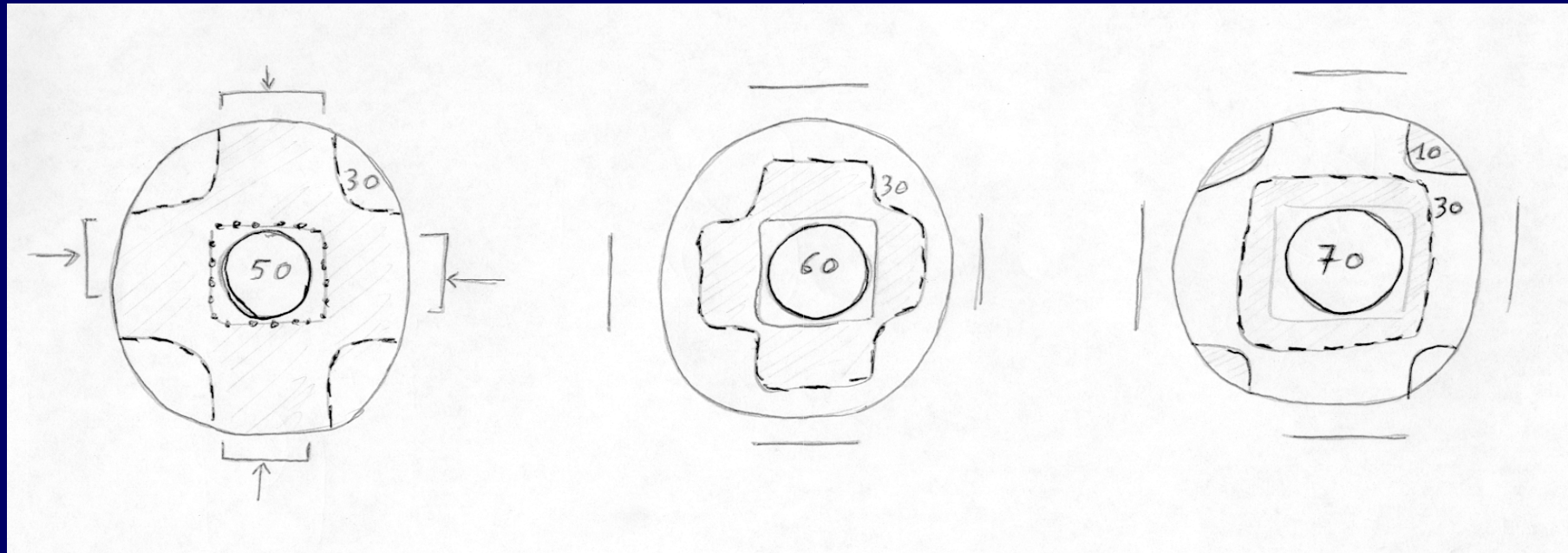
The ultimate goal of physics in radiotherapy

- 100% dose in GTV (CTV) (homogeneous ?)

0% " in organ at risk (OAR)

OAR : limiting factor

High accuracy – optimal Targeting ++



200 kV
1930

"peau - brûlure"

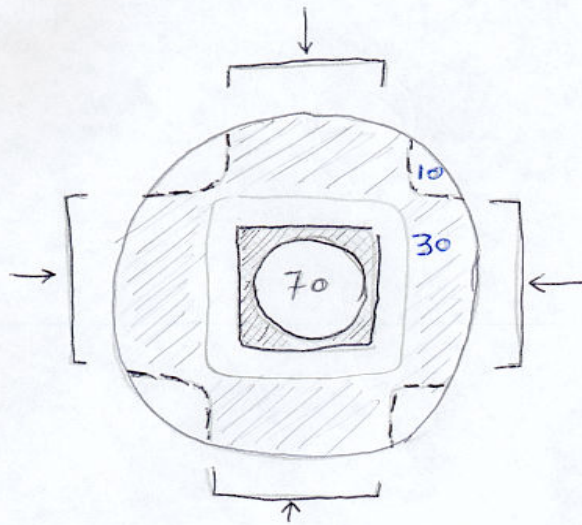
Cobalt
1950

"abdomen"

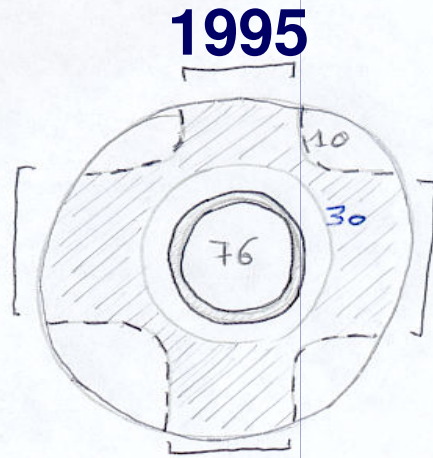
Linac
1980

FACTEUR LIMITANT : TOLERANCE TISSUS SAINS

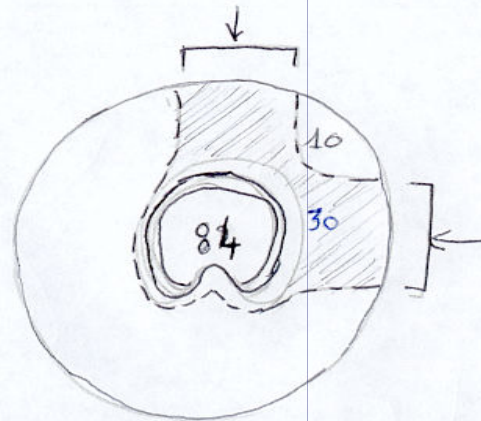
OAR Tolerance → T Dose Escalation



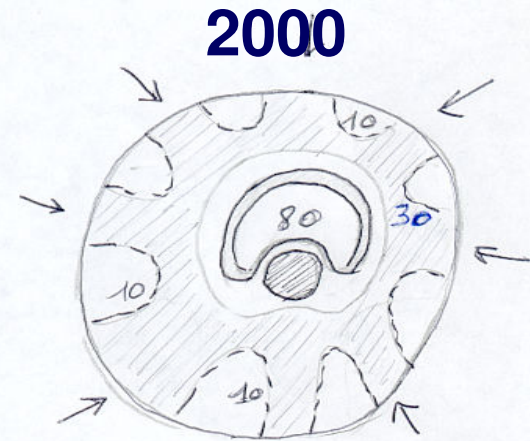
LINAC
1980



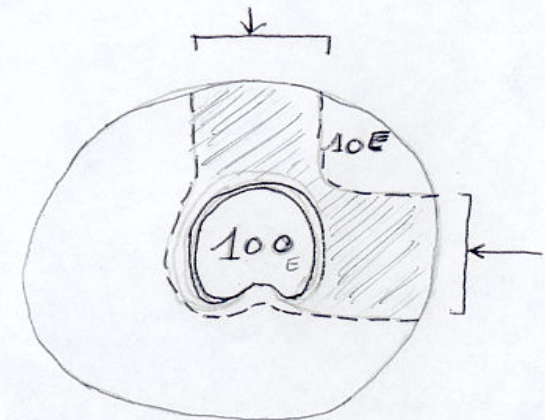
RC3D (CML)



PROTON
1990



RCMI concave



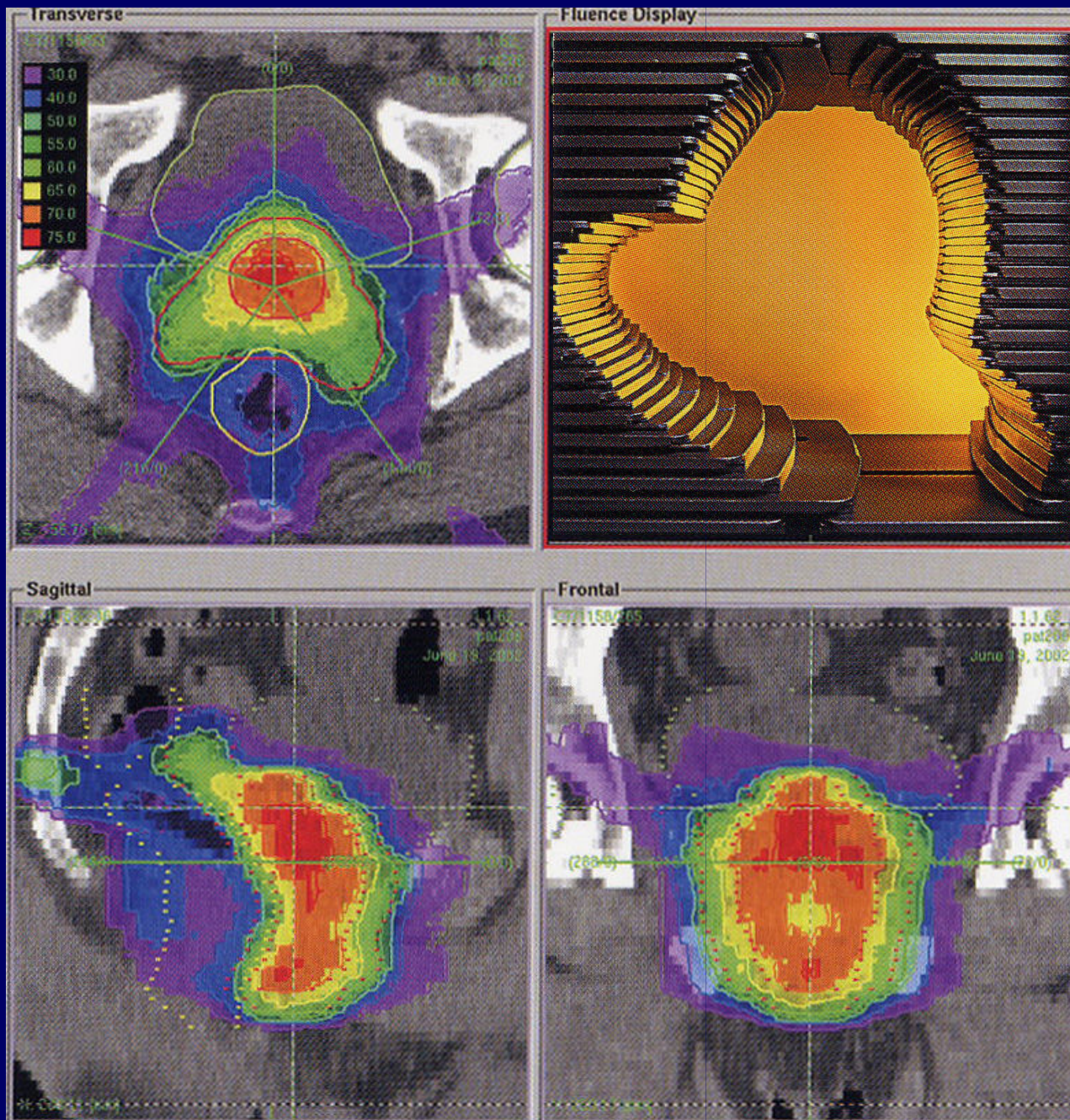
CARBONE - Neutron
2000

R
A
D
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B
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O
L
O
G
Y

Radiotherapy - History

- **1896-1950 : Kilovoltage**
- **1950-1995 : Megavoltage**
- **1995-2010 : Computer Assisted RXT**

Particles - Hadrontherapy



· Collimateur multilames

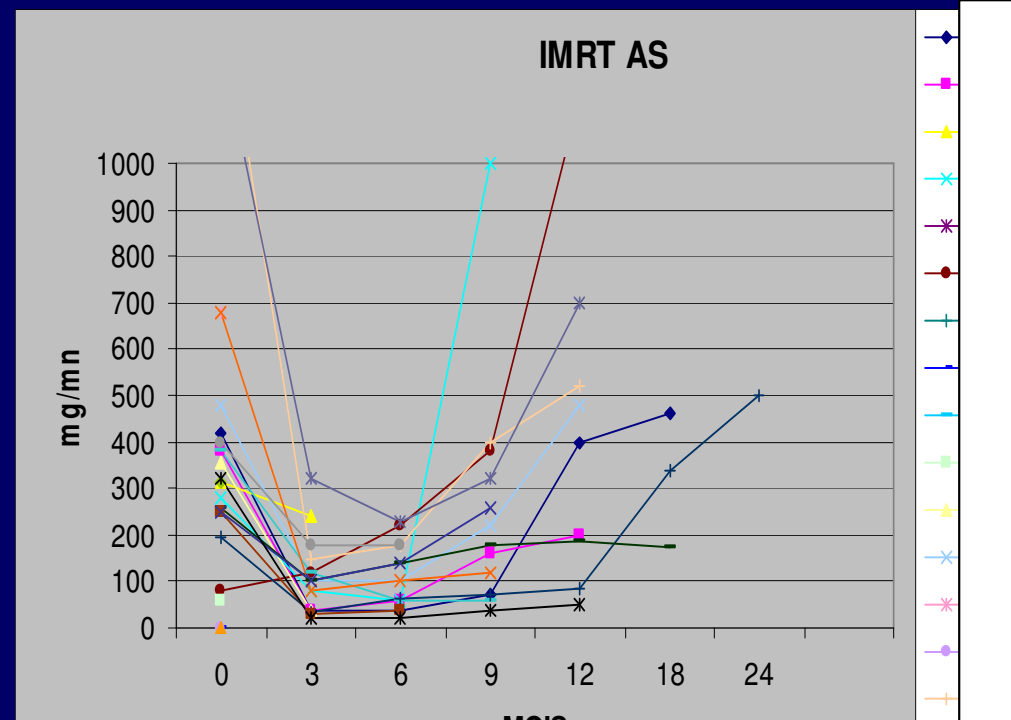
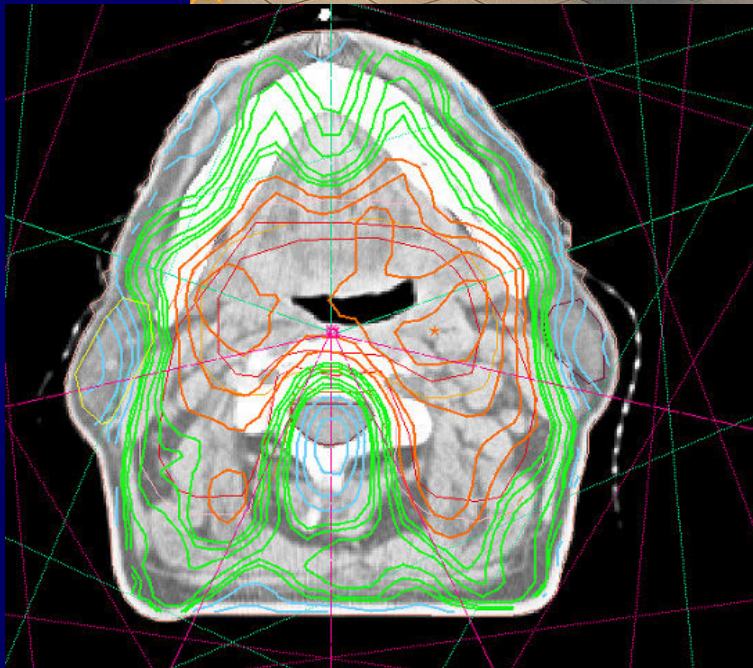
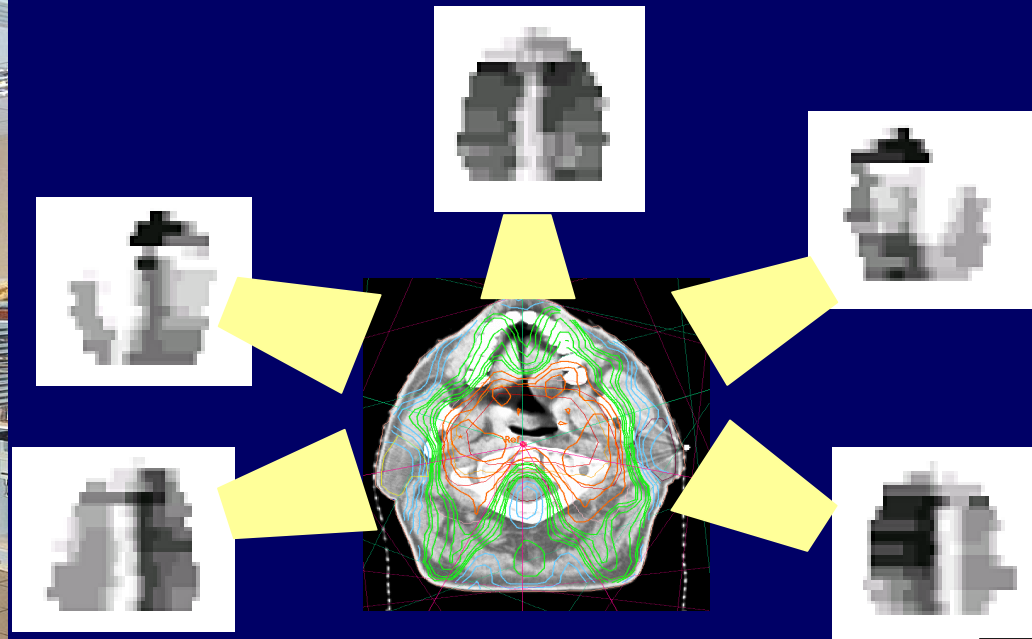
· Logiciel de planimétrie

(beam eye view)

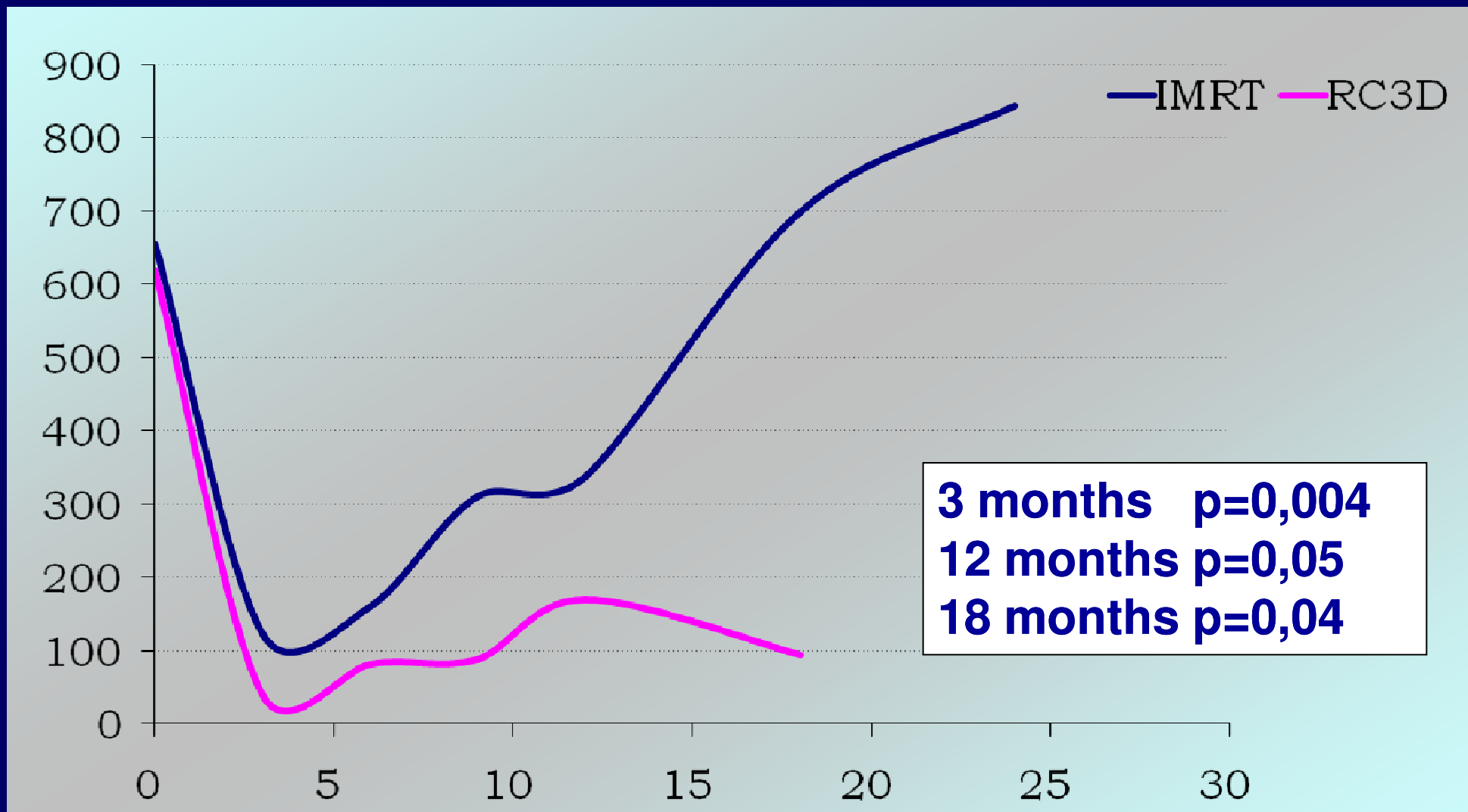
**Conformal
3D
Radiotherapy**

IMRT Intensity modulation

RCMI



IMRT for parotid sparing and preservation of salivary flow w/ IMRT versus 3D RT

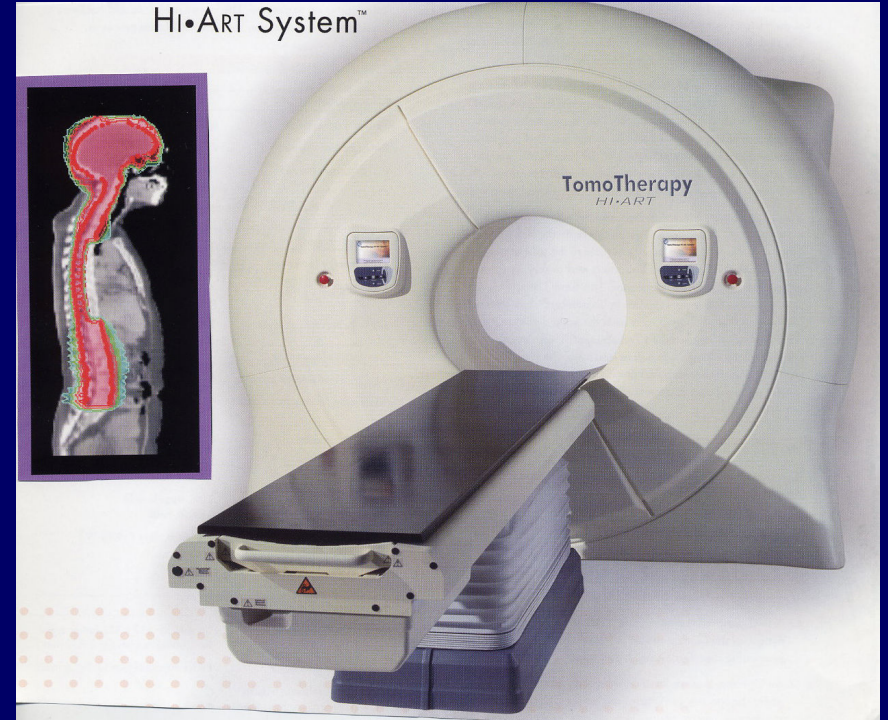
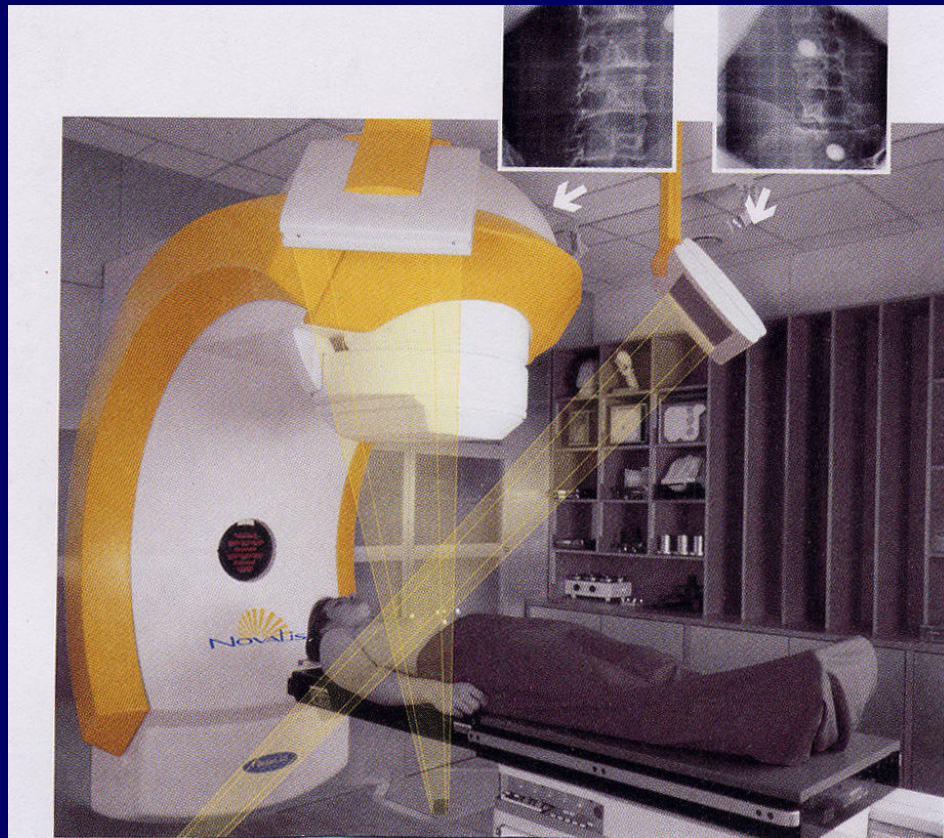




IGRT : Image guided

"cible mobile"

Mobile target

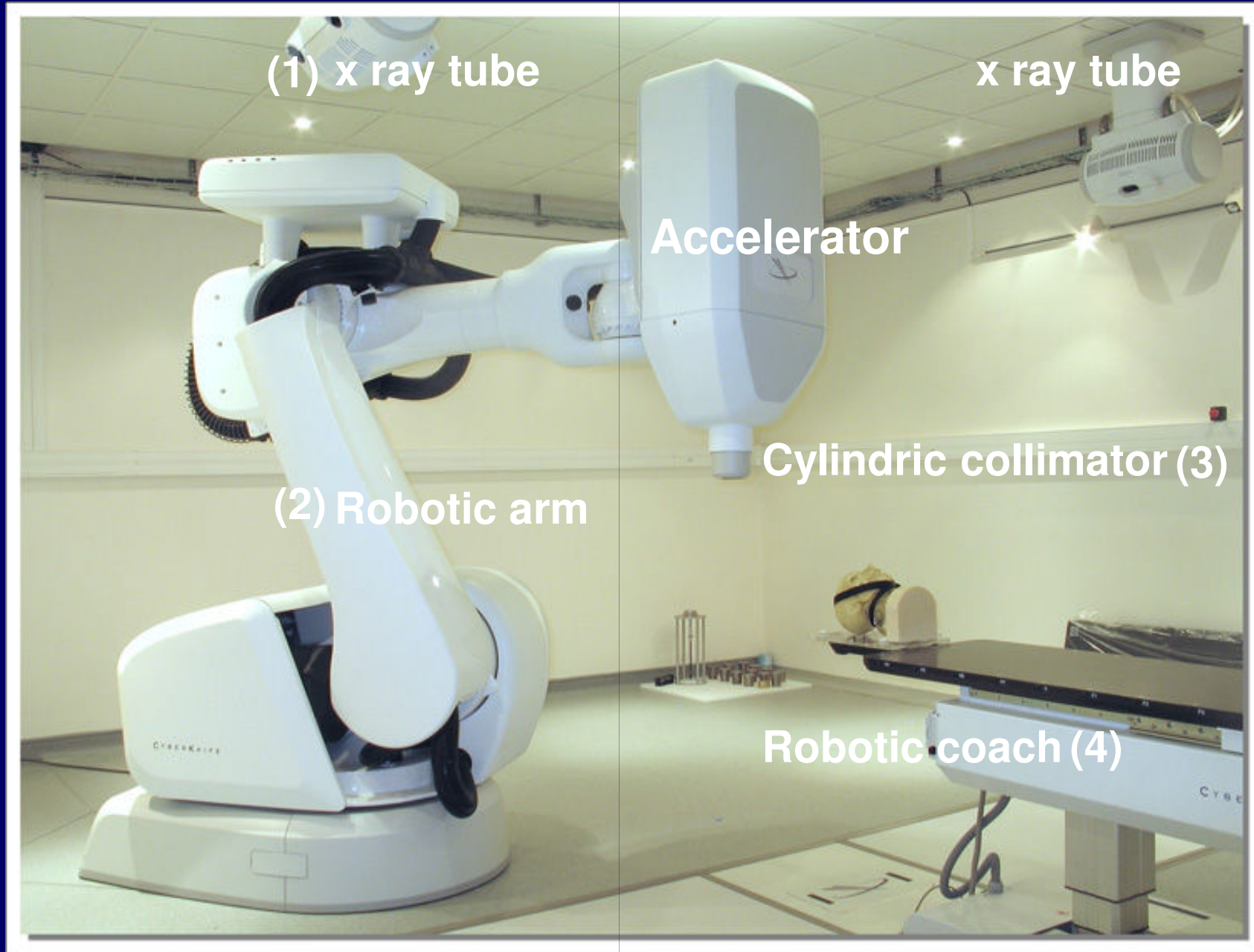




VERO – NOVALIS (VARIAN)

Robotic Stereotactic Radiotherapy (Cyberknife™)

G4









**Real time
tracking**

Temps réel

"synchrony"

Accuracy - Precision

- CK mechanical accuracy = 0.2 mm
- CK spinal fiducial tracking
 - "clinical accuracy" = 0.6 mm
- Synchrony "total clinical accuracy" = 0.7 mm (± 3)

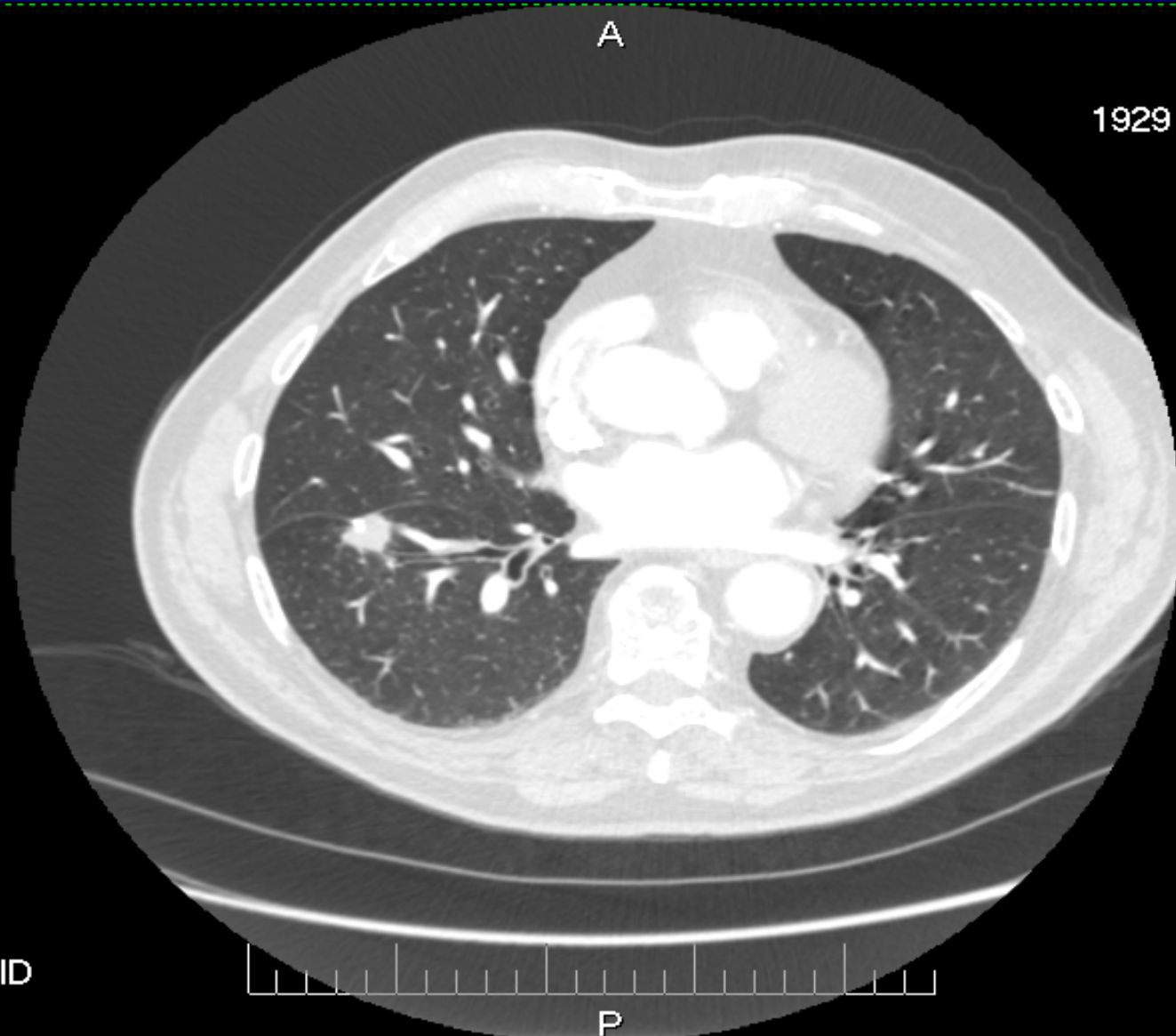
Accurate Targeting = **HYPOFRACTIONATION**

Poumon- Lung : initial

LightSpeed VCT
x: 6211
Thorax Abdo
: VISIPAQUE 320
e: 2/1
n: 159/670
x: 1124.0

Mag: 1.1x

20.0 kV
20.0 mA
3 mm
ilt: 0.0
T: 0.4 s
P: 0.0 s
S: 0.00 mm/s
PR:
n:DCM / Lin:DCM / Id:ID
/:1500 L:-600



CHU Pasteur

1929 Jan 07 M TAP 5856/5

Acc

2006 Sep 0

Acq Tm: 17:25:4

DFOV: 39.0 x 39.0cm

Poumon- Lung : 2 months



Rachis- medulla (spine)

1.5T GEMSOW
Ex: 35527
SC:RCD SAG T1+
C: 10
Se: 107/9
Im: 5/10
Sag: R20.7 (COI)

Mag: 3.3x

A

ET: 3
TR: 320.0
TE: 9.6
USCS123
4.0thk/1.0sp
Id:DCM / Lin:DCM / Id:ID
W:769 L:328

S_L

IRM

1932 Sep 27 F 06RCD4

2006 No

Acq Tm: 10:5

320 x

I_R

DFOV: 21.2 x 12.2



Évaluation de dose

Dose Rx(cGy) 2269

Rx (%) 70

Prescrire

Revue finale

Haute résolution

Correc de contour

Calculer

Enregistrer plan

Afficher faisceau sur 3D

VOI disponible

Nom

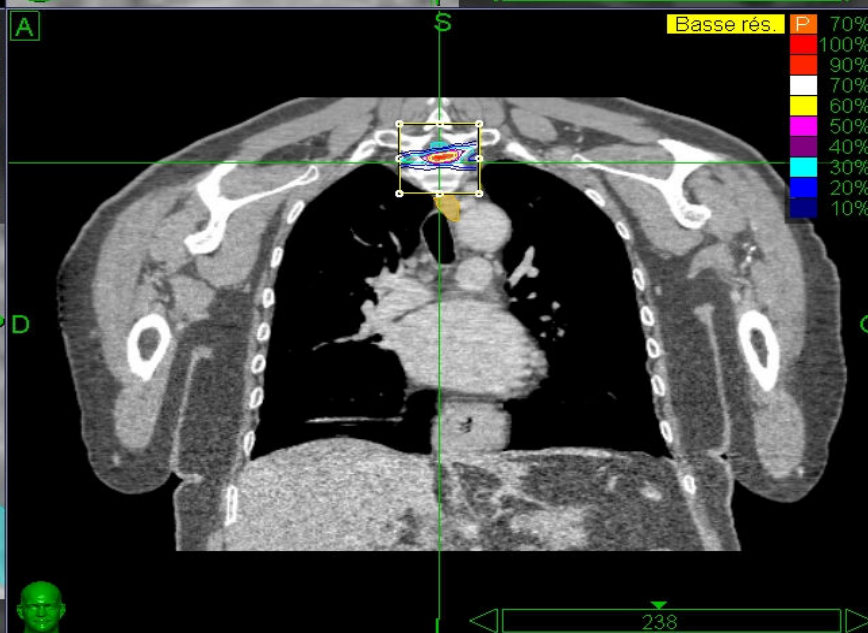
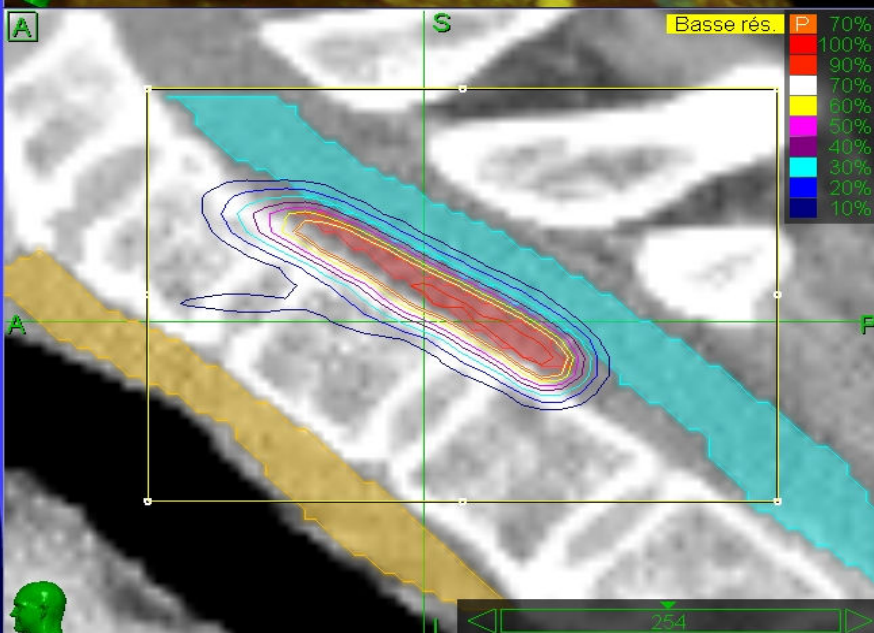
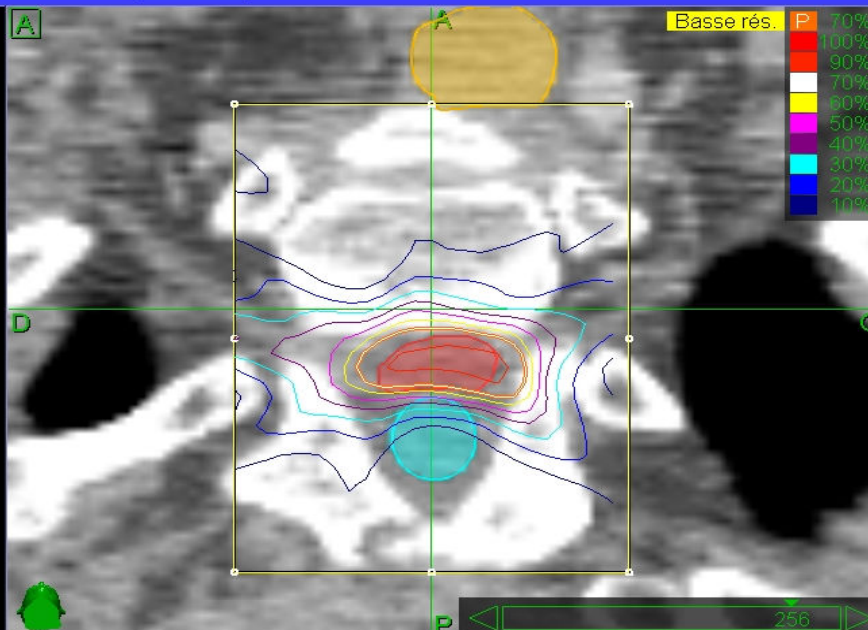
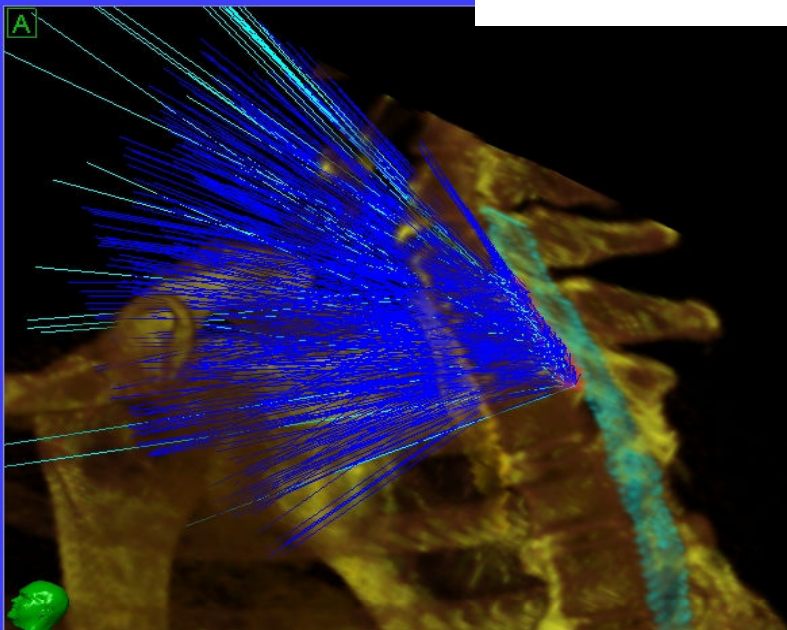
Spinal Cord

Esophagus

GTV

Dispositions

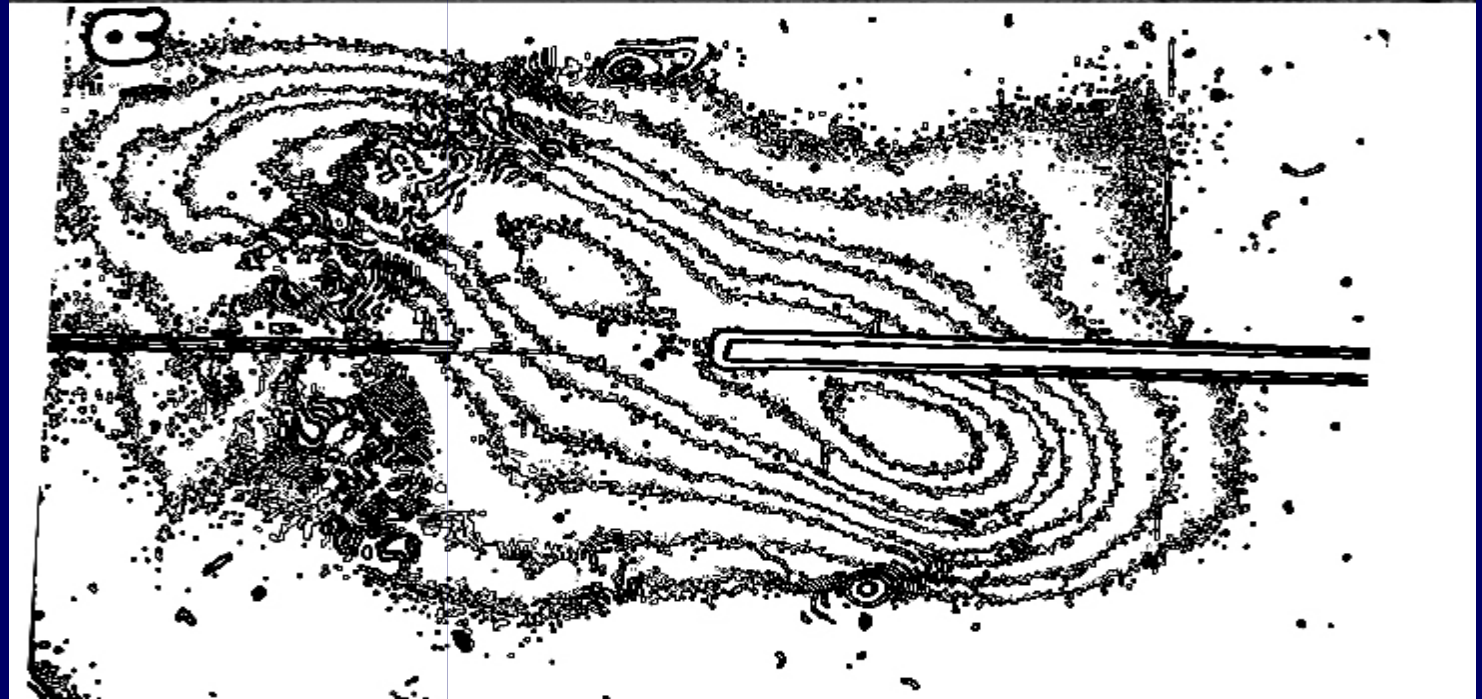
| | | | |
|----|------|----|---|
| 3D | DVH | 3D | A |
| A | Dose | S | C |

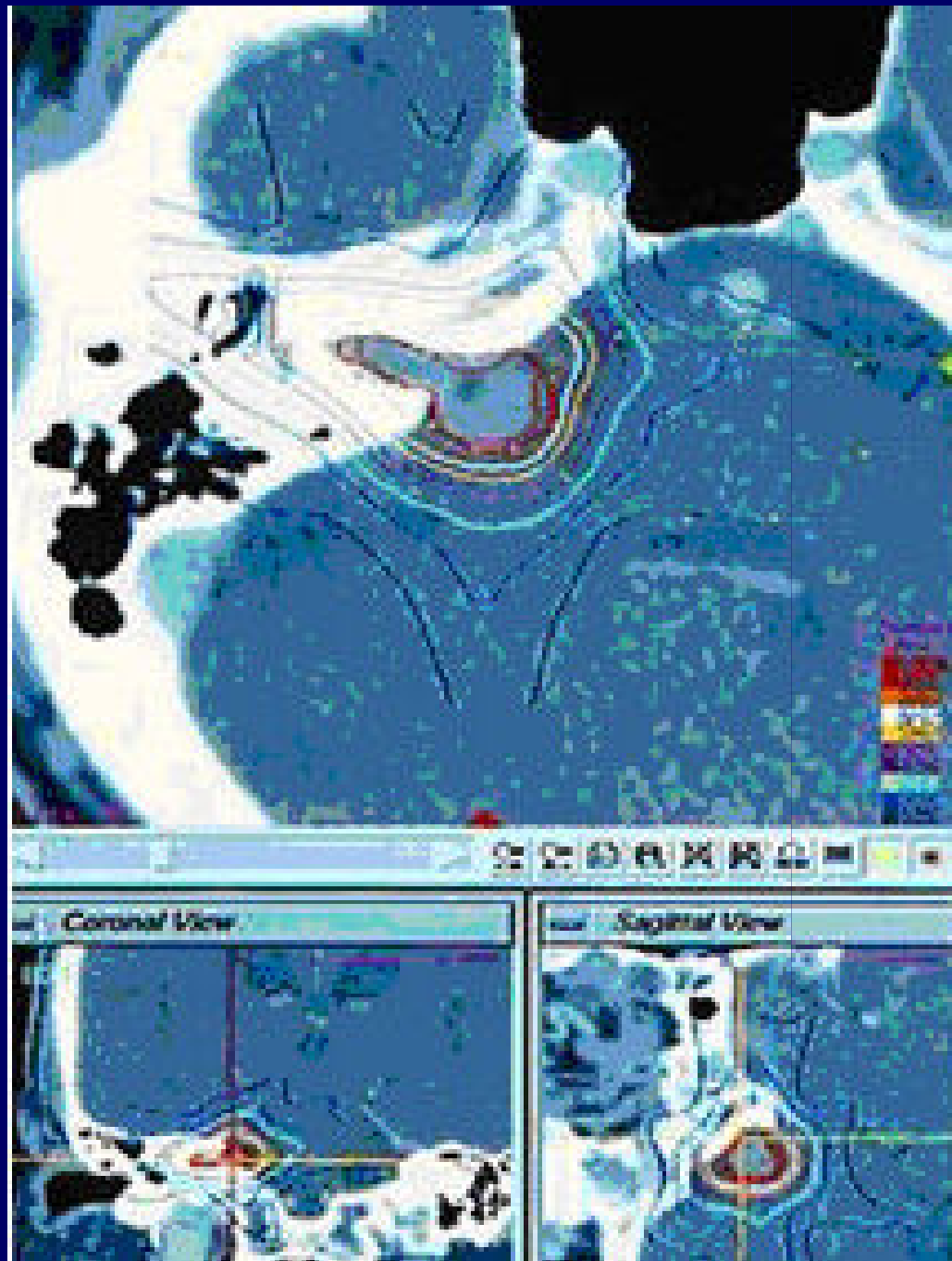


**Computer dose
distribution**



**Phantom
dosimetric
control**





- Acoustic
schwannoma

- 8 Gy x 3 fractions

KIPPAK

2007

Centre
Antoine LACASSAGNE - NICE

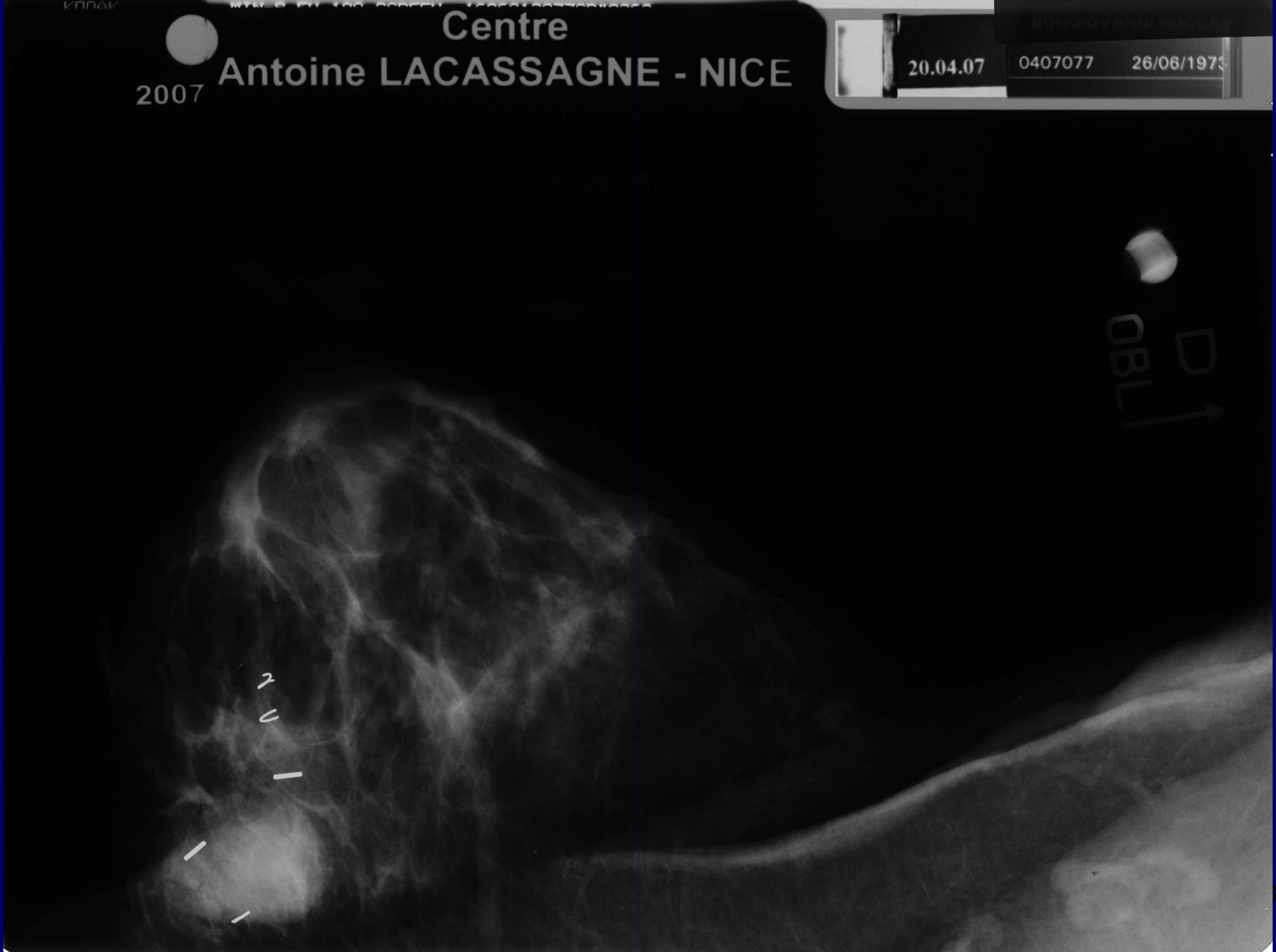
20.04.07

0407077

26/06/1973

D1
OBLI

2
C
-
-
-



Évaluation

 Correc de contour Haute résolution

Calculer

Prescription

Dose Rx (cGy) Rx (%)

Prescrire

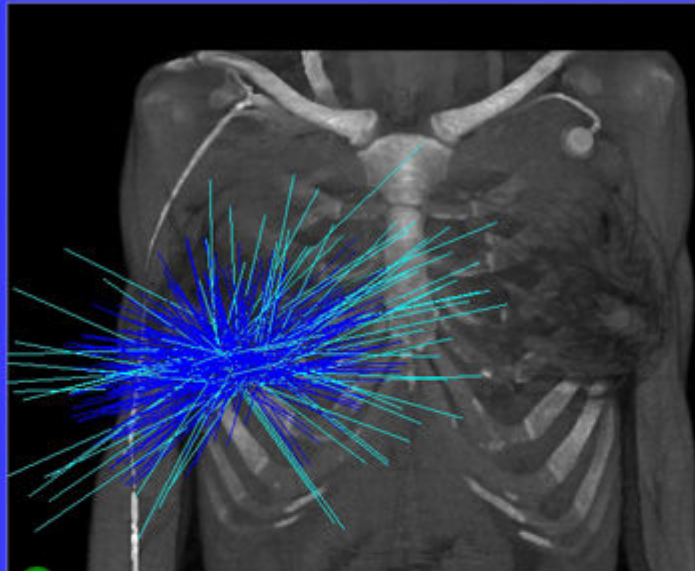
Point de référence

 Utiliser dose ponct. max.Dose (cGy) Point :

Patient
ROCCA BONGIOVANNI
0407077

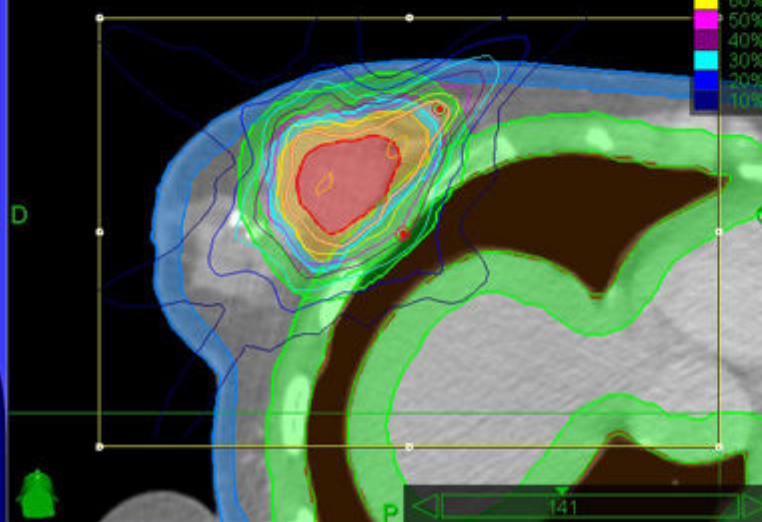
Plan
BONGIOVANNI-PY
2007-05-02 11:37:13

Rx
70%, 1950.00 cGy



A

Haute rés

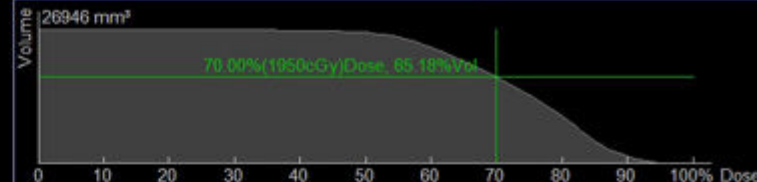


D

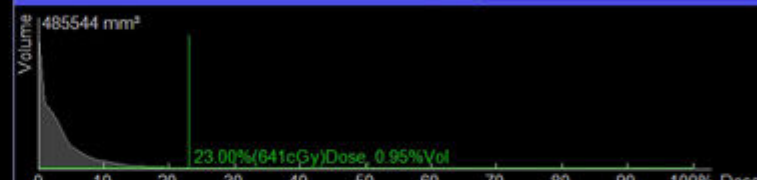
P

141

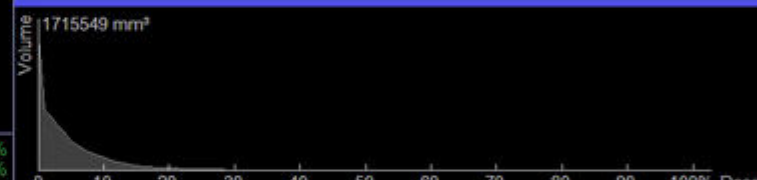
Volume cible : TumorSite(CTV)



Volume critique : poumon D



Parties molles

**- Chemo : FEC - T****-RSR : 6.5 Gy x 3****- Chemo : 5 cycles****-Surgery****-Breast RXT : 50 Gy / 5 w**

GREEN SAVE

1973 Jun 26 F DR PLANTADE

1973 Jun 26 F 07SEINS2583

20.0cm
350/12

Acc: 1847991

2/6

Acc:

431/4

2007 Apr 10

88.5

2007 Jun 20

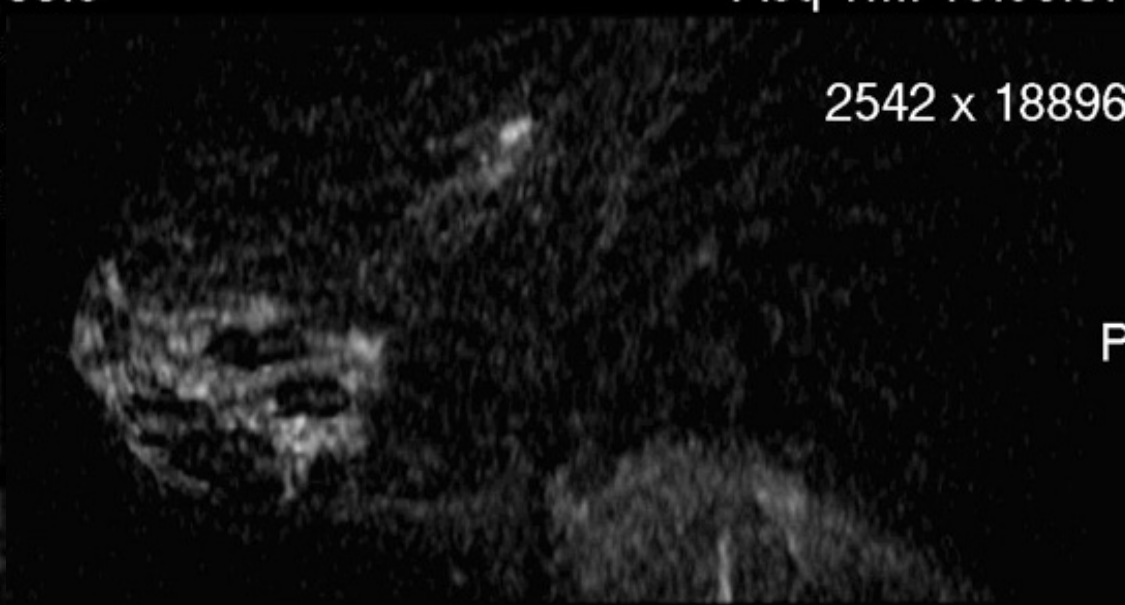
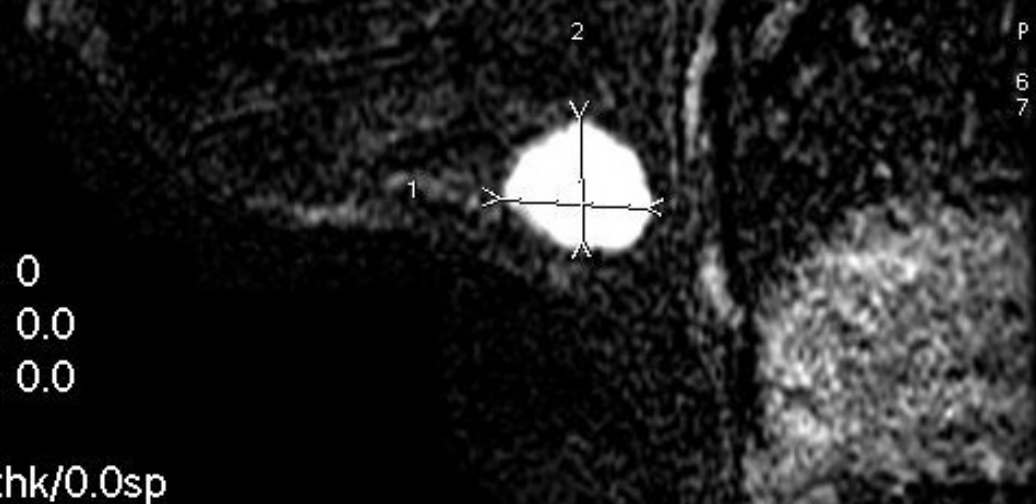
0

Img Tm: 09:59:25

Acq Tm: 10:06:37

512 x 512

2542 x 18896



0
0.0
0.0

hk/0.0sp



CK - CAL 11/2006 - 12/2007 = 116 pts

| | | N° | G3 Tox | Loc cont (2y) | 2 y OS (%) |
|--------|---------|------------|-----------|---------------|------------------------|
| Lung | T1-2 | 33 | 3 | 21/23 | 87 |
| | Meta | 5 | | | |
| Liver | HC | 2 | | | |
| | Meta | 11 | 0 | 5/7 | 80 |
| Spine | Ch. Sa. | 11 | 1 | 5/8 | 81 |
| | Meta | 5 | | | |
| Brain | Schw. | 8 | 0 | 16/20 | 80 |
| | Meta | 19 | | 7/13 | |
| Breast | | 7 | 0 | 7/7 | 100 |
| | | 116 | 3% | 82% | 86%₂ |

Dose escalation : Phase III ++ Evidence 1

- Prostate

Polak : 70 - 78 Gy : 59% → 78% (8y)

- Breast

EORTC : 50 - 65 Gy : 10% → 6% (10y)

Lyon : 50 - 60 Gy : 5% → 3% (5y)

- Brain metastatis

RTOG : 15 - 24 Gy : 5 → 7 months

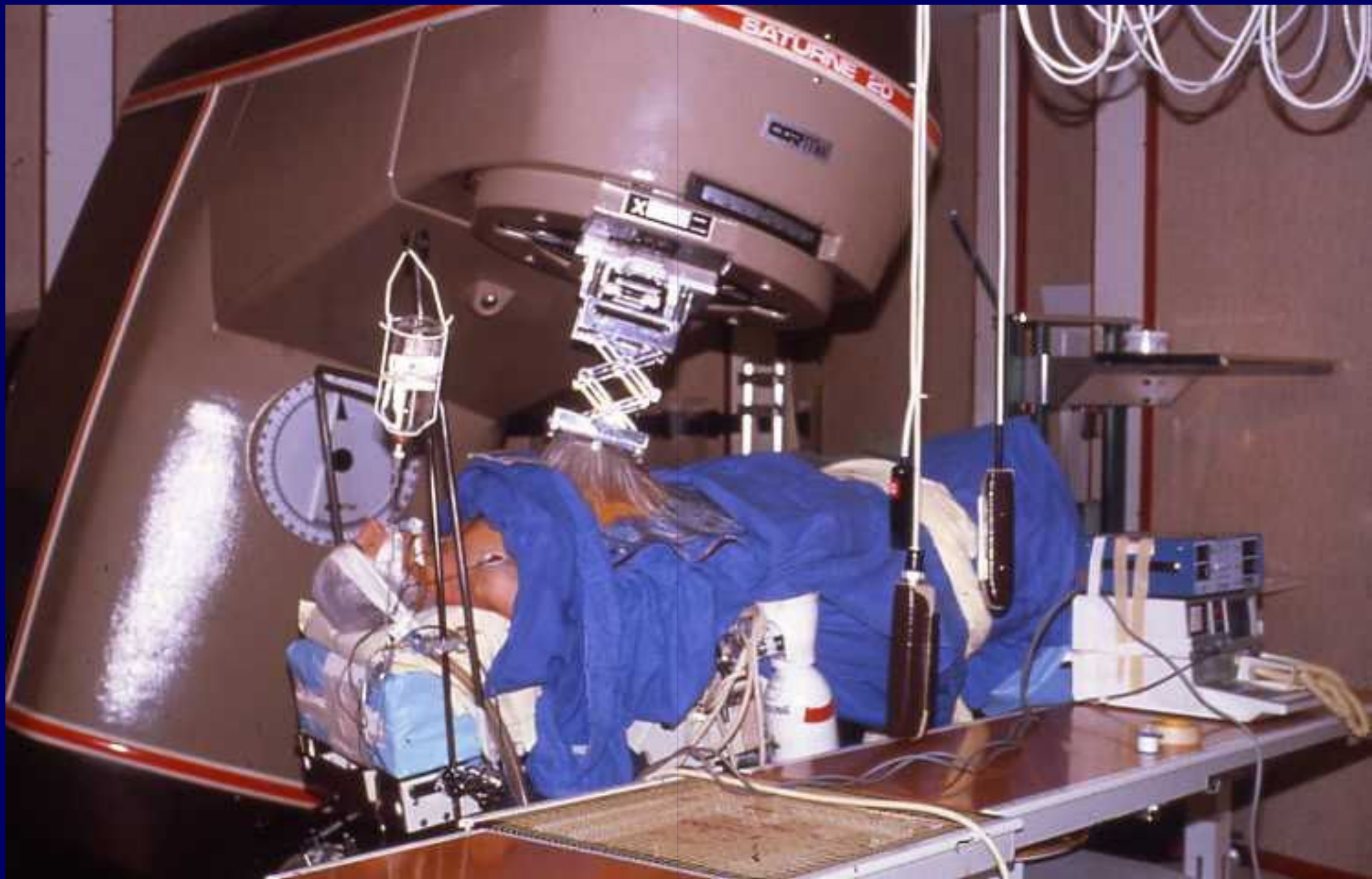
- Rectum

CXRT : 2% vs 30% pCR (ACCORD 12)

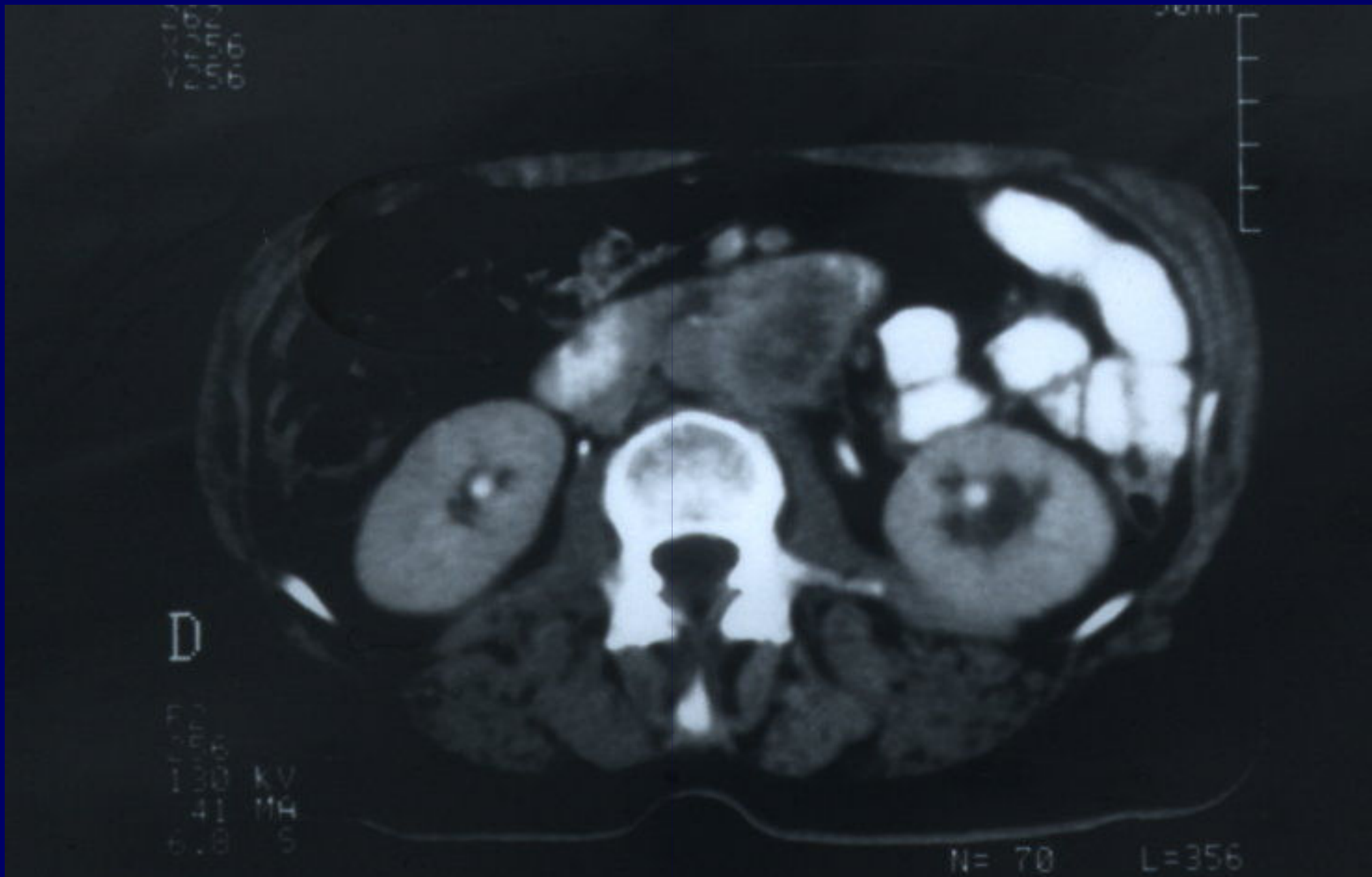


Radiothérapie per opératoire

IOERT
(Electrons)



12 - 20 Gy/1 F



40 Gy/4 w + 18 Gy IORT

TI 40
03-4-2009 10:51

+ 1331

R

L



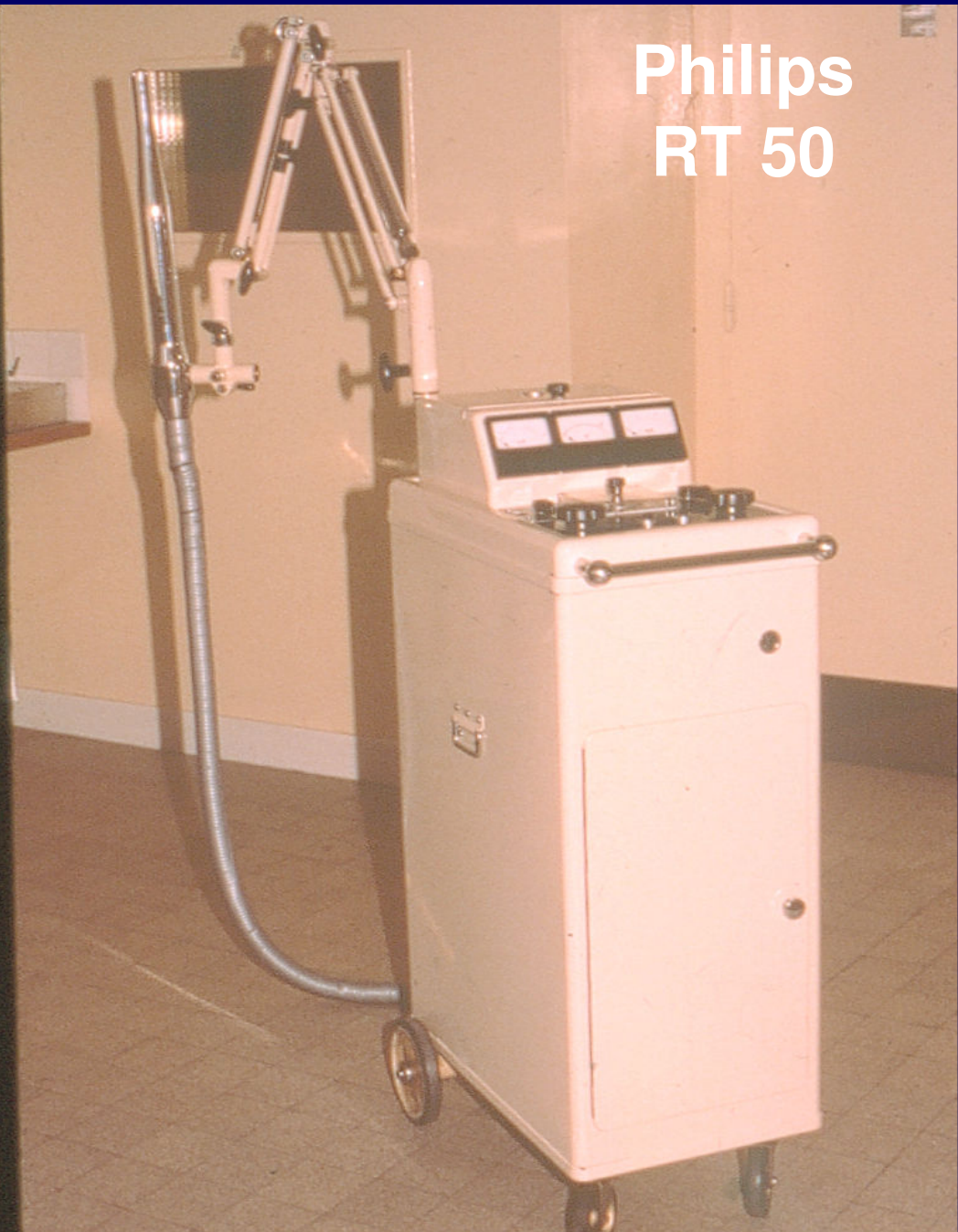
MU 400
WL 1200
1.5 mm



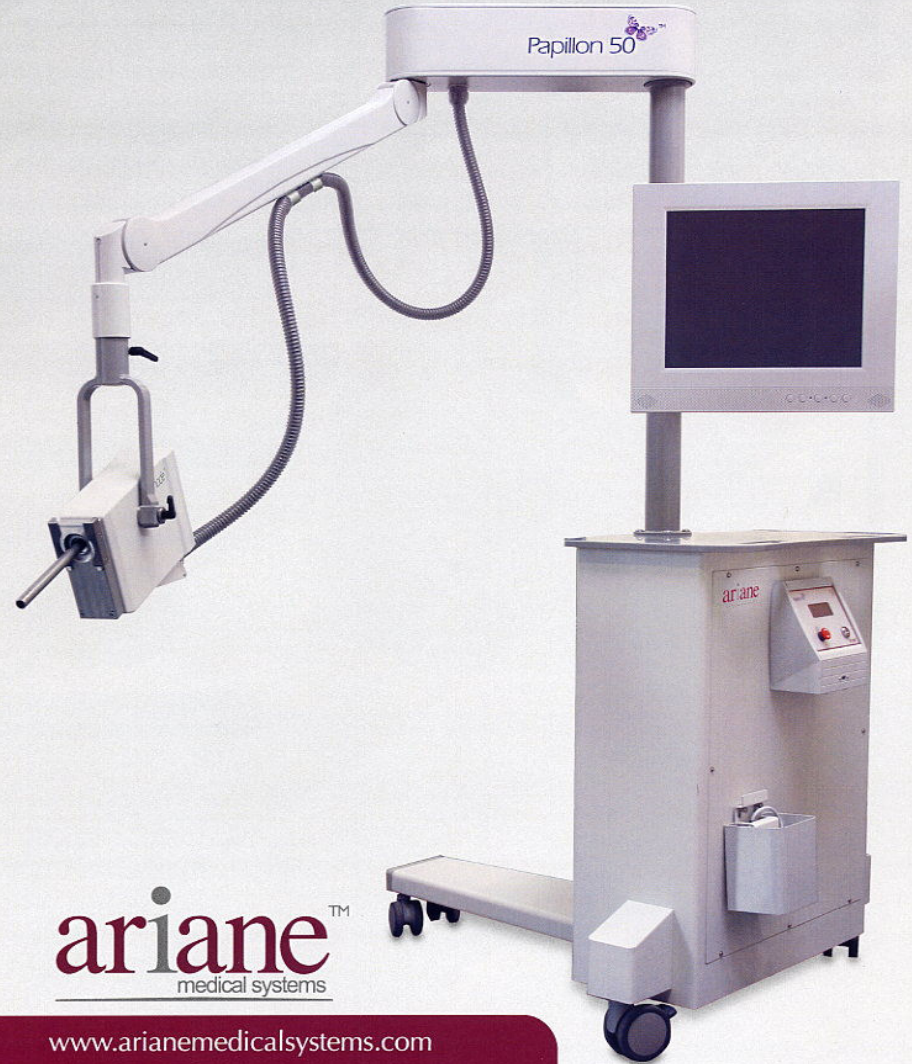
Mobetron®

LIAC (Italy)

Philips
RT 50



Papillon 50TM
A better way to treat
accessible tumours

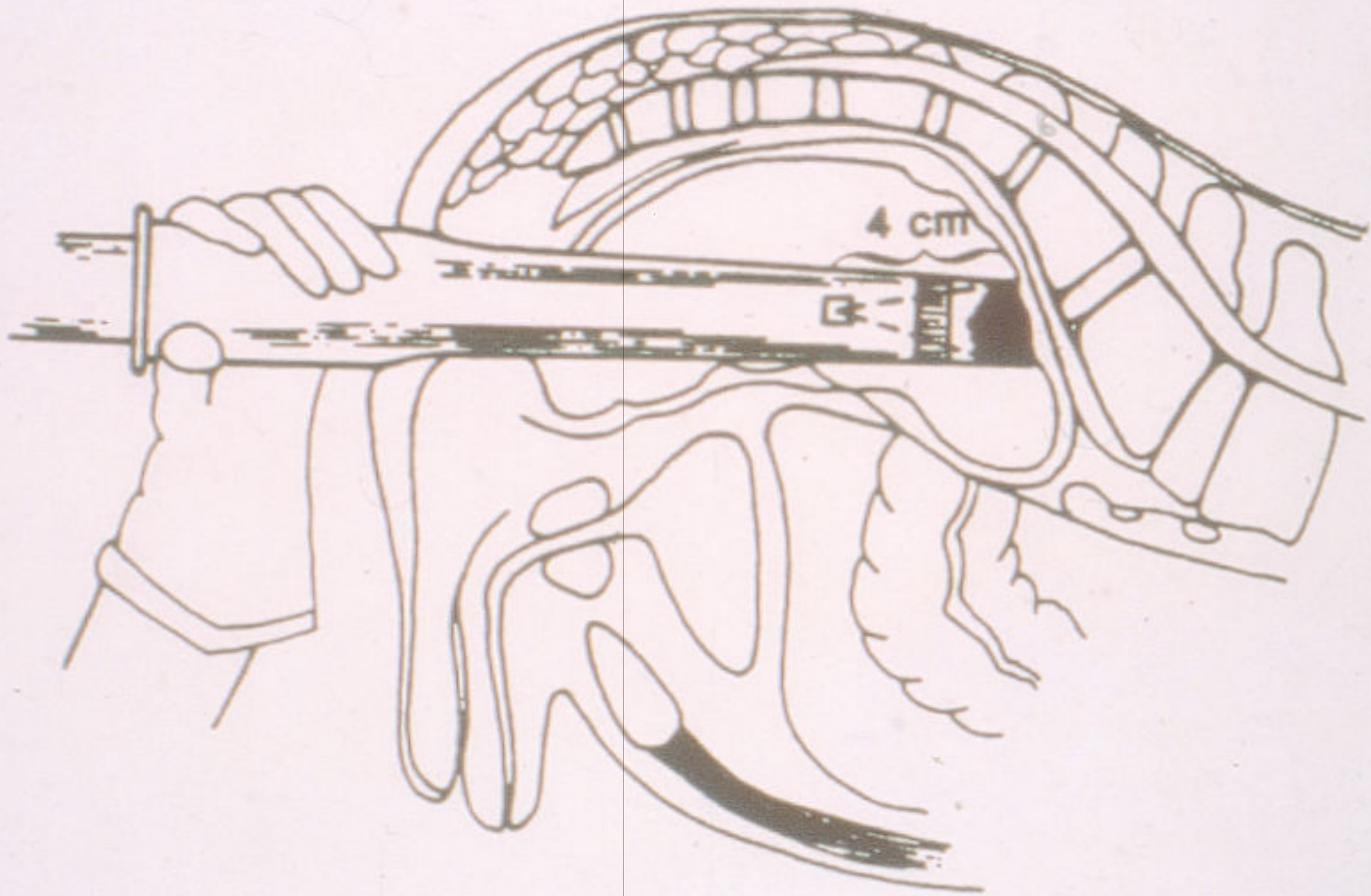


arianeTM
medical systems

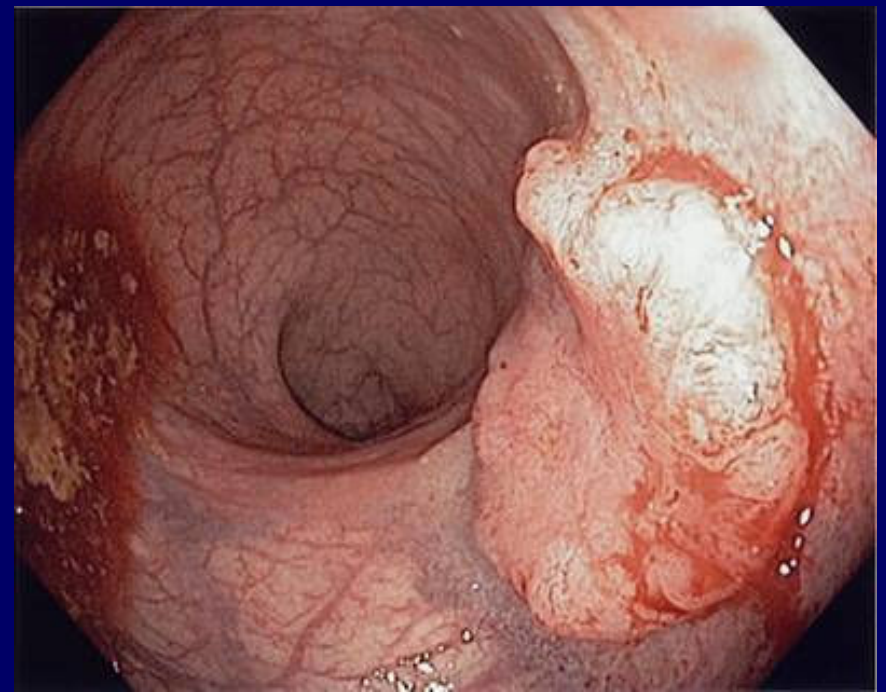
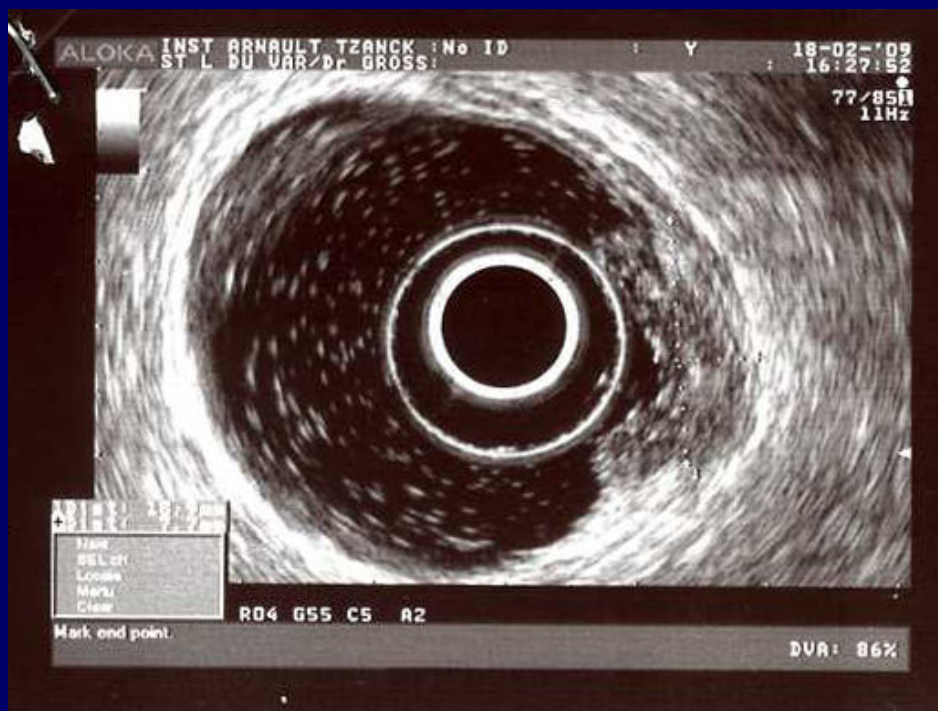
www.arianemedicalsystems.com



TREATMENT OF RECTAL CANCER



PAPILLON TECHNIQUE - (De VITA 1986)

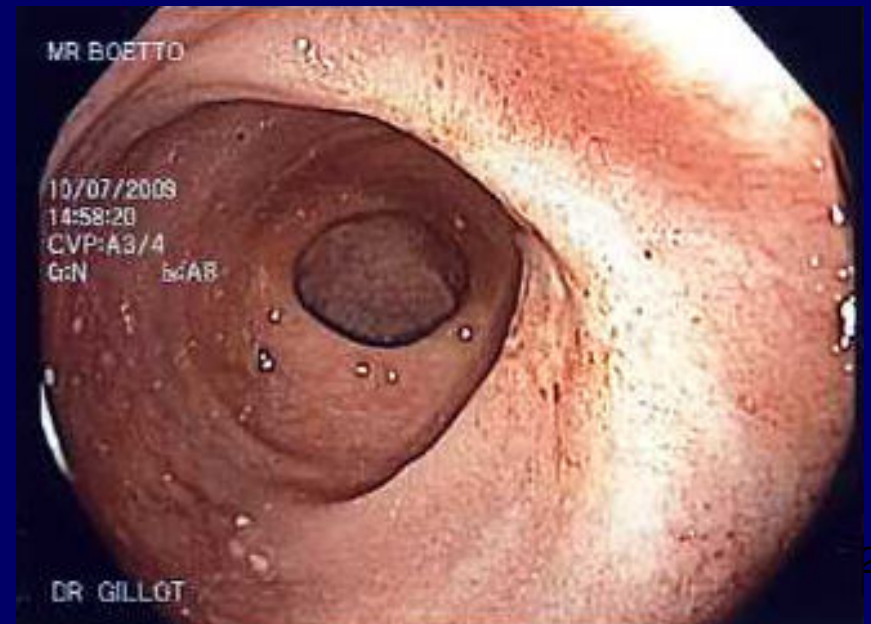


Mr B. 84 y Card. Ins.

ADK uT3 N0 low R.

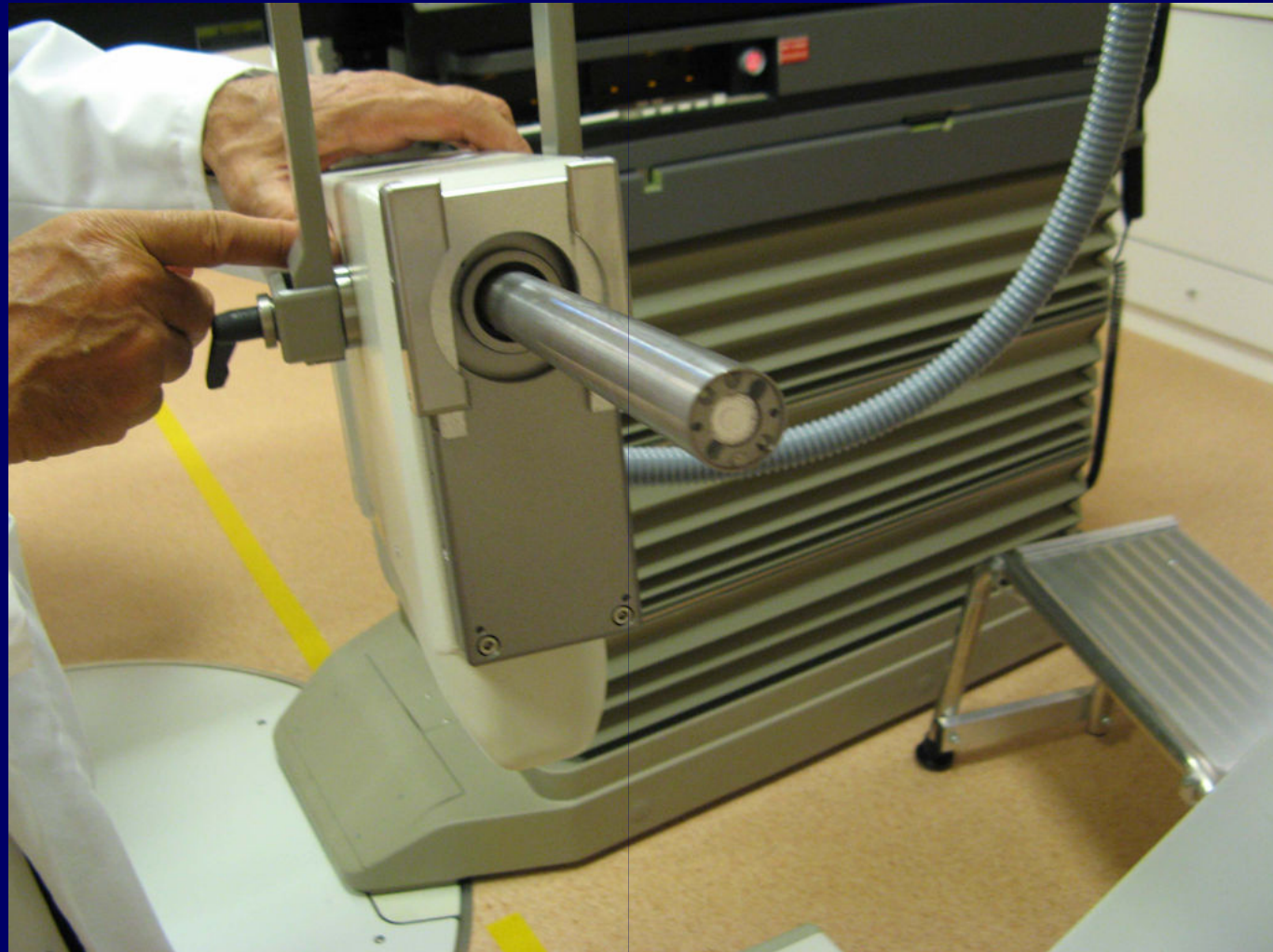
3/2009 : CXRT (100 Gy)

EBRT :CAP 50 = 9/09 NED





Papillon 50 clinical session



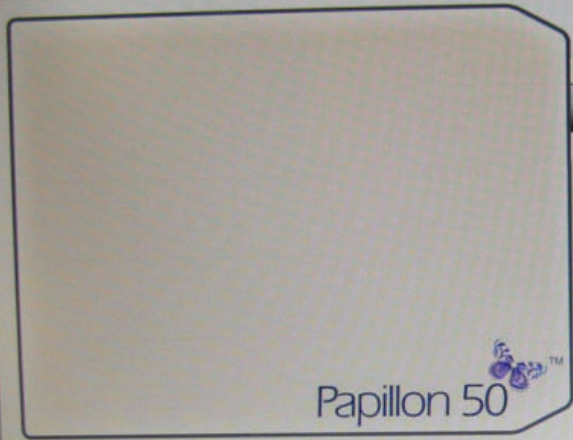
Clinical Mode

Service Mode

Treatment Setup

Clinical Options

System Shutdown



Image

Review Capture Internal External Adjust Adjust



Treatment

Oncology Ref:

Patients Name:

Applicator:

| | Prescription | Delivered |
|--------------------|----------------------|-----------|
| Tube Voltage (kV): | <input type="text"/> | 0.00 |
| Dose (MU): | <input type="text"/> | 0 |
| Time (Sec): | 0 | 0 |

Treatment Progress

0 Dose (MU) 0

CGMA X On Tlk User ES Off Pwr Key

Par: 57h 00m 12s DR: 4h 24m 17s PC: 1.1.0.0 P50: 1.1 CB#: 1.6 Serial No: 021 Cabinet: 26.75 °C Oil: 27.25 °C Rad: 28 °C



Miniaturized X-ray source,
shown actual size

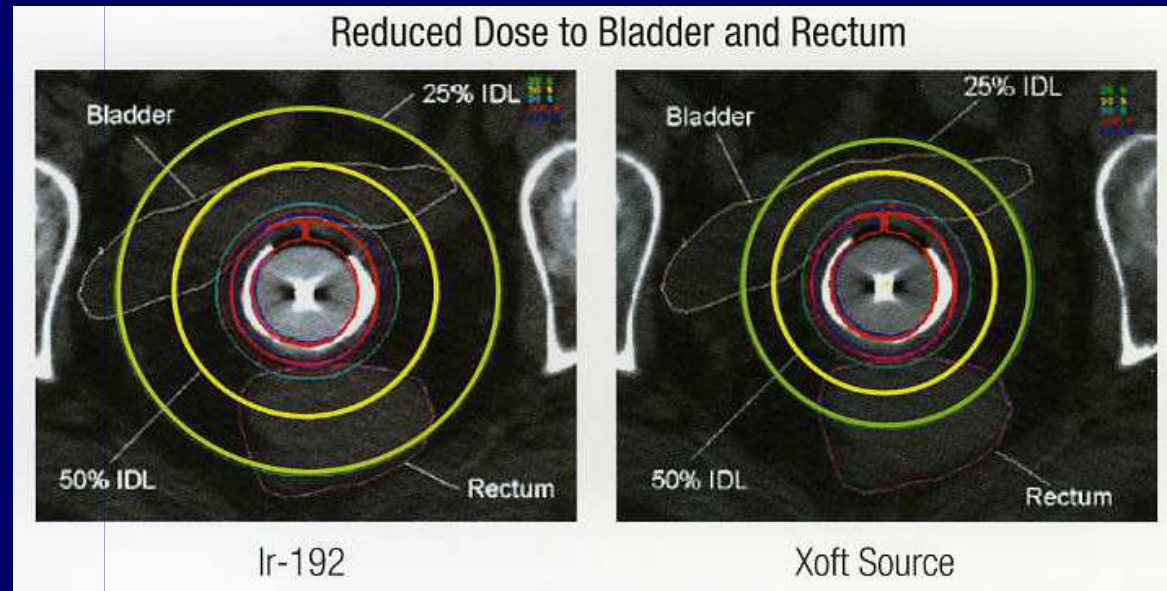
Axxent[®] -Xoft[®]

Axxent®

Electronic Brachytherapy System



Axxent HDR X-ray Source



Small is beautiful

HADRONTHERAPIE

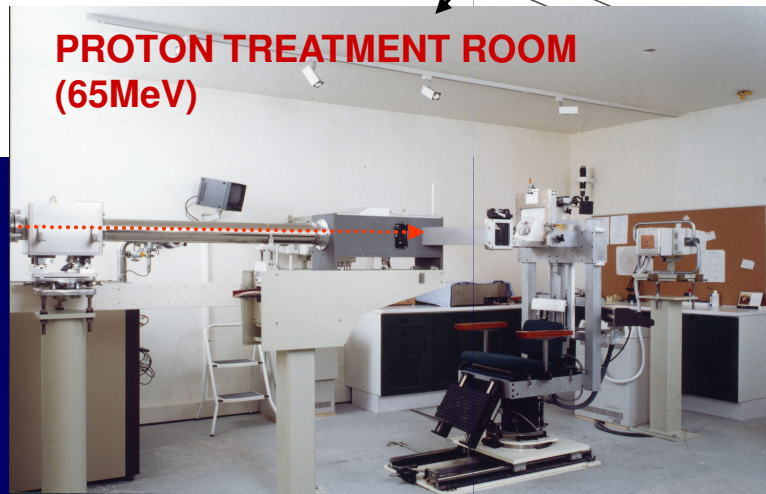
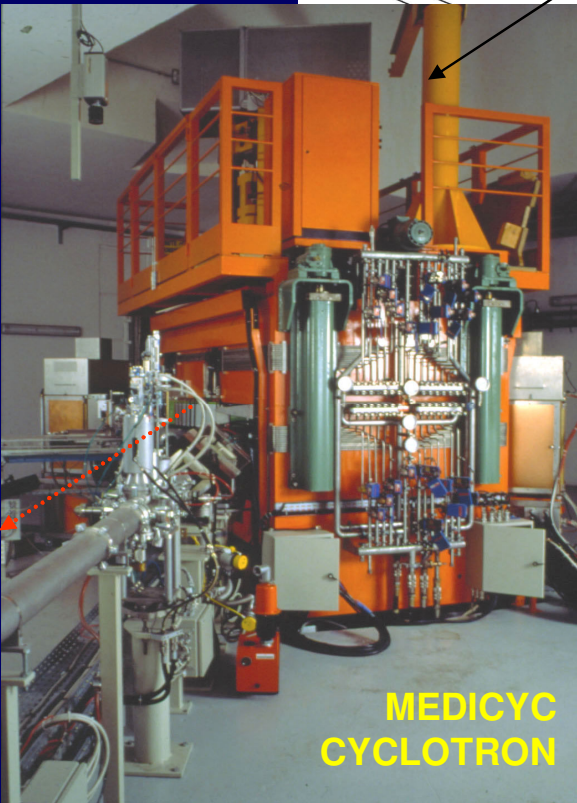
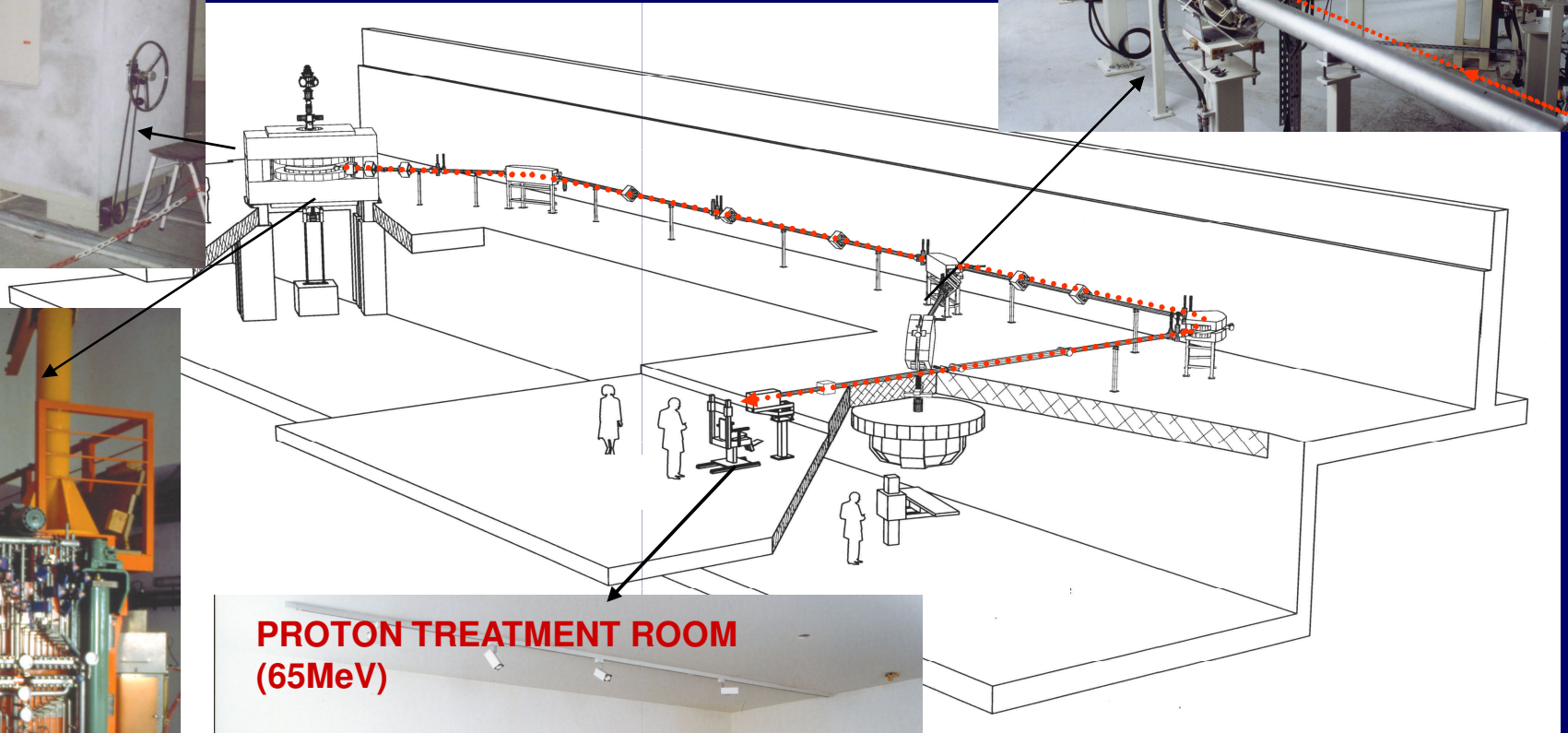
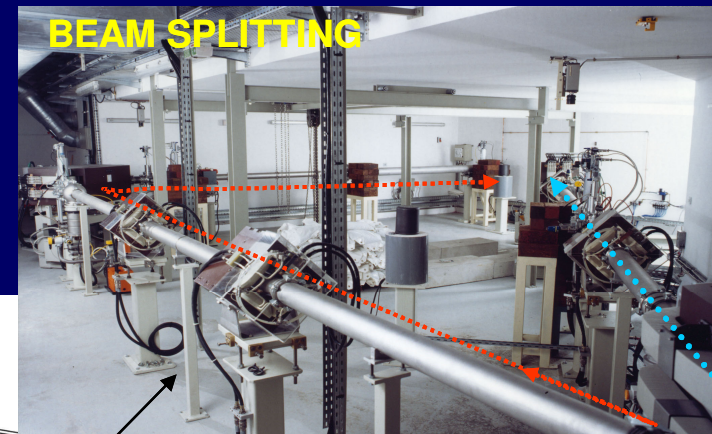
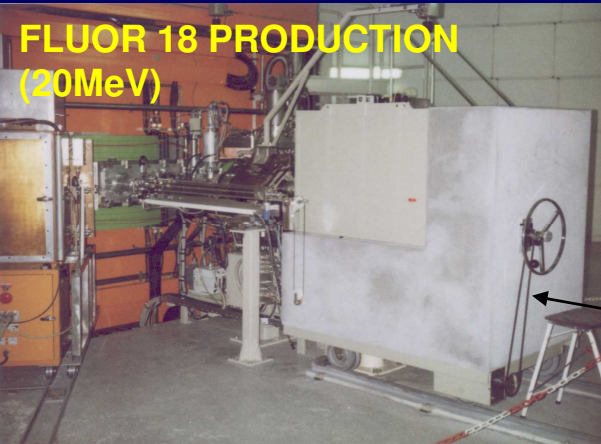
- "Particules Lourdes"

Proton – (neutrons) – alpha – C12

- Propriétés

- Balistique : pic de Bragg – lateral scatter
- Biologique : EBR - oxygène

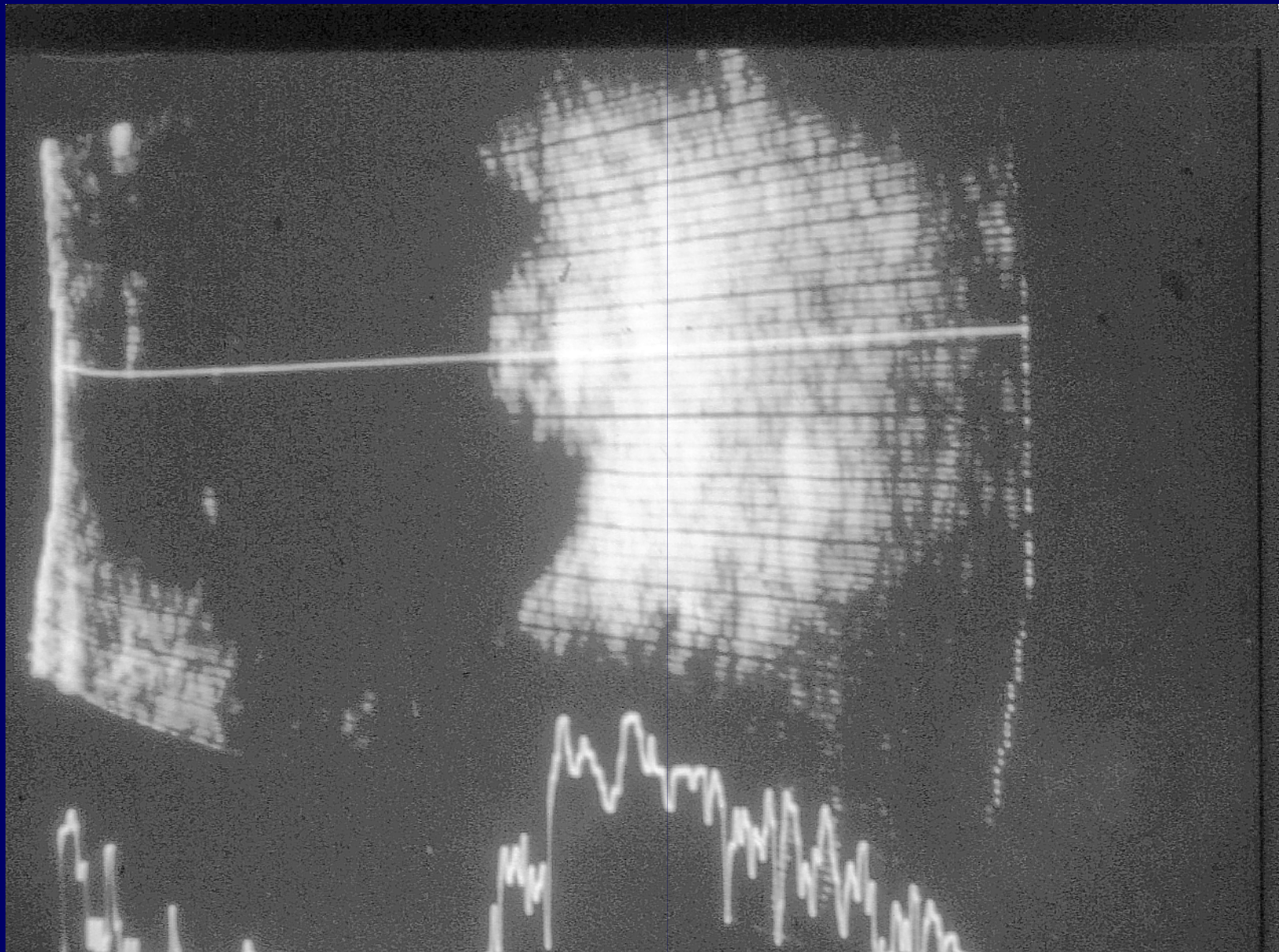
THE HADRON FACILITY in NICE

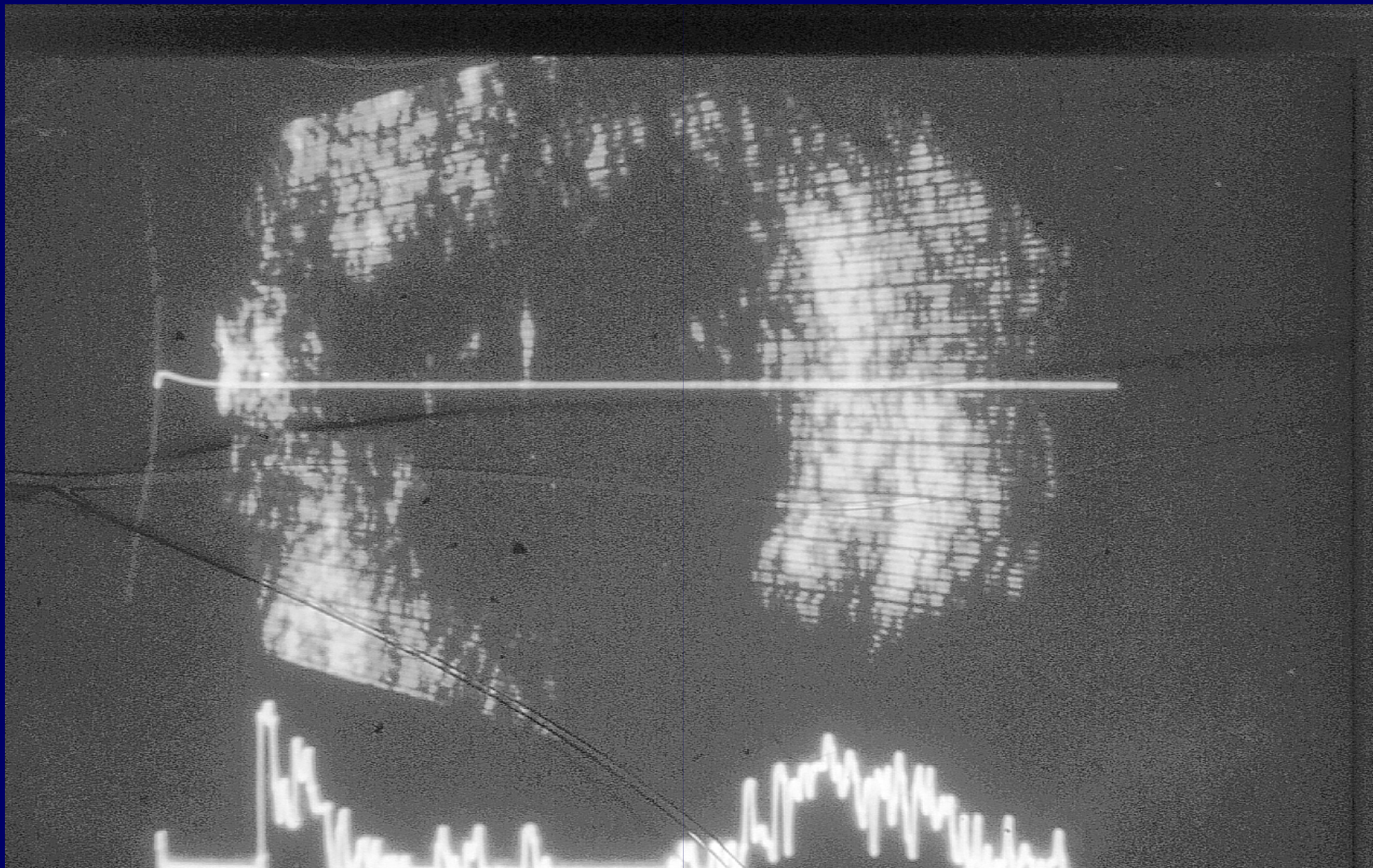




A. Courdi, P. Chauvel : IJROBP 1999 ; 45-5







NICE – Protons - Uveal melanoma

- 1991 – 2006 : 2532 pts (P. Chauvel)

Control local : 93% (T1-2 > T3)

Vision \geq 2/10 : 50%

5y survival : 92%

- Quality of beam : 63 MeV
- Neutron contamination
- Conjunctiva
- Monte Carlo algorithm (eye plan)

Paris – CP Orsay – I. Curie Protons – uveal melanoma

-1981 – 2006 = 2992 pts (L. Desjardins)

Local control : 94%

Vision > 2/10 : 82%

5 y survival : 78%

- Beam = 201 MeV

-Phase III

Hamrouni J Fr Ophtal 2005;28:833

Desjardins Ophtalm. Res 2006;38:255

Proton 201 MeV Beam - CPO

- Chordomas Base of skull – 1999-2003 = 100 pts
- Photons + Protons = 67 Gy (CGE) (45+22)
- ov. 5 y surv. = 80% (98% vs 52%)
- **local control = 54% (70% vs 34%) (4 years)**
- toxicity : chiasm - psychol.
 (42%) hearing - pituitary

Proton facilities - world

- USA

- Japan

China

- Europe

- continuous increased number

- pediatric onco: (2nd kc: **neutron**)

Hadron – Improved Beam delivery

- USA = Proton ++ Optivus – IBA
Varian – Siemens – Mitsubishi
- STILL RIVERS – Synchrocyclotron superConducting
Monarch²⁵⁰
- Livermore CA = Dielectric Wall Accelent
Tomotherapy : DWA (low – high)
intensity-modulated proton ++
- Laser – Plasma driven Accelator = 2020 ?

Proton – Innovative Technology

- Gantry - Active scanning - Laser

Plasma Tomotherapy – superconducting

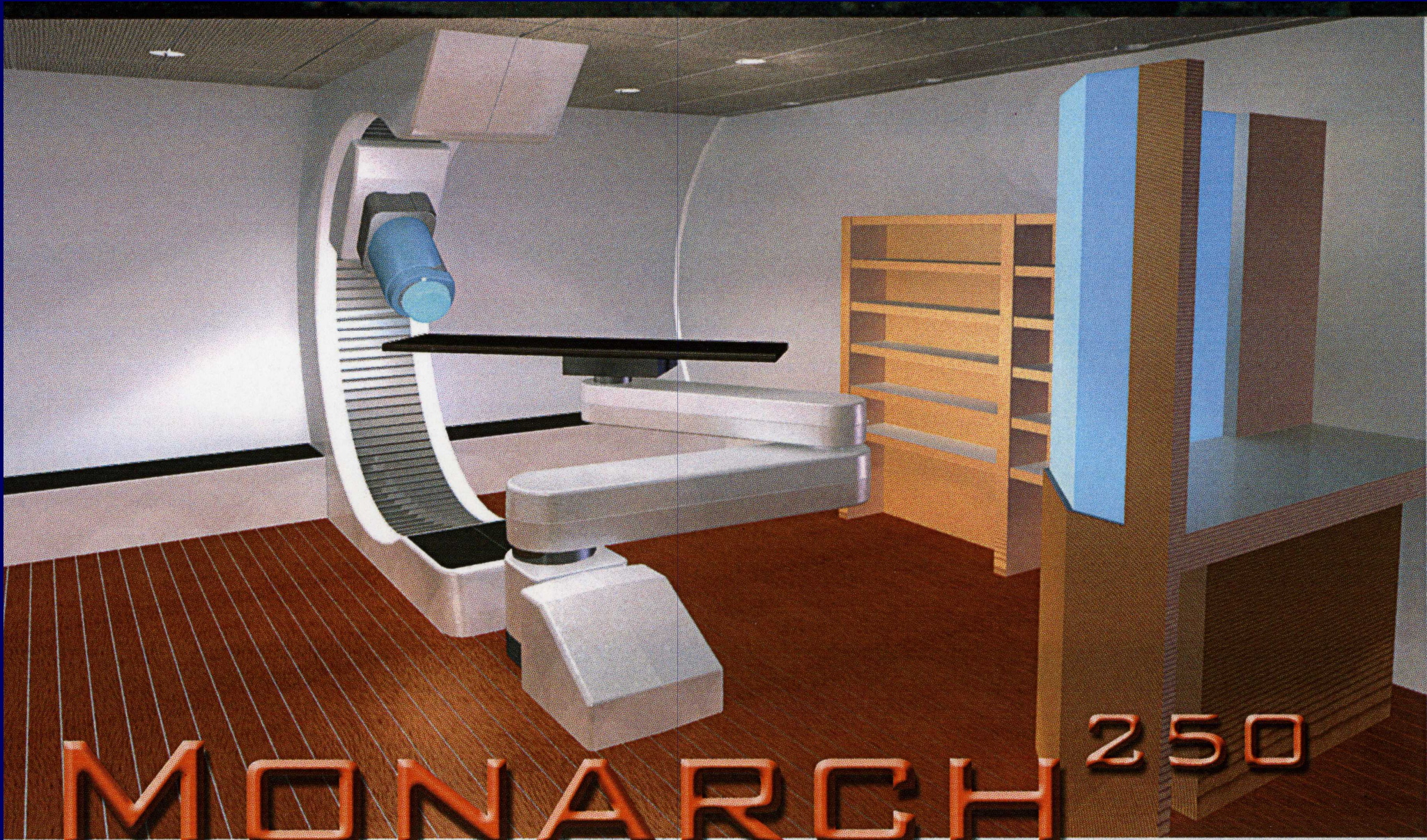
FFAG – Synchrocyclotron – mobile T.

From heavy (700 tons) expensive

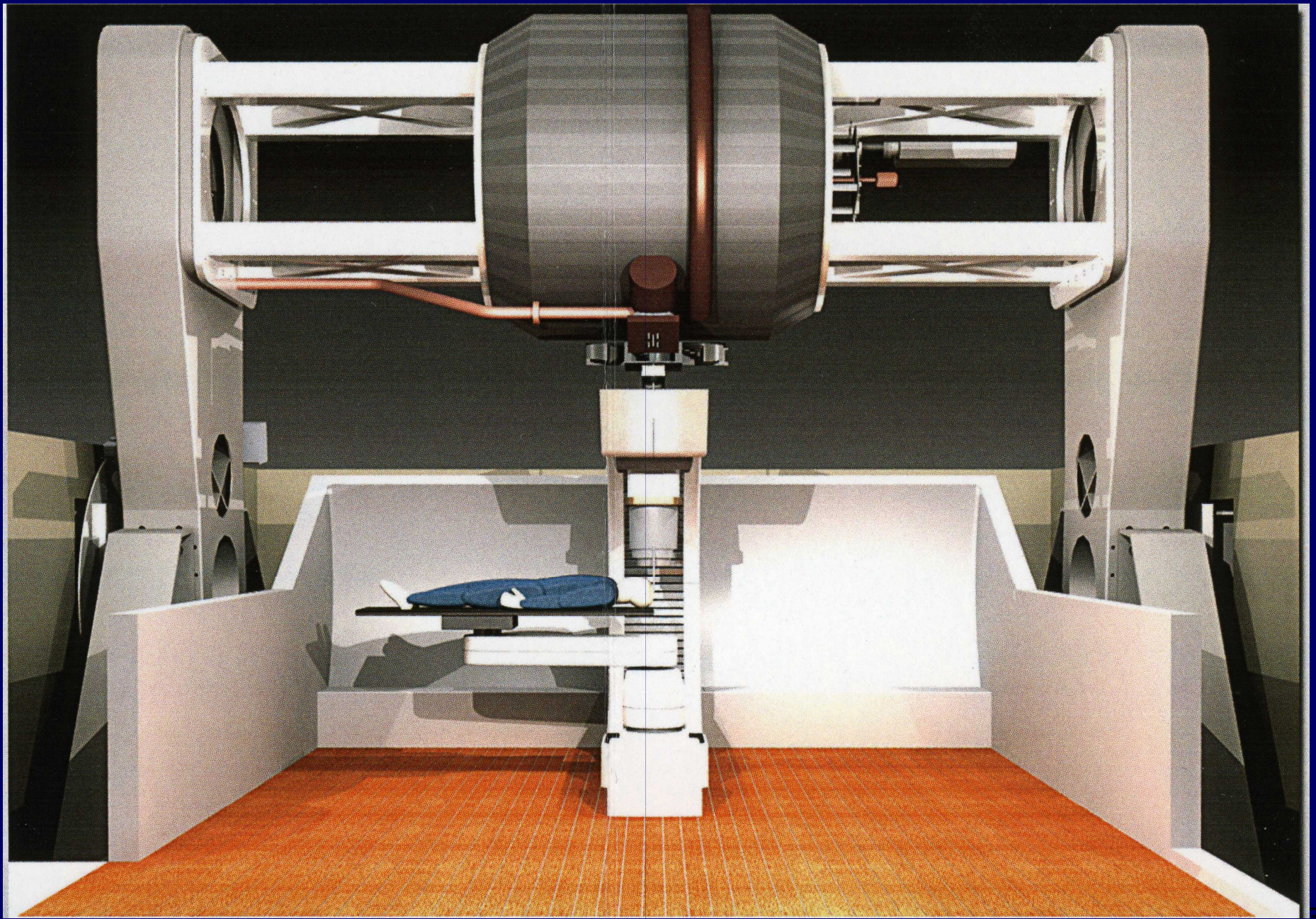
to light (60 tons) - “economic”-in hospital

CERN – LOCMAF unit ?

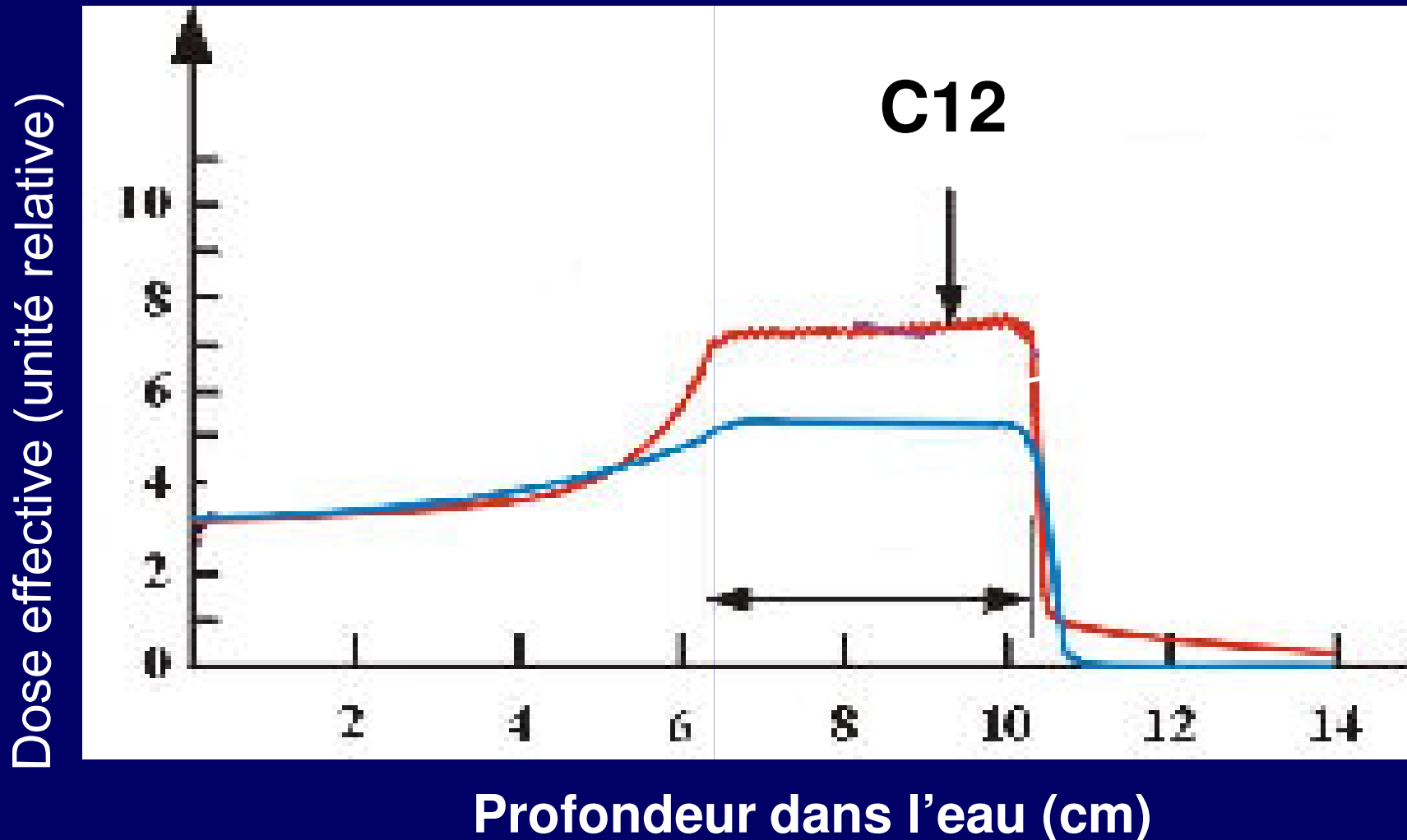




MONARCH 250



Effet biologique des ions carbone

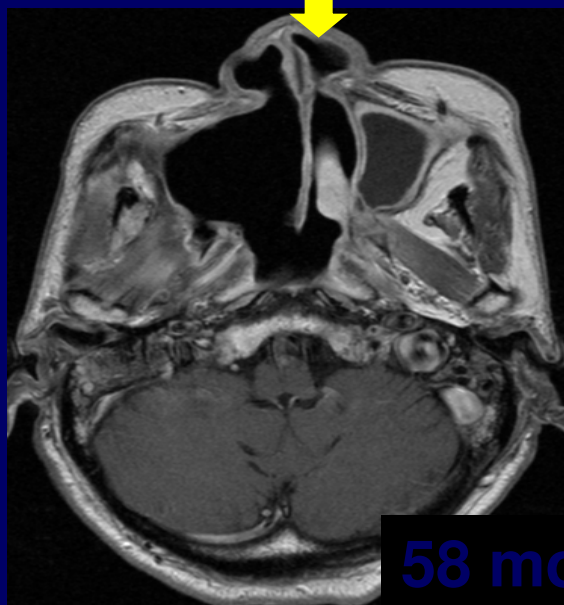
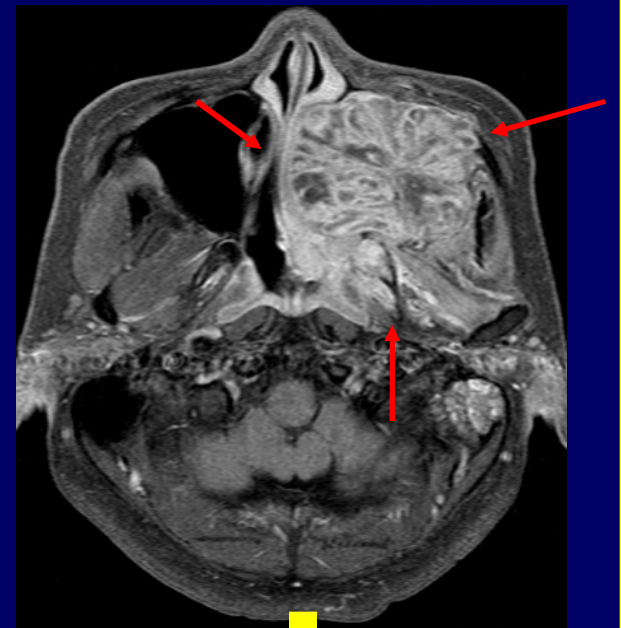
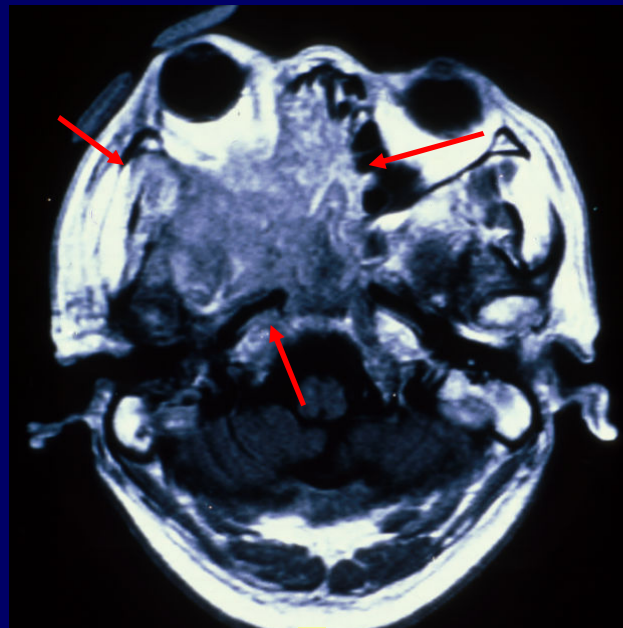


Effet biologique, pic de Bragg étalé, modulation d'intensité ⁷⁴

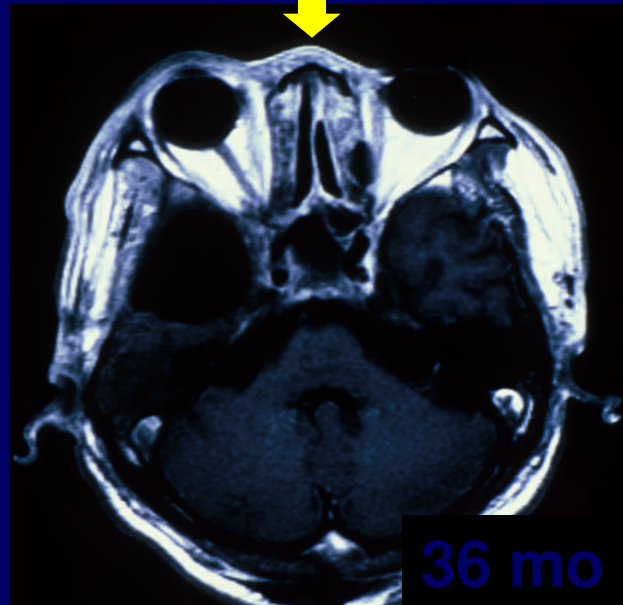
Malignant melanoma

Adenoca

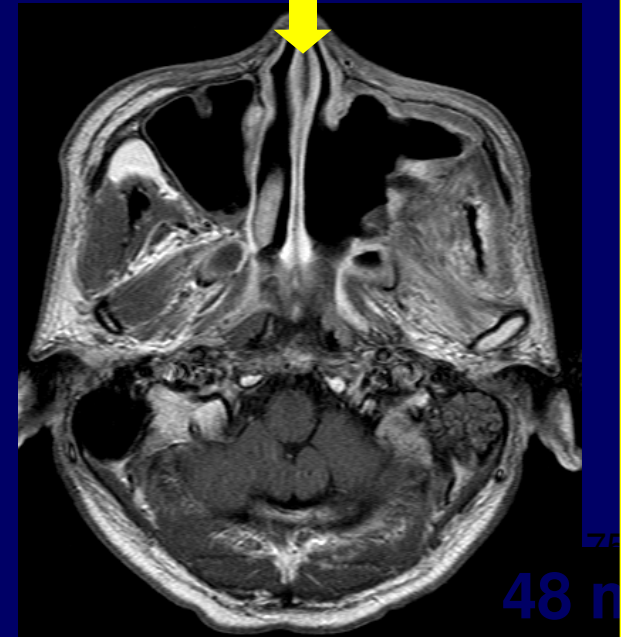
Adenoid cystic ca



58 mo

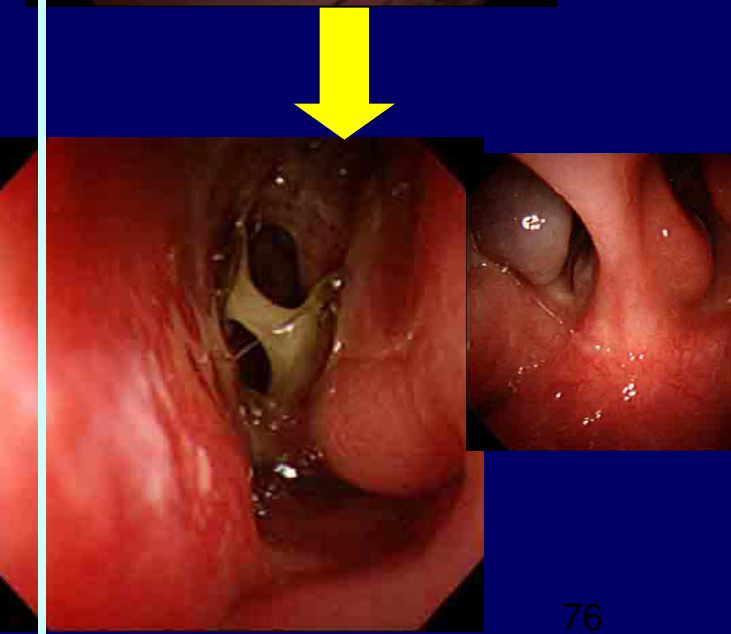
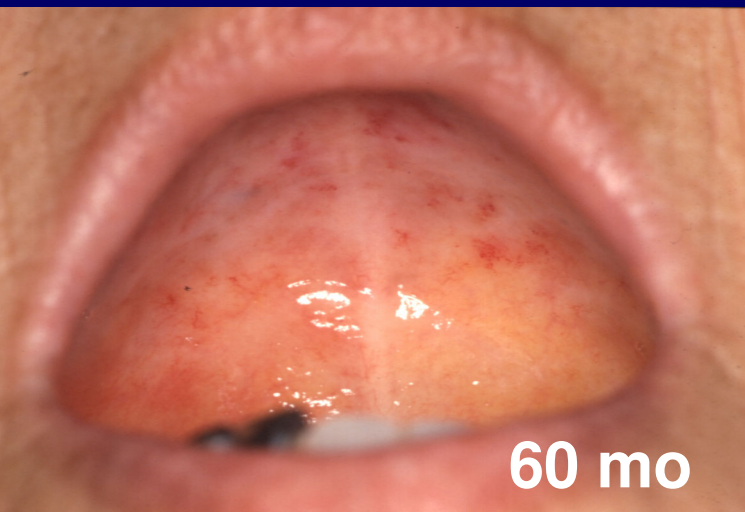
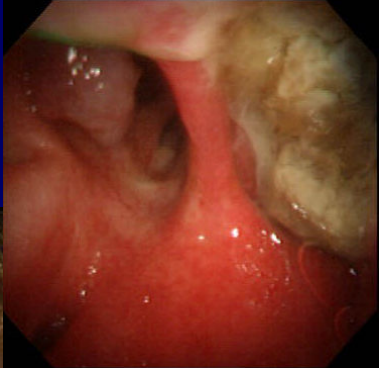


36 mo

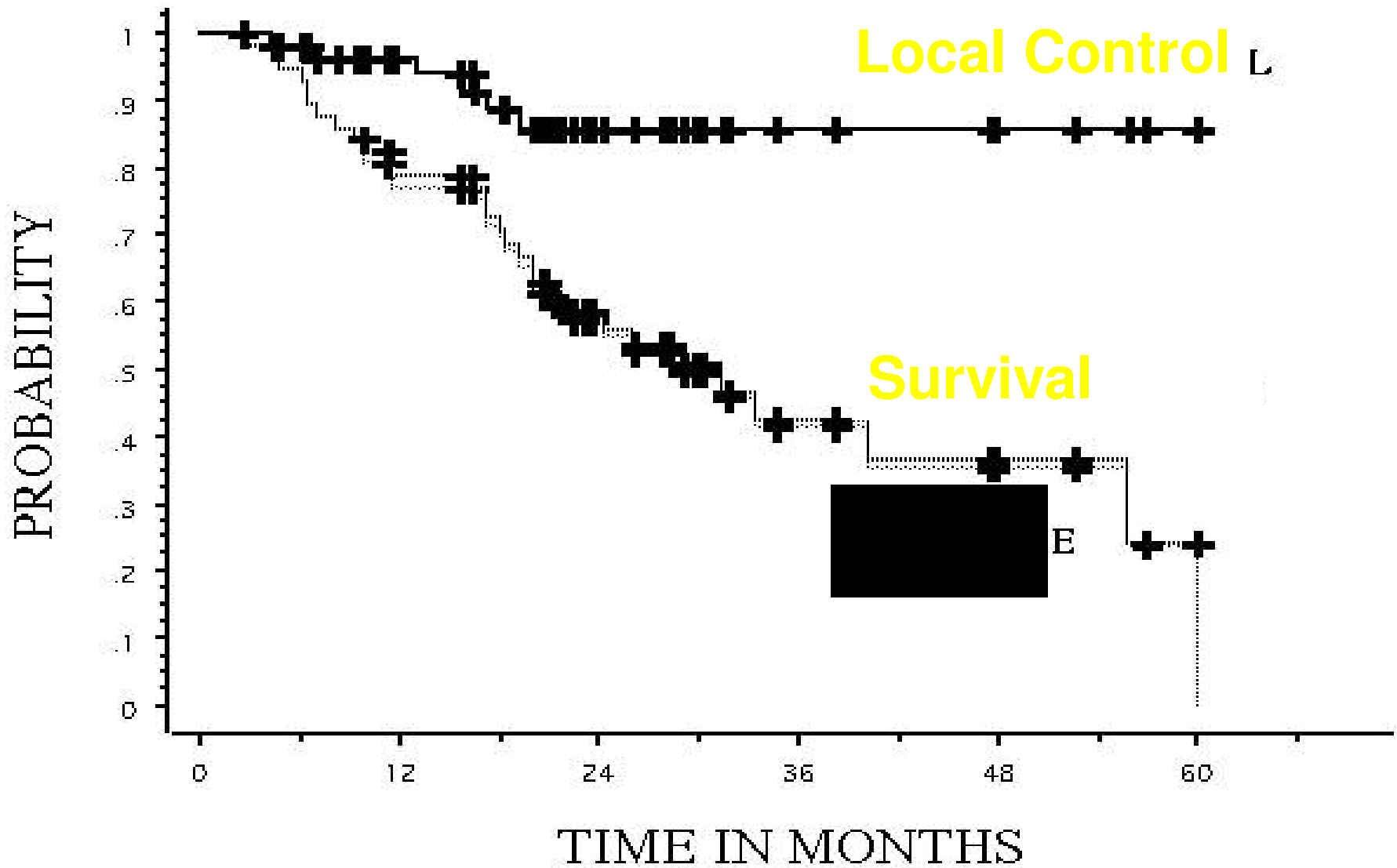


48 mo

Malignant melanoma

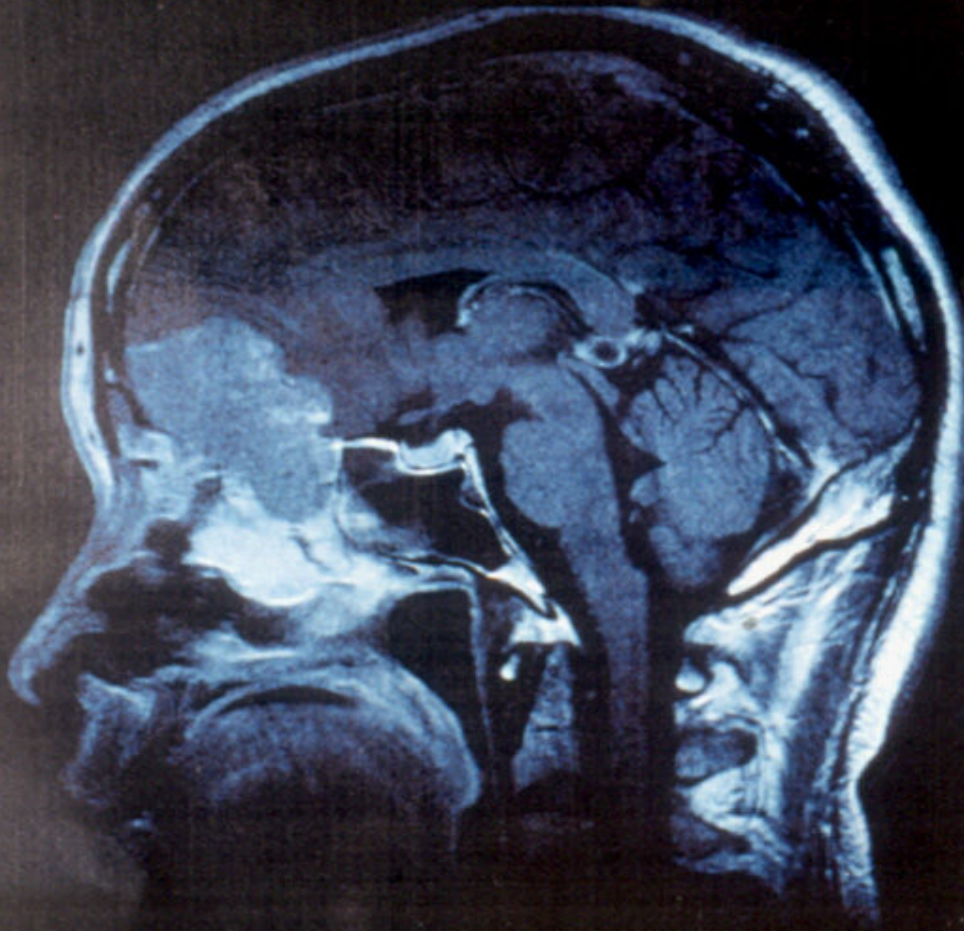


Malignant Melanoma (n=57)

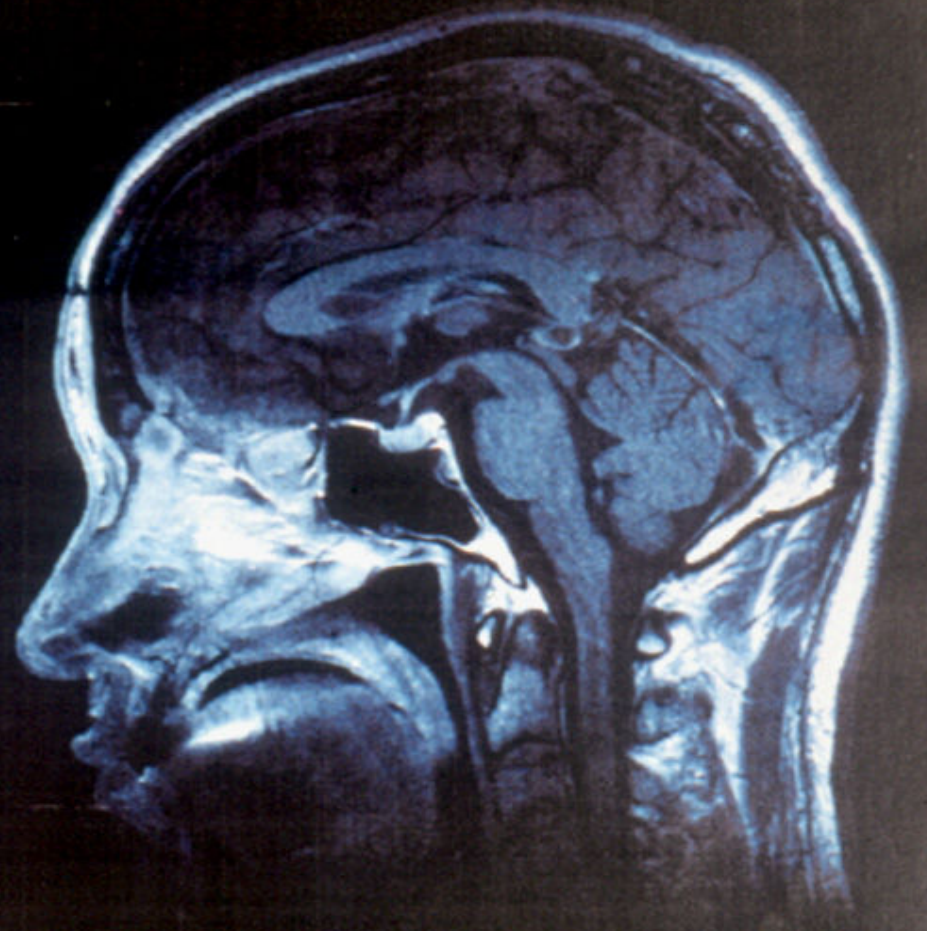


Adénocarcinome de l'ethmoïde (NIRS Japon)

Adeno ca. of the ethmoid sinus



Pre RT

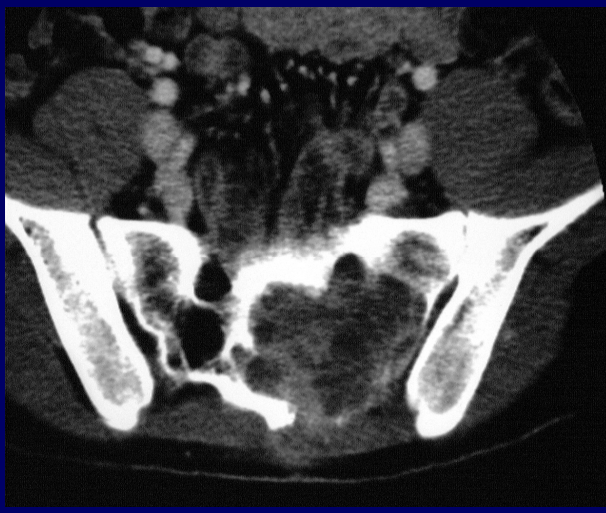


6 m

Osteosarcoma of the Sacrum

52.8 GyE/ 16 fx/4 wks (3.3 GyE x16)

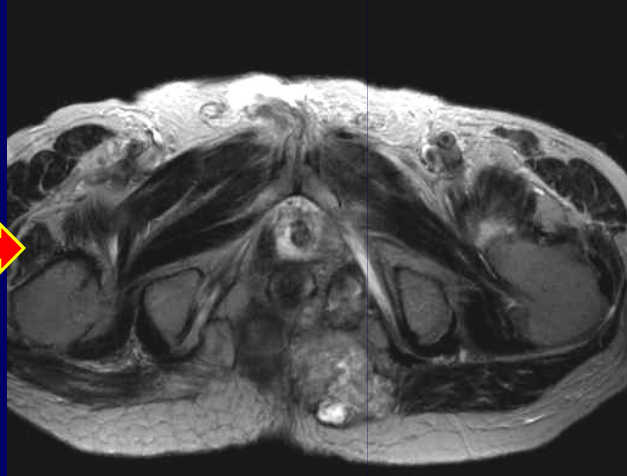
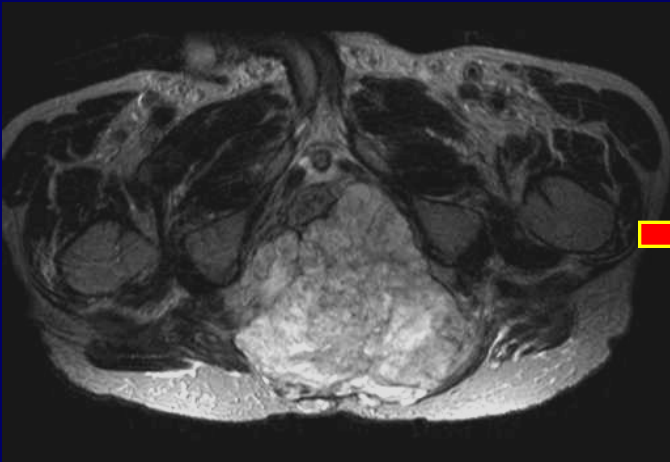
60 mo



Chordoma of the Sacrum

64.0 GyE/ 16 fx/ 4wks (4.0 GyE x16)

50 mo



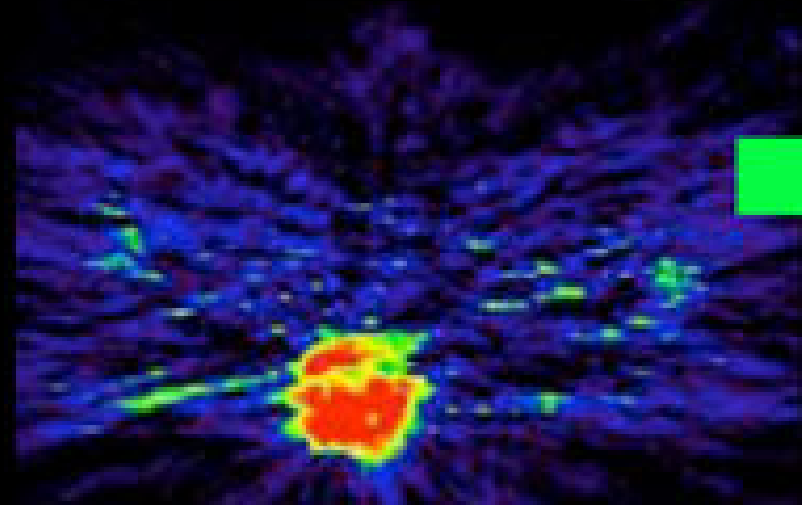
Case 1 : 64y M 73.6GyE/16Fr



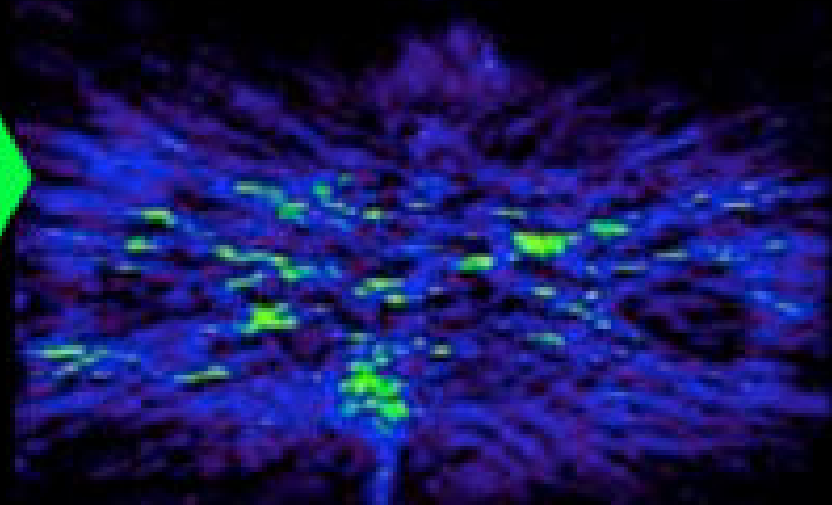
Before Treatment



2 months after Treatment

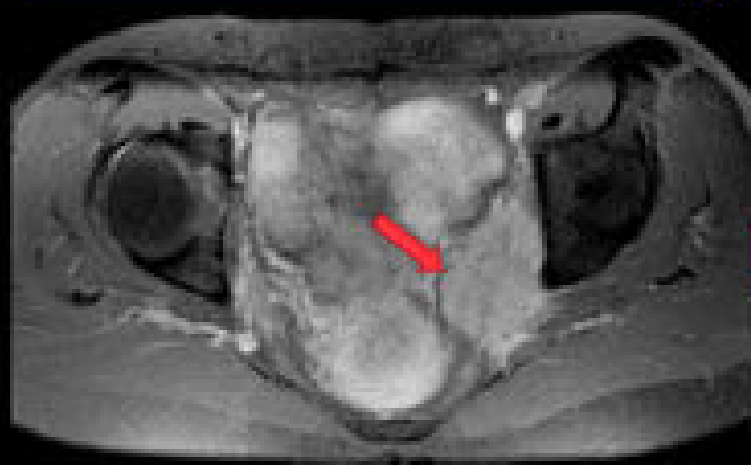


Before Treatment

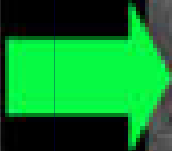


One month after Treatment

Case 2: 59y F 73.6GyE/16fr



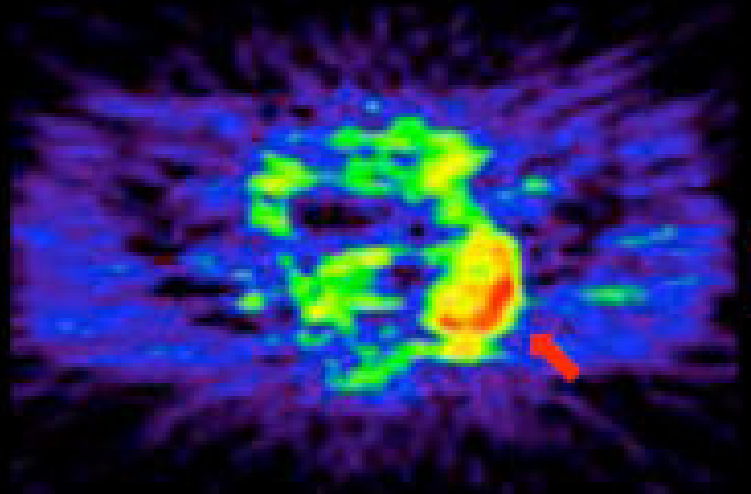
Before Treatment



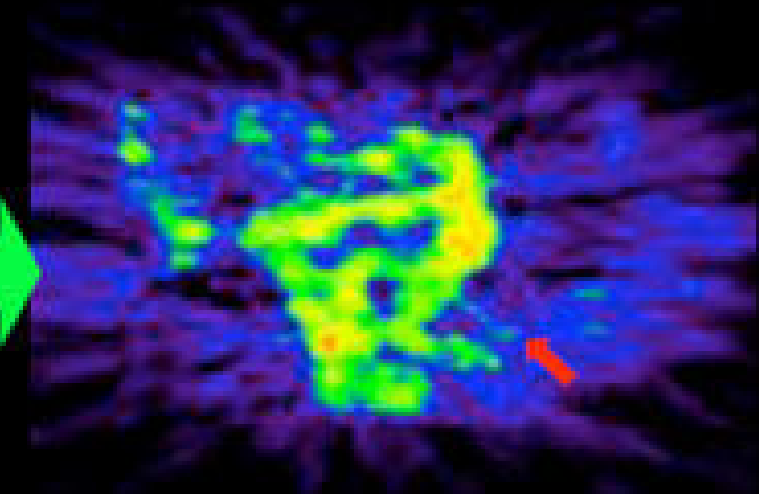
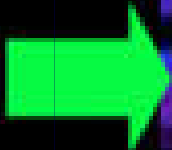
MRI



10 months after Treatment



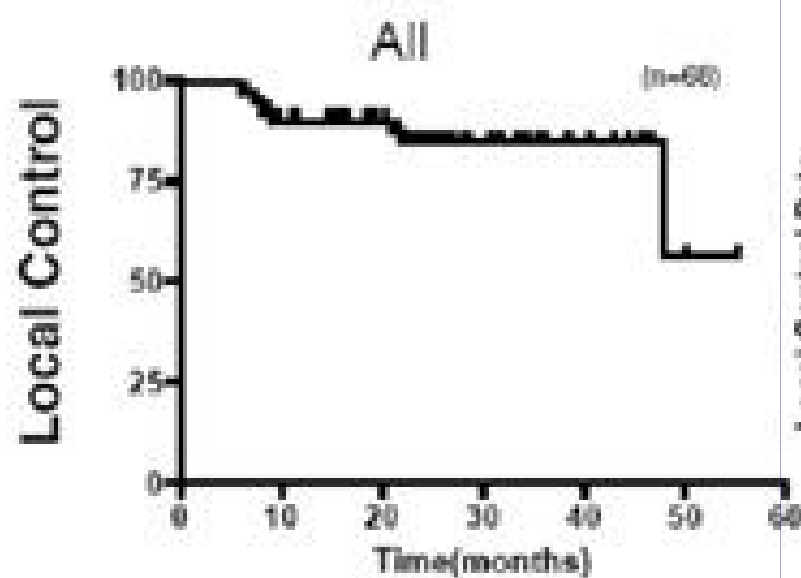
Before Treatment



One month after Treatment

Local Control Rates

(locally recurrent rectal cancer)

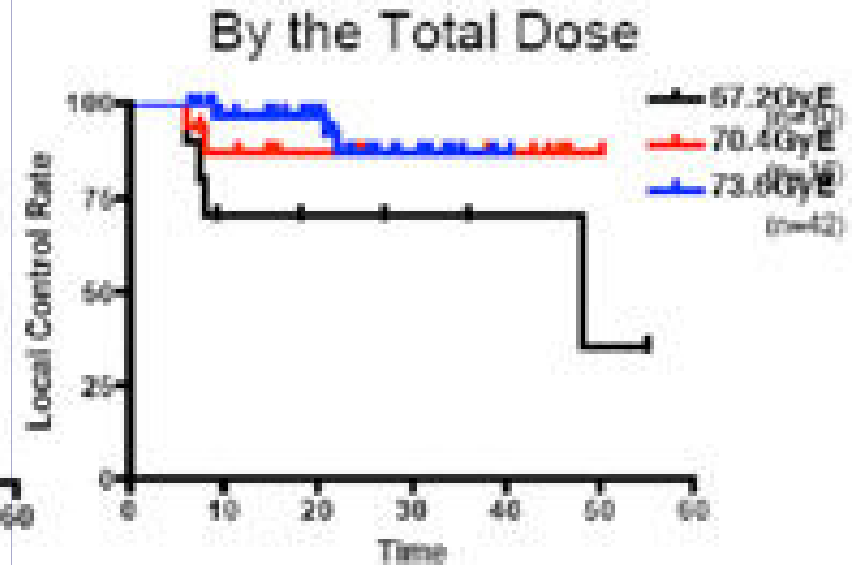


Local Control Rates

1y 93%

2y 83%

3y 79%



3y Local Control Rates

67.2GyE:70%

70.4GyE:87%

73.6GyE:87%

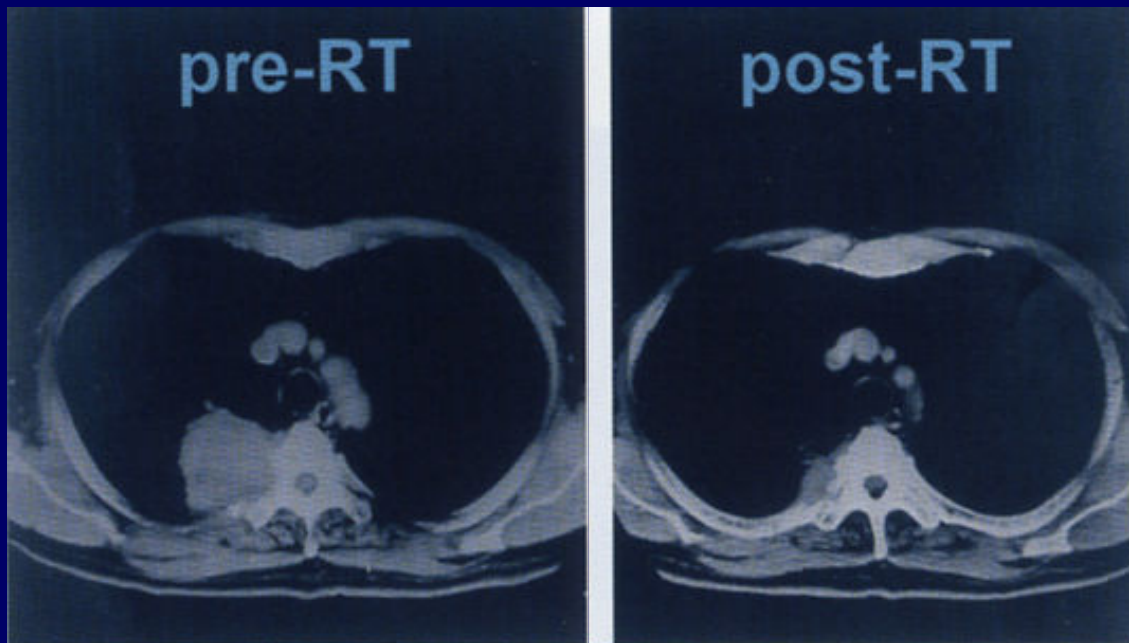
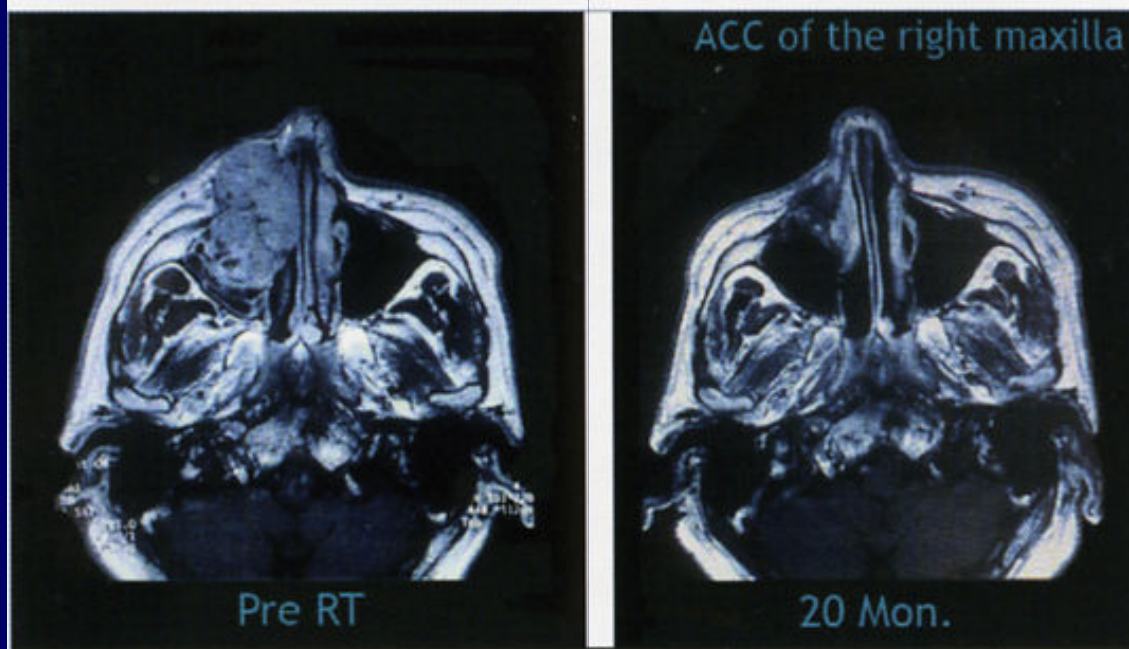


Fig. 4 : cancer pulmonaire avant et après traitement (Doc. NIRS, Chiba - Japon)



Résultats NIRS - CHIBA

| Loc | Lieu | N° | Contrôle | Tox ≥ 3 |
|--------------------------|------|--------|--------------------|--------------|
| Sarcome | NIRS | 224 | 85/95% | < 5% |
| Chordome (base crâne) | GSI | 96 | 70% | 4% |
| Poumon | NIRS | 50 (+) | 85-91% (dose +) | < 5% |
| ORL (CAK) | GSI | 29 | 77% | |
| Foie (CHC) | NIRS | 47 (+) | 95% | < 5% |
| Prostate | NIRS | 415 | 86-98% | |
| Gliome 3-4 | NIRS | 48 | Dose (+) | |

Hyogo – Carbon 12



Ion beam facility

Large medical device

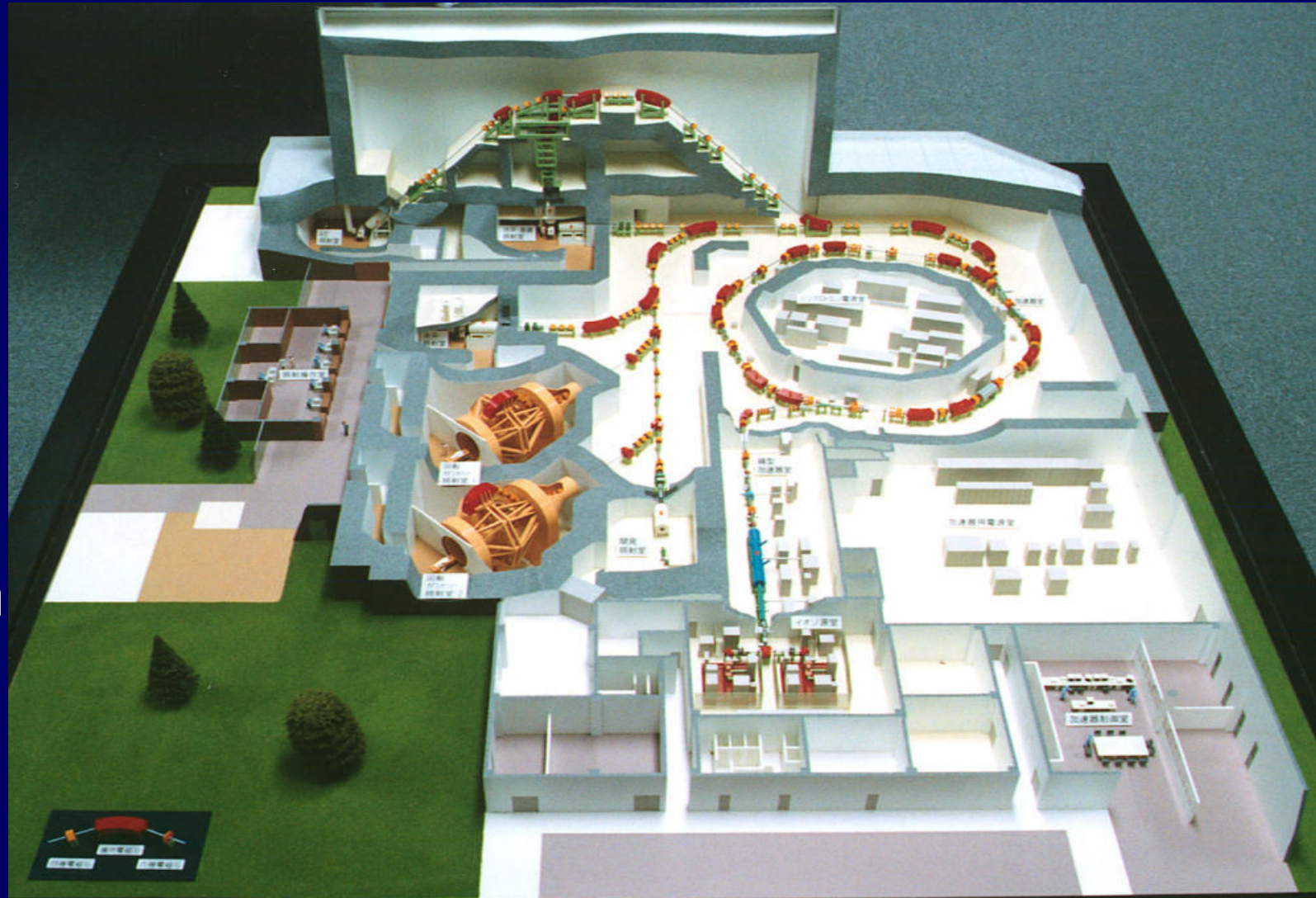
System

Ion source

Accelerator

HEB transport

Treatment room



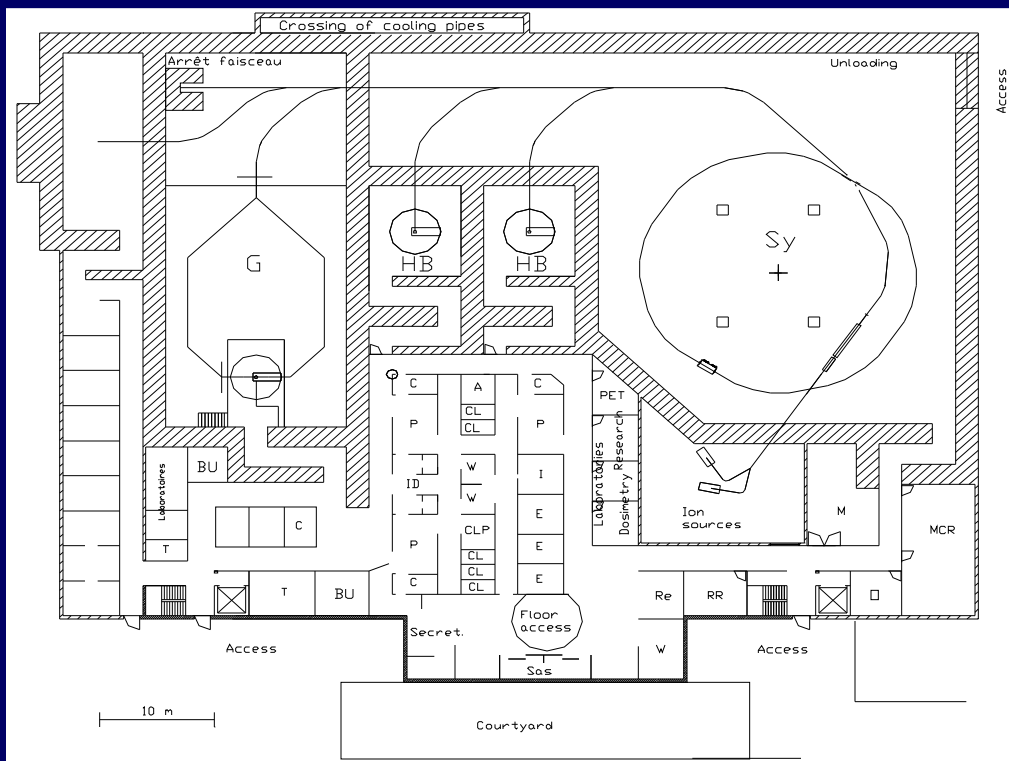
Carbon 12 (3 Tt rooms - 1000 pts/year)

| | Investment | running cost | Tt cost |
|---------------|------------|--------------|---------|
| | M € | M € | € |
| • Heidelberg | 68 | 14 | 26 000 |
| • TERA | 89 | 13 | 25 000 |
| • Lyon Etoile | 88 | 17 | 27 000 |
| • Medauston | 75 | 14 | 24 000 |
| • Karolinska | 80 | 17 | 27 000 |



Université Claude Bernard Lyon 1

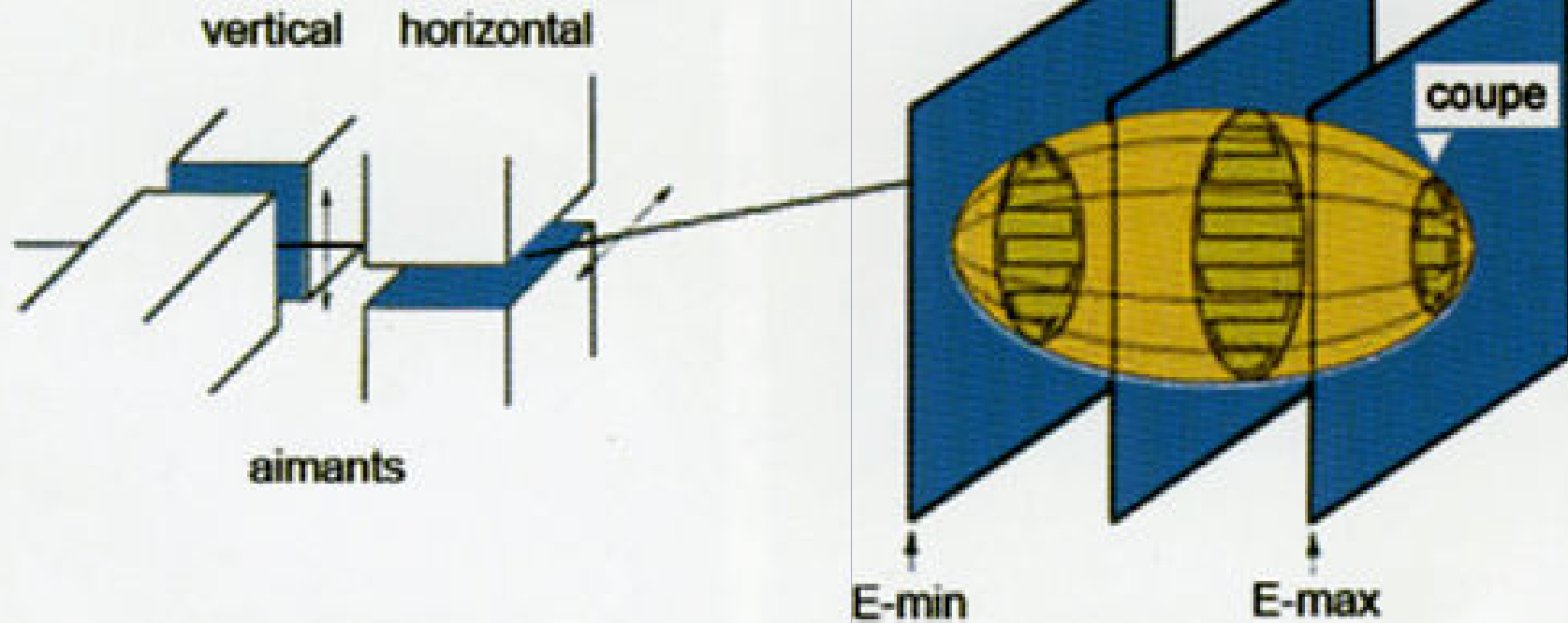
Building (new design)



ETOILE - LYON



Balayage



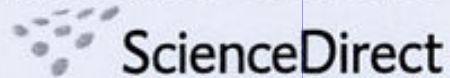
Hadrontherapy in France : 2007 - 2012

- Neutron : Orléans (closed 2008)
- Proton : - **Orsay** (CPO) 230 MV - 3 rooms - Gantry
eye - Base skull - Pediatric
 - **Nice** : 63 MV - eye (supra)
 - **Caen** Archade : Research
- Carbon 12 : **Lyon** Etoile 2012



ELSEVIER
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Disponible en ligne sur www.sciencedirect.com



Cancer/Radiothérapie 12 (2008) 141

CANCER
RADIOTHÉRAPIE

<http://france.elsevier.com/direct/CANRAD/>

Éditorial

Sécurité et transparence Au cœur de la culture des oncologues radiothérapeutes

En France, chaque année, environ 200 000 patients bénéficient d'une radiothérapie sous le contrôle de 600 oncologues radiothérapeutes. La radiothérapie participe directement à 40 % des guérisons observées actuellement en cancérologie : elle est à la base des traitements conservateurs (œil, larynx, sein, rec-

des traitements qu'ils dispensent. L'ouvrage accessible aux professionnels et au grand public, témoigne de leur volonté de transparence : il s'est orienté essentiellement sur les questions de qualité des traitements, de gestion du risque et de respect des doses de tolérance aux organes à risque, et sa légitimité se fonde

J.P. Gérard, M. Bolla

Cancer/Radiothérapie 12 (2008) 141

SOMMAIRE (362 pages)

GUIDE DES PROCEDURES DE RADIOTHERAPIE EXTERNE 2007

Société Française de Radiothérapie Oncologique
avec la participation de la Société Française de Physique Médicale,
de l'Autorité de Sûreté Nucléaire, de la Haute Autorité de Santé et
de l'Institut National du Cancer



- 2007 -

HAS

HAUTE AUTORITÉ DE SANTÉ

sfpm

SOCIÉTÉ FRANÇAISE DE PHYSIQUE MÉDICALE



INSTITUT
NATIONAL
DU CANCER

AUTORITÉ
DE SÛRETÉ
NUCLÉAIRE
asn
www.asn.fr

- Parcours du patient
- Infrastructure – équipement
- Radiobiologie
- Dose : contrôle - Tolérance OAR
- **Radioprotection** : Justification optimisation
- **Sécurité** - qualité (pédiatrie, grossesse)
 - Procédure 35 localisations
 - Prescription : **volume/dose** : OAR
 - Préparation - technique traitement

2010 – 2020 = where to go for RXT

- **Mobile Target – IGRT**
lung – liver etc...
- **Stereotactic RXT**
brain – extracranial
- **Proton : (eye-paediatric-specific T.)**
- **Light Ion = C12 – Helium**

Physics + Biology

Better Geographical Targeting

to increase :

- . Conformality
- . Therapeutic ratio

(cost-benefit ratio)

IDEAL = 100 % in tumour (Dose – Gy)

0 % in normal tissue

2010 – 2030 - changes +++

- Population : industrialized – BRIC – developing
 - **Ageing** : 5-10 % \geq 80 years (F = 5M)
 - Cancer in France :
 - 400.000/y
 - RXT : 200.000 - initial : 150.000
 - meta : 50.000
- 25-30.000 \geq 80 y

Cancer Treatment 2010 - 2030

- **Surgery ++**
- **Medical Treatment (Molecular biology)**
 - chemo. Hormono
 - Biotarget drug (Mol. Signature)
- **Radiotherapy : Accurate targeting – High LET**
 - “Bio modulation” ?
- **Global approach of patient**
Taylorred Treatment of Tumor

Complexity - Hyperspecialization

ROENTGEN



26 décembre 1895



VICTOR DESPEIGNES 1896

**Observation
concernant un cas de
cancer de l'estomac
traité par les rayons
Rontgen**

*par le Docteur Victor
Despeignes, ancien chef
de travaux à la Faculté de
Médecine de Lyon.*

Lyon Médical 26 Juillet 1896:428-506



1902

1912

STOCKHOLM

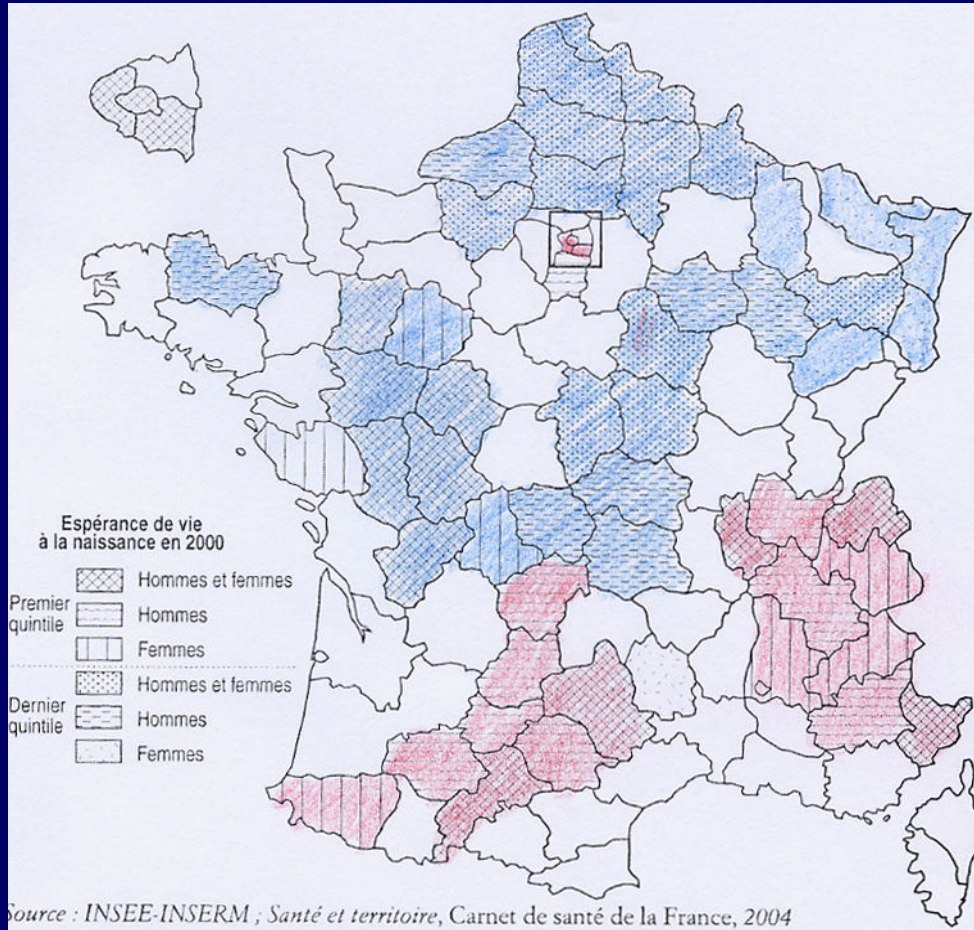
Increased need for Radiotherapy

- one cancer out of two needs RXT
- Population increase : 2020 : 8 Billions in the world
(300/100.000) : 24 millions cancer/year
12 millions RXT : 24.000 linacs (1/500 patients)
- Population ageing : 2010-2030
people above 65yx2
people above 80yx3 (surgery ↘)
- Metastatic chronic phase : RXT ↗
Oligo meta : brain – lung – liver etc ...

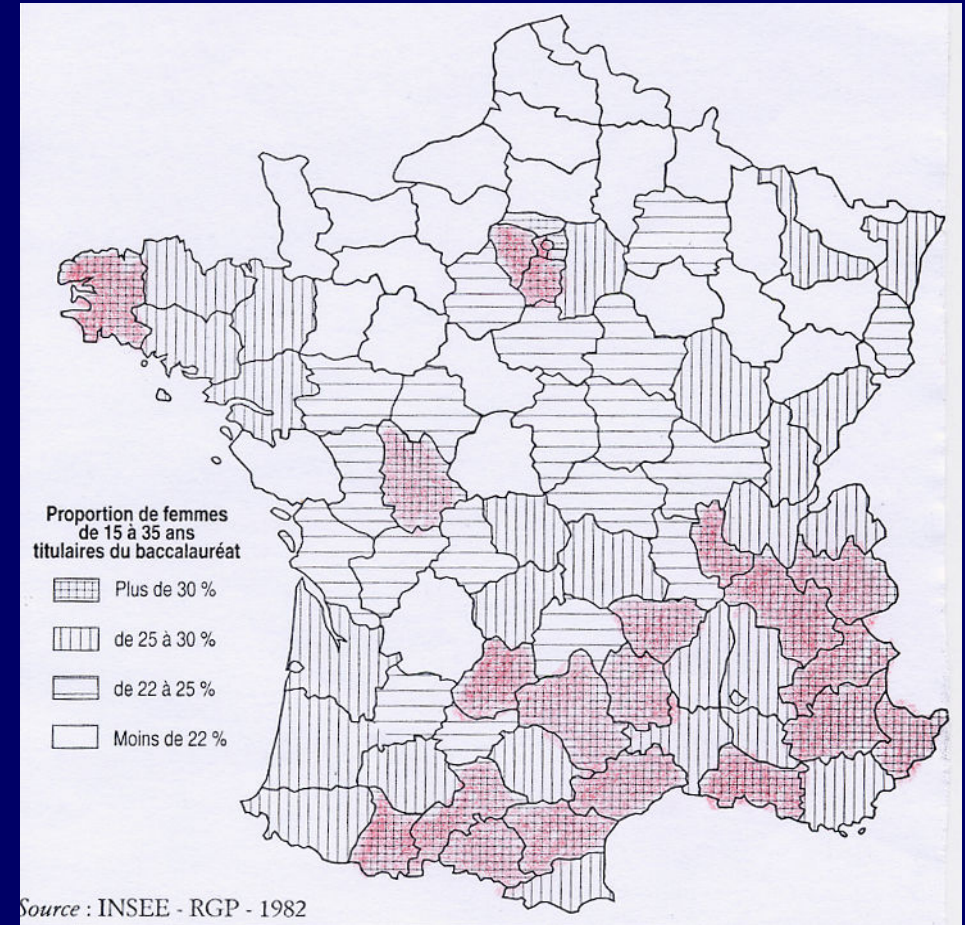
Radiotherapy - 2010 – 2030 (France)

- **RC3D :** 100.000 patients
- RCMI :** 50.000 (H & N – Prostate)
- Mobile – IGRT :** 20.000
- Proton :** 5.000 ? 10.000 ?
- C12 :** 1.500 ? 3.000 ?
- **More cure : 50-55 % - Lower Toxicity**
- More organ preservation – better palliation**

Espérance de vie en 2000



Femmes avec BAC 1982





LE QUOTIDIEN DU MEDECIN

SPECIAL FEMMES

www.quotimed.com

N° 8327 - CAHIER 2

VENDREDI 7 MARS 2008



INFECTIONS A VIH

Pas de réponse
préventive adaptée

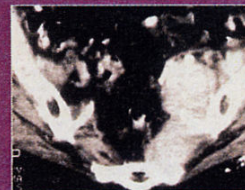
PAGE 7



FEMMES ENCEINTES

Le suivi
par le généraliste

PAGE 8



CANCER DE L'OVAIRE

Des signes
d'appel inconstants

PAGE 10

La femme est l'avenir de la prévention

La prévention est un attribut féminin, les femmes sont plus attentives que les hommes à leur santé et à celle de leur famille, elles s'approprient davantage les messages préventifs et c'est souvent par elles que passe l'observance médicamenteuse : pour ce numéro « spécial femmes » consacré à la prévention et au dépistage, les praticiens (en majorité des praticiennes) interrogés par « le Quotidien » sont quasi unanimes. Avis aux décideurs (souvent des hommes) des campagnes de santé publique

PAGES 3 A 5

L'HISTOIRE DU JOUR

Lait de femme

« **U**n des premiers signes de la décadence de l'Empire romain fut l'abandon de l'allaitement maternel » : voilà ce qu'écrivit A. Deray il y a cent cinquante ans*. Jules César disait : « Les dames romaines ne font-elles plus d'enfants ? Je ne leur vois entre les bras que des chats ou des chiens. » Démosthène demanda la condamnation d'une femme qui faisait allaiter son enfant par une femme étrangère. A Sparte, une loi imposait à tout homme de saluer une femme allaitant son enfant. « Marc-Aurèle voulait que toutes les femmes allaitassent leurs enfants pour être mères tout entières et non à demi. » Antonin le Pieux lui-même saluait les femmes qui donnaient le sein à leur enfant ; il leur faisait distribuer des récom-

Le dépistage du cancer
du col garde sa place



Be prepared - proactive

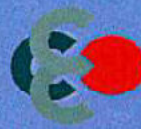
- **Technology innovation ++**
 - **Scientist – ingeneor**
- **Trained professionals**
 - **Doctors – Physicist – Technicians ...**
 - **Legal Frame – Financial support**
 - **Political will**

VISION

for the sake of the patients...

merci





European Multidisciplinary
Colorectal Cancer
Congress 2010

European Multidisciplinary Colorectal Cancer Congress

NICE : 28 - 30 March 2010

Acropolis Palais des Congrès
Nice
France