ENDPOINTS IN ONCOLOGY- HOW LONG WILL A CANCER PATIENT SURVIVE?

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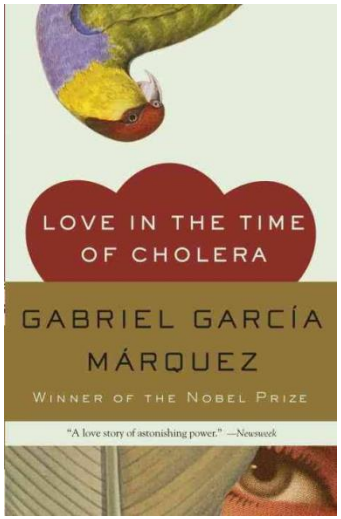
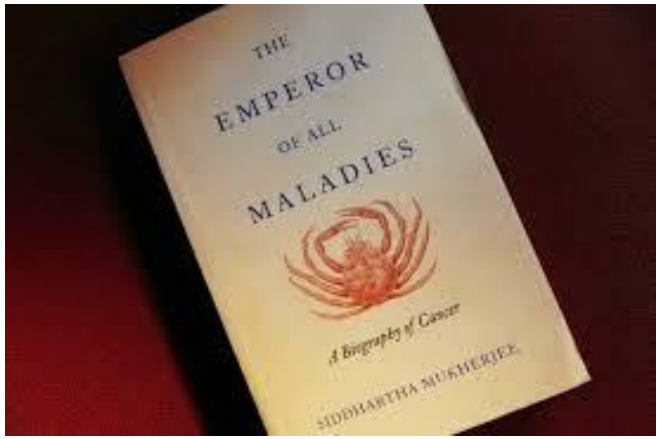
CONSULTANT RADIATION ONCOLOGY

MANIPAL GOA

Why so much of cancer today ?



Times have changed



It should be recognized that incidence data change over time due to a number of factors, real and apparent. The most important real factor is demographic change, in particular, ageing of the population due to elimination of diseases causing early death. This will inevitably lead to an increased number of cancer cases. There are also real changes in cancer incidence due to changes of lifestyle, socioeconomic development and exposure to environmental agents. Among the factors apparently raising incidence figures are the increasing awareness of cancer in the population, the availability of diagnostic procedures (this also includes the introduction of screening programmes, which will increase the incidence figures, albeit temporarily) and improvement in cancer registration techniques. Owing to the interplay of all these factors, the rates of change of cancer incidence vary considerably around the world.

HISTORICAL PERSPECTIVE

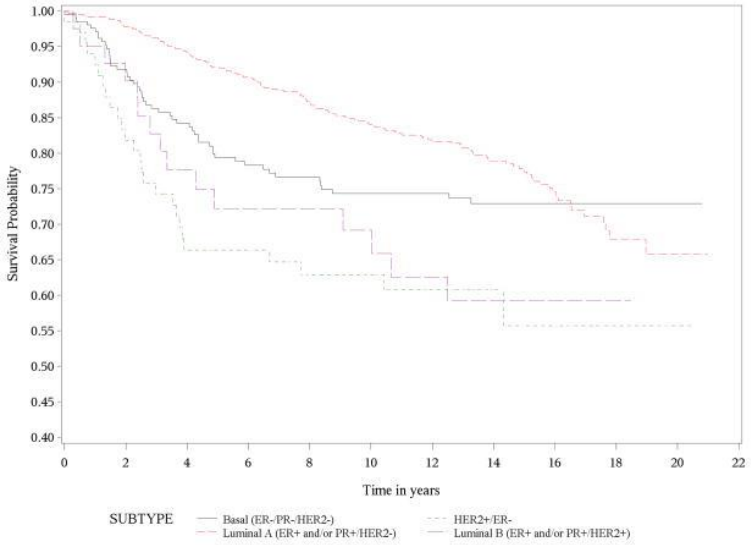
- CANCER as a dreadful disease
- Presumed that Cure was only possible in a sma percentage of pa
- Almost all n consid ative or te
- Pati are branded as cancer victims.

Lead to the "first question of patient" - How long would I live?

NOT MANY TREATMENT OPTIONS !!!

SURVIVAL- WHAT DOES IT MEAN.

- Half (50%) of people diagnosed with cancer in England and Wales survive their disease for ten years or more (2010-11).
- Cancer survival is higher in women than men.
- Cancer survival is improving and as has doubled in the last 40 years in the UK.



EVEN IN WORST TYPES OF NON METASTATIC BREAST CANCERS 70% PTS SURVIVE FOR >7 YRS
FOR THE BEST TYPES ITS MORE THAN 85 %

SOME OTHER CANCERS

PROSTATE CANCER	
Stage	**5-year relative survival rate**
local	nearly 100%
regional	nearly 100%
distant	28%
Data from ACS	

Testicular Cancer	
Stage	**5-Year Relative Survival Rate**
Localized	99%
Regional	96%
Distant	73%
Data from ACS	

Lung Cancer	
Stage	**5-year observed survival rate***
I	50%
II	30%
III	14%
IV	1%

Tongue Cancer	
Stage	**5-Year Relative Survival Rate**
Local	78%
Regional	63%
Distant	36%

Lymphoma	
Stage	**5-year Survival Rate**
I	About 90%
II	About 90%
III	About 80%
IV	About 65%

Colorectal cancers	
Stage	**5-year Relative Survival Rate**
I	92%
II	87%
III	69%
IV	11%

WHAT DOES THIS SURVIVAL MEAN?

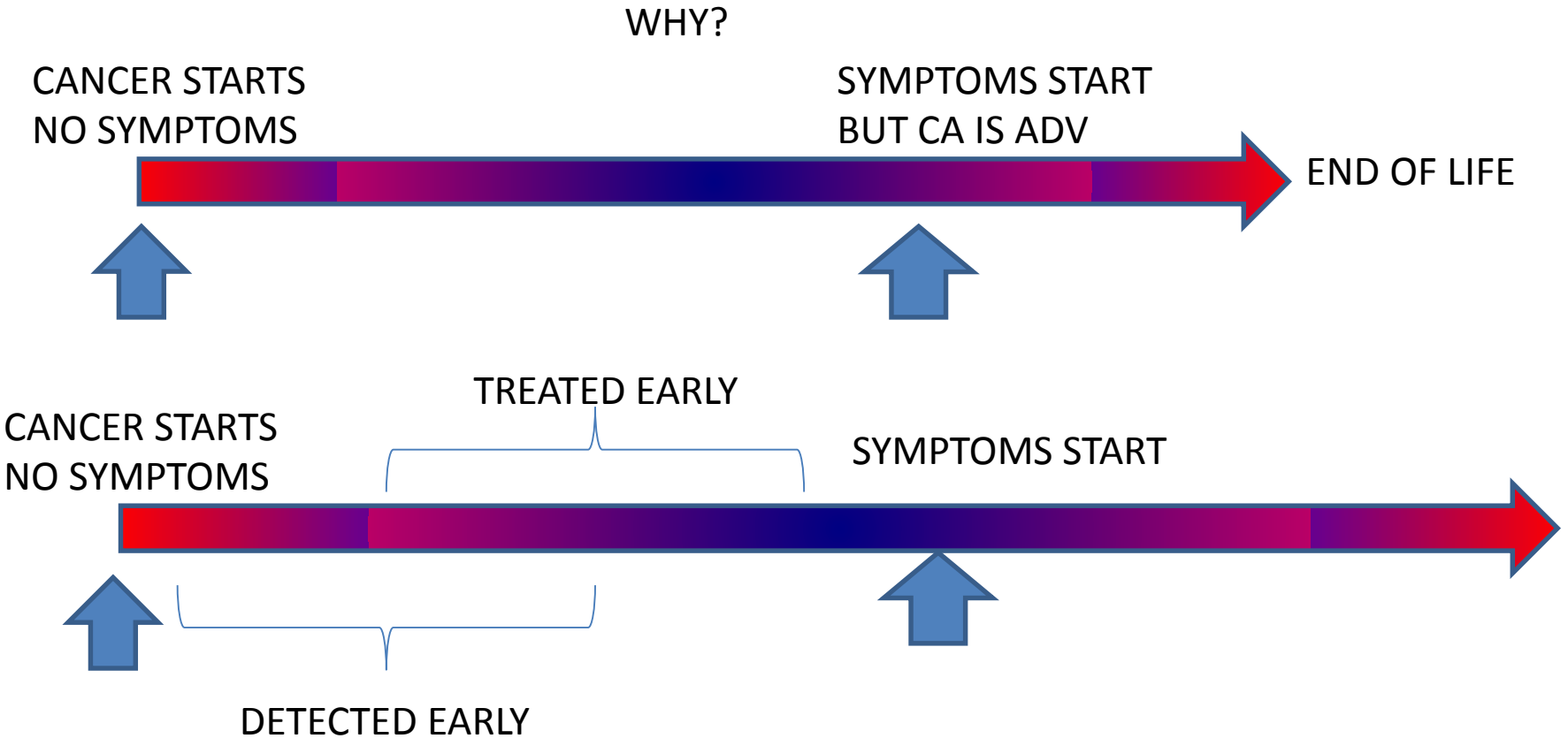
ENDPOINTS YOU SHOULD KNOW ABOUT for advanced Cancers

- Progression free survival
- Disease free survival
- Quality of life (symptom control)
- Cost benefit for the patient

Survival rates are often based on previous outcomes of large numbers of people who had the disease, but they cannot predict what will happen in any particular person's case. Many other factors can also affect a person's outlook, such as the grade of the cancer, the genetic changes in the cancer cells, the treatment received, and how well the cancer responds to treatment.

How to avoid stage 4 at diagnosis?

- Answer is Screening of normal people.



That sounds good but what do you do if you have been diagnosed with THE EMPEROR OF ALL MALADIES?

- DON’T PANIC
- MEET AN ONCOLOGIST TO HELP YOU UNDERSTAND THE DISEASE.
- GO THROUGH ALL THE STEPS OF TREATMENT.
- DON’T GOOGLE TOO MUCH. THERE IS LOT OF MISINFORMATION ON THE NET ALSO.
- DISCUSS DISCUSS DISCUSS WITH YOUR ONCOLOGIST.
- TAKE TREATMENT AFTER PROPER WORK UP.

Diagnosis First

"After extensive X-rays and blood tests, we've confirmed what we already suspected-- you're not big-boned, you're fat."

SIMPLE TESTS REQD FOR
A. DIAGNOSIS
B. STAGING

"Good news! The exploratory surgery turned up negative!"

How Do You Treat…

Cut It or Tear it Out

Surgery

Burn It

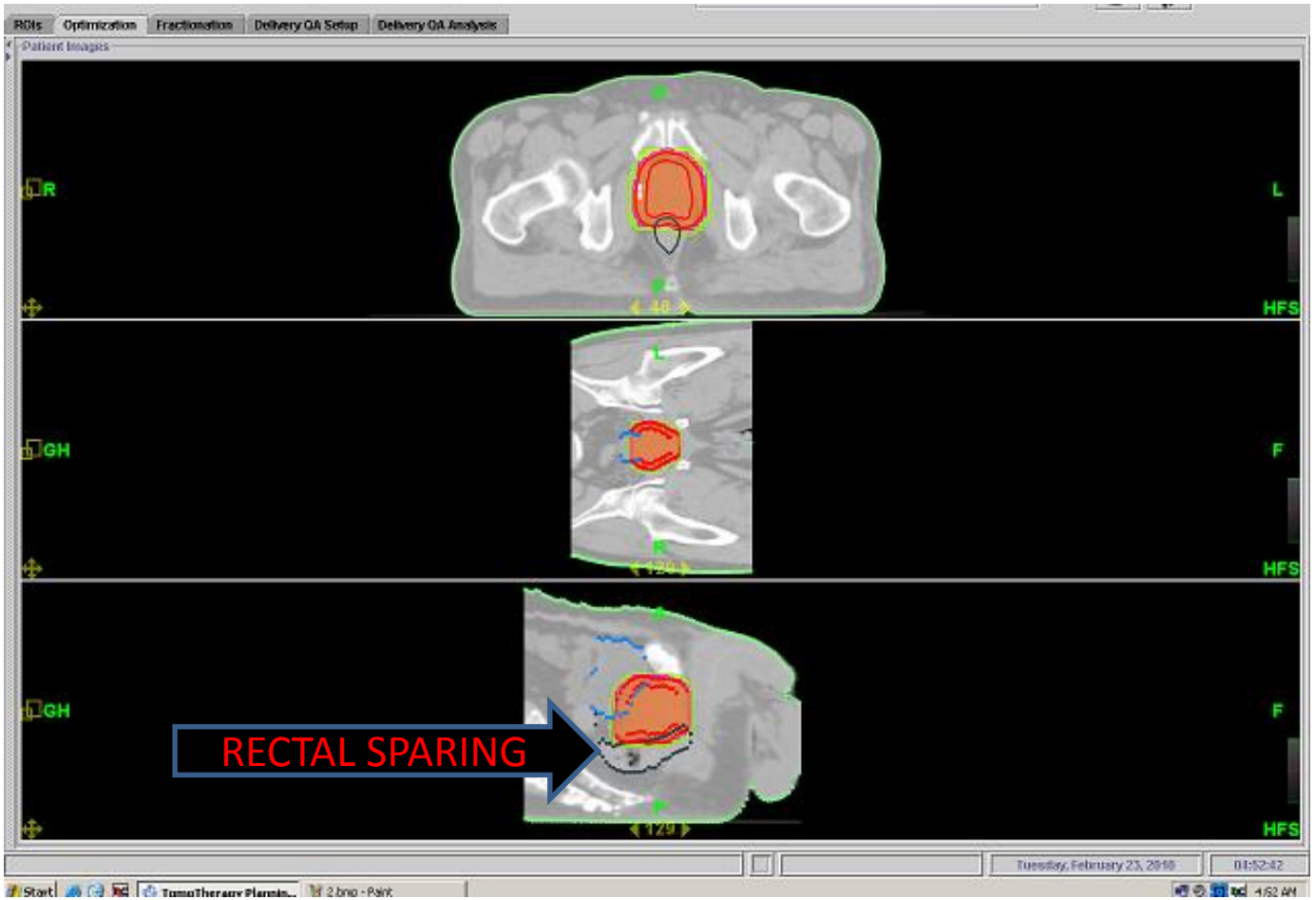
Radiation Therapy

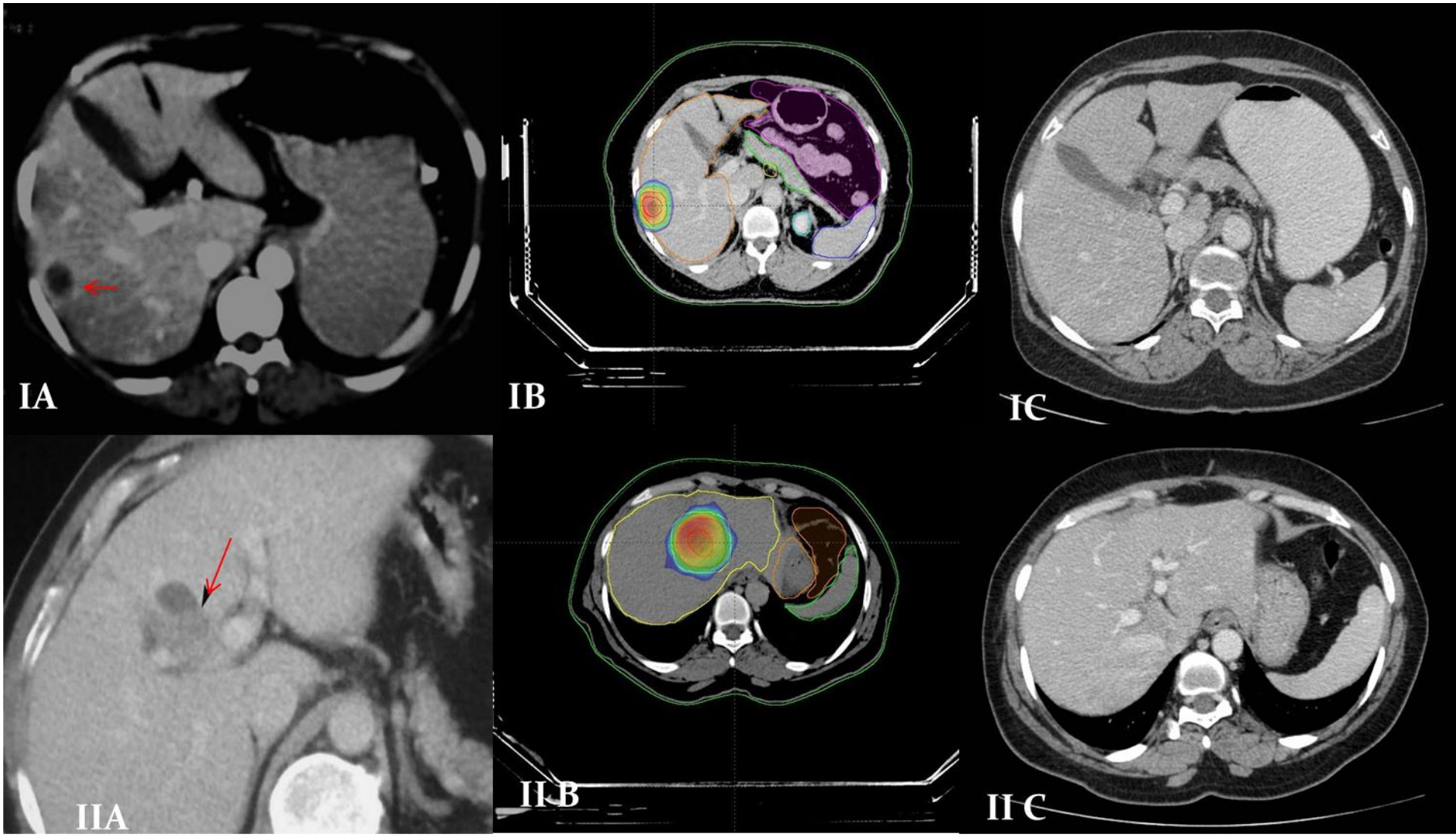
Poison It

Chemotherapy

AN IMRT PLAN

THE COMFORMED DOSE DISTRIBUTION





IA. Seg VIII metastasis

IB. SBRT dose distribution

IC. Complete response 3 mths

IIA. Seg IV metastasis

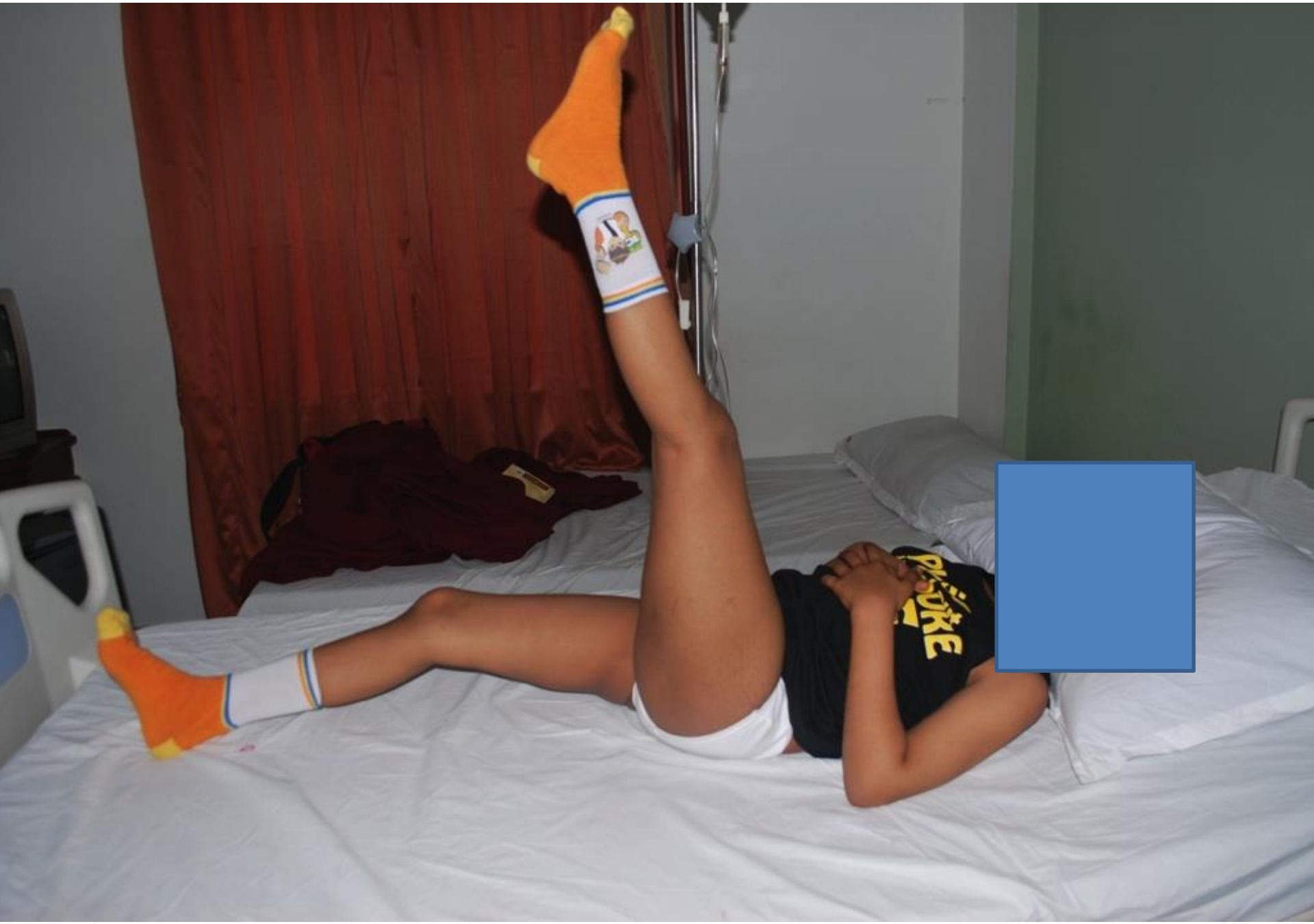
II B. SBRT dose distribution

IIC .Complete response 3 mths

FROM MASTECTOMY TO BREAST CONSERVATION

LIMB SALVAGE

Soft Tissue sarcoma, proximal femur
Massive, Painful, Bedridden



These advancements have led to

- Ability to treat tumours radically with RT/CT
  - e.g oropharynx, larynx, cervix, prostate etc
- Ability to deliver high dose per fraction (Hypofractionation)
  - E.g SIB in Head and Neck, Prostate
- ORGAN CONSERVATION (e.g larynx, oropharynx, prostate, cervix, breast)
- Increase survival (e.g nasopharynx, rectum, breast ETC)
- Prevention of long term morbidity and better QOL.

- Even though we have talked about how technology can make life easier, ……
- WHAT IS THE GRIM REALITY……..?

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Original Article

Hypofractionated Radiotherapy for T1N0M0 Glottic Cancer: Retrospective Analysis of Two Different Cohorts of Dose-fractionation Schedules from a Single Institution

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Abstract

Aims: To determine the influence of dose and fractionation on tumour characteristics, toxicity, disease control and survival outcomes in T1 glottic carcinoma.
Materials and methods: Between 1975 and 2000, treatment charts of 652 patients with T1 glottic carcinoma who received curative radiation with four hypofractionated schedules (50 Gy/15 fractions [3.3 Gy/fraction] or 55 Gy/16 fractions [3.43 Gy/fraction] or 60 Gy/24 fractions or 62.5 Gy/25 fractions [2.5 Gy/fraction]) were analysed. The patients were divided into two groups based on fraction size <3 Gy and >3 Gy. Local control and overall survival were calculated. Patient- and tumour-related factors affecting local control were analysed using univariate and multivariate analysis. Factors affecting late toxicity were also analysed.
Results: The local control and overall survival at 10 years were 84 and 86.1%, respectively, for T1 glottic carcinoma. The response to radiation had a significant effect on local control with univariate analysis ($P = 0.001$). Other factors, such as beam energy, anterior commissure involvement and fractionation, did not affect local control. Persistent radiation oedema was seen in 123 patients (23.4%) and was significantly worse in patients who received radiation with a larger field size (>36 cm^2) on a telecobalt machine ($P < 0.001$).
Conclusions: Radical radiotherapy schedules incorporating a higher dose per fraction yield acceptable local control rates and late toxicity. Telecobalt therapy for early glottic cancer is a safe alternative to treatment with 6 MV photons on a linear accelerator in terms of local control and late toxicity as long as field sizes smaller than 36 cm^2 are used.
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Key words: Early vocal cord; glottic cancer; hypofractionated radiotherapy

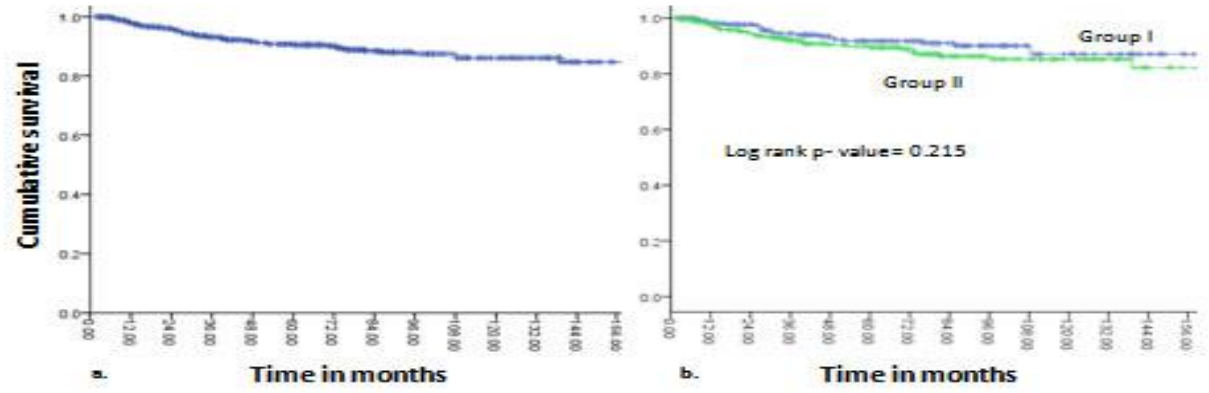
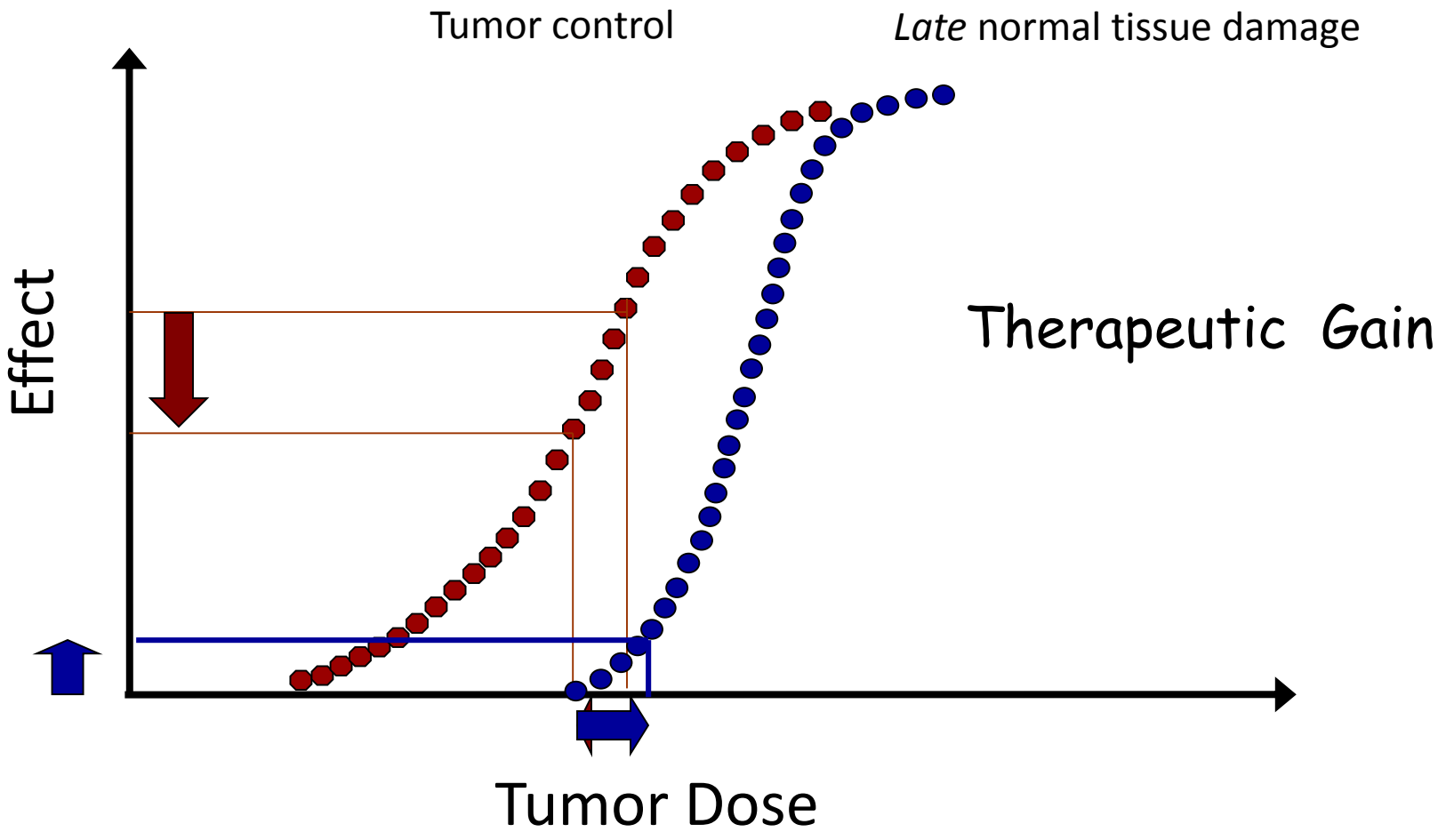


Figure 1: Kaplan Meier Plots showing overall survival for the whole group (1a.) and for Group I and Group II (1b.).

Thank You

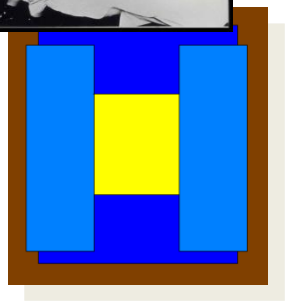
The Goal of Successful Radiotherapy



The Evolution of Radiation Therapy

1960's

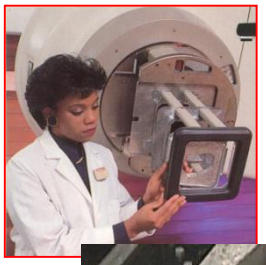
The First Clinac

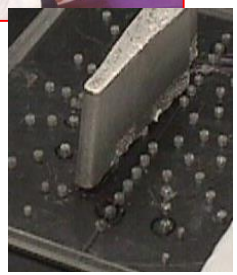


Standard Collimator

The linac reduced complications compared to Co60

1970's

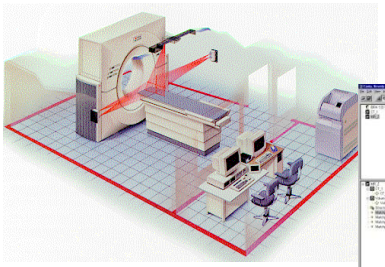




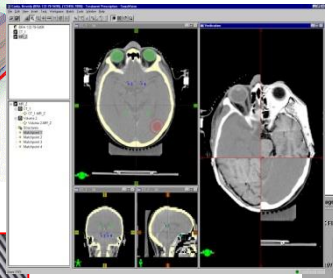
Cerrobend Blocking
Electron Blocking

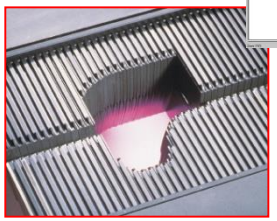
Blocks were used to reduce the dose to normal tissues

1980's



Computerized 3D CT Treatment Planning

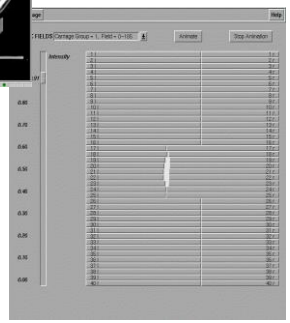




Multileaf Collimator

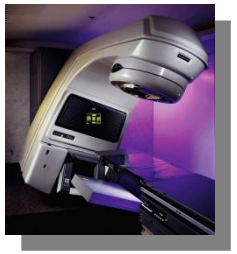
MLC leads to 3D conformal therapy which allows the first dose escalation trials.

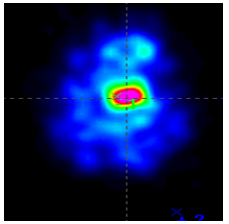
1990's



Computerized IMRT introduced which allowed escalation of dose and reduced compilations

2000's



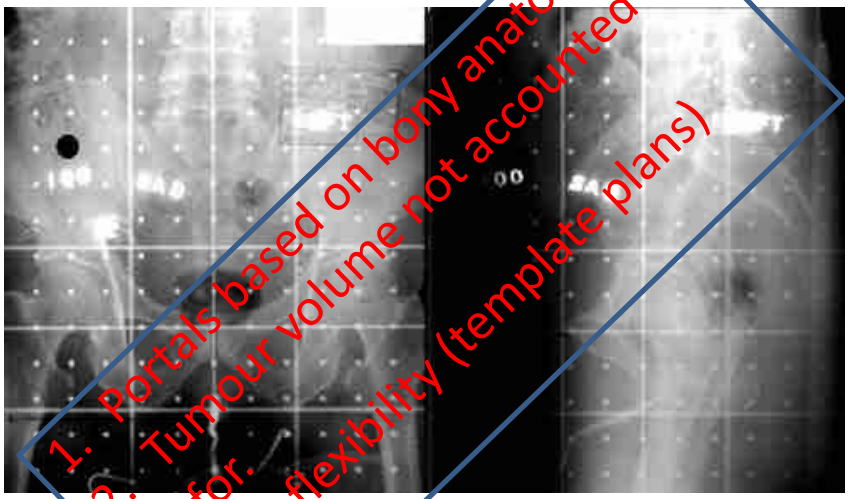


Functional Imaging

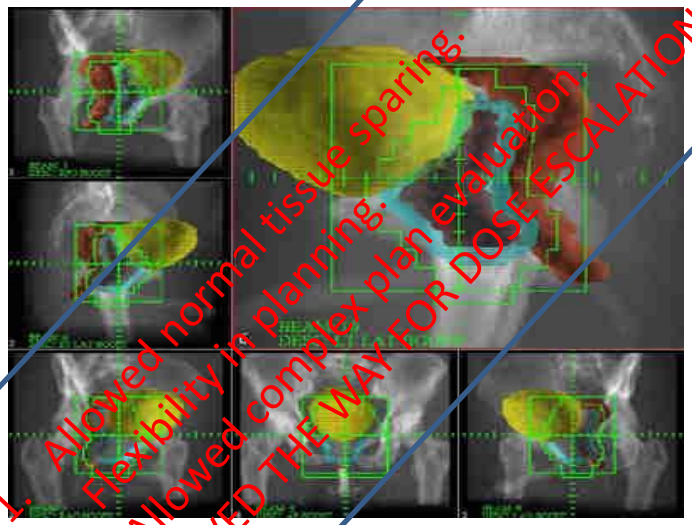
High resolution IMRT

IMRT Evolution evolves to smaller and smaller subfields and high resolution IMRT along with the introduction of new imaging technologies

EVOLUTION TO REVOLUTION



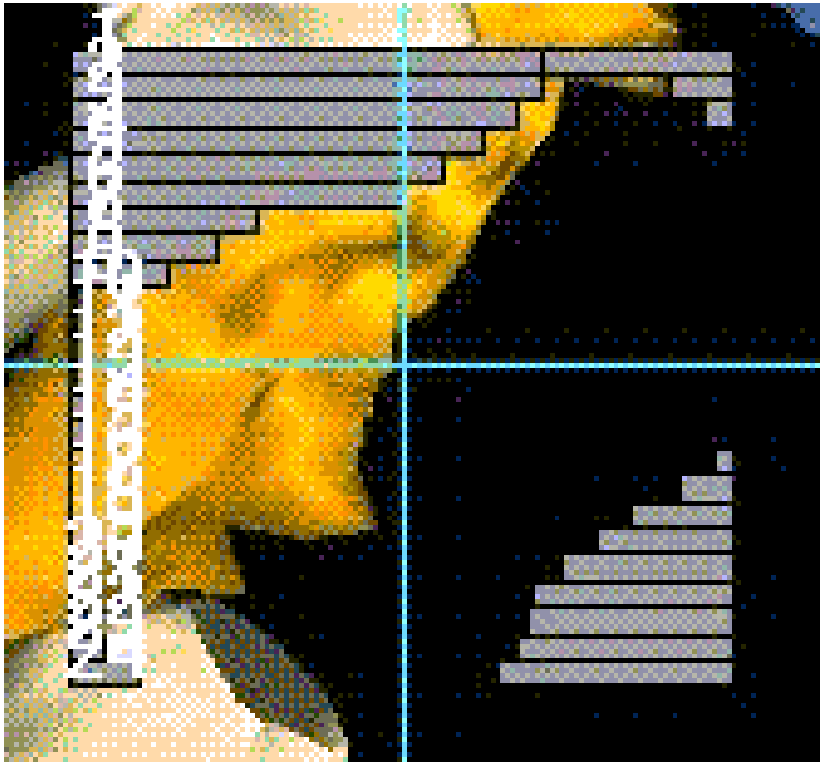
1. Portals based on bony anatomy.
2. Tumour volume not accounted for.
3. No flexibility (template plans)



1. Allowed normal tissue sparing.
2. Flexibility in planning.
3. Allowed complex plan evaluation.
4. PAVED THE WAY FOR DOSE ESCALATION.

2D VS 3D PLANNING

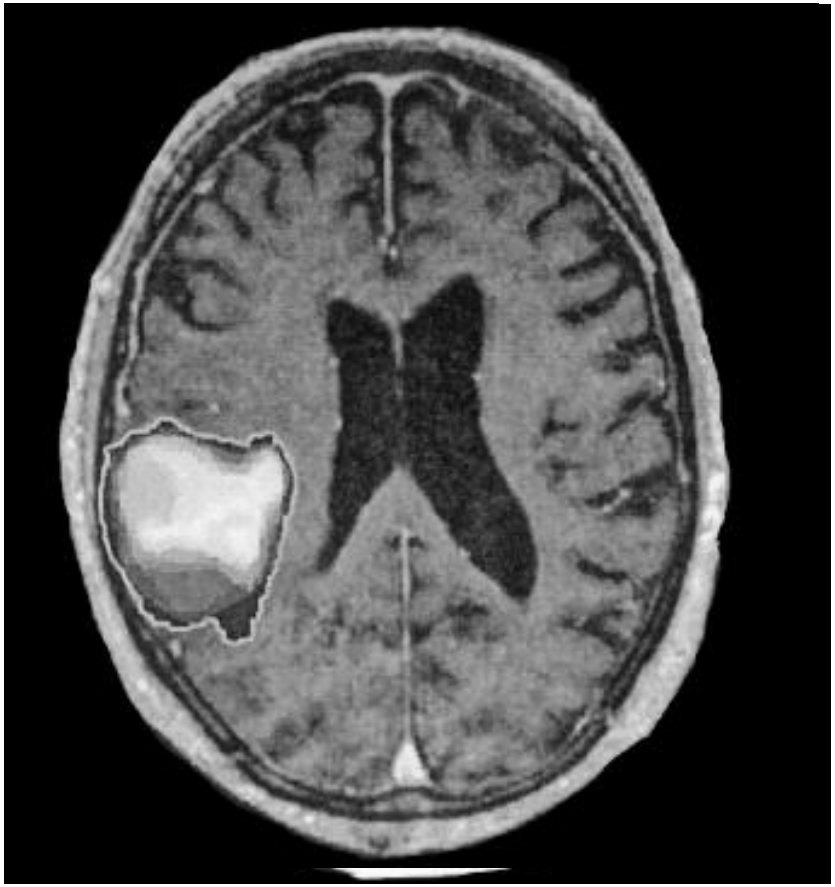
IMRT & IGRT



- *As the treatment head arcs, "leaves open and close to control the amount of radiation given in each "beam's eye view."*
- *This creates the ability to tightly sculpt dose.*

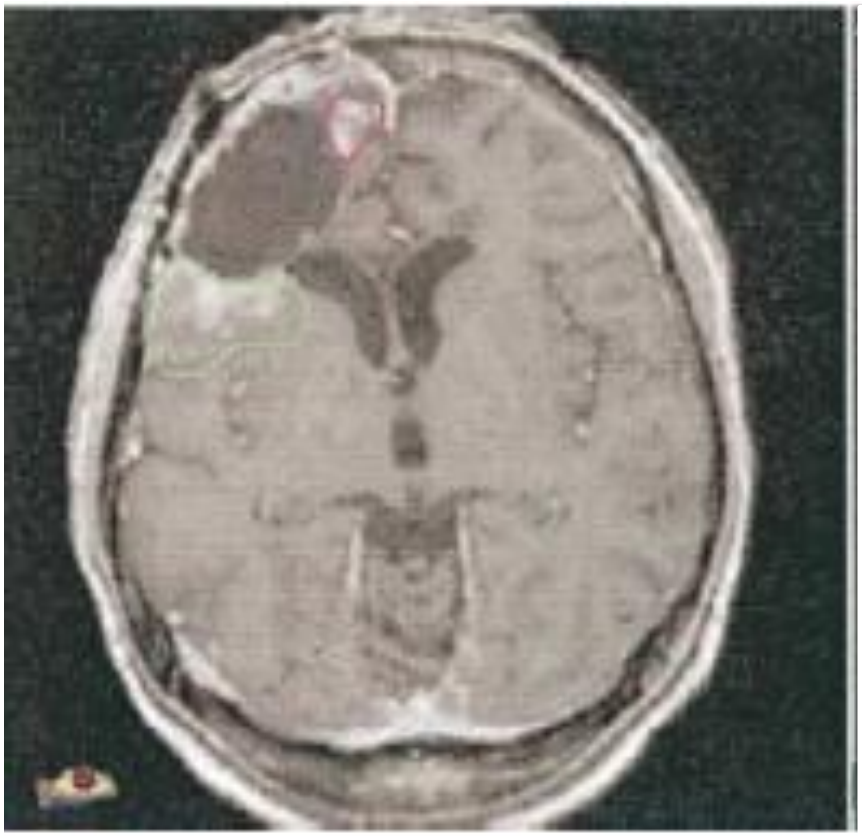
To Improve our precision……

CT-MR Coregistration



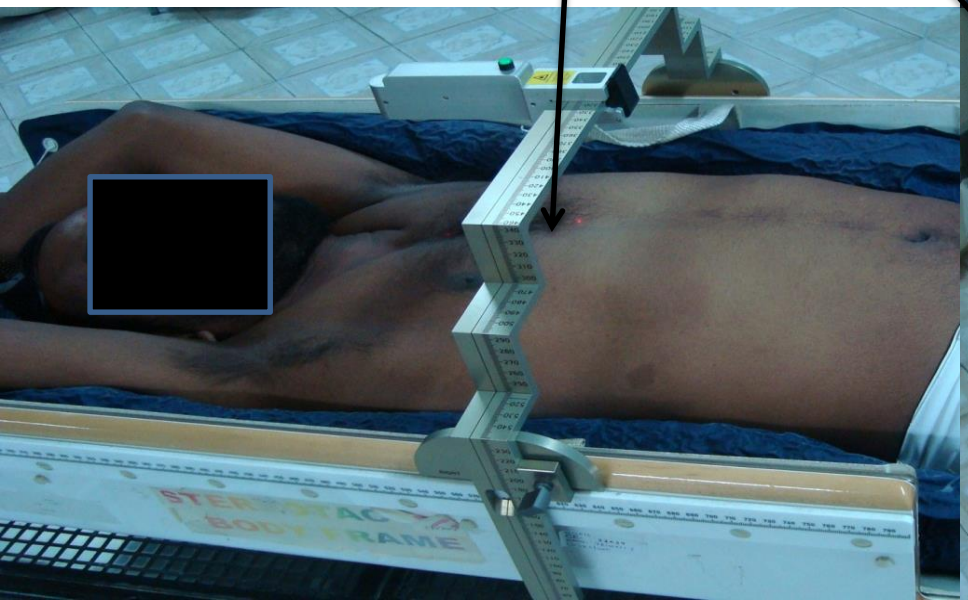
- Increased tumor volumes.
- Better contouring of normal tissue.
- Made us more sure during non coplanar plannings

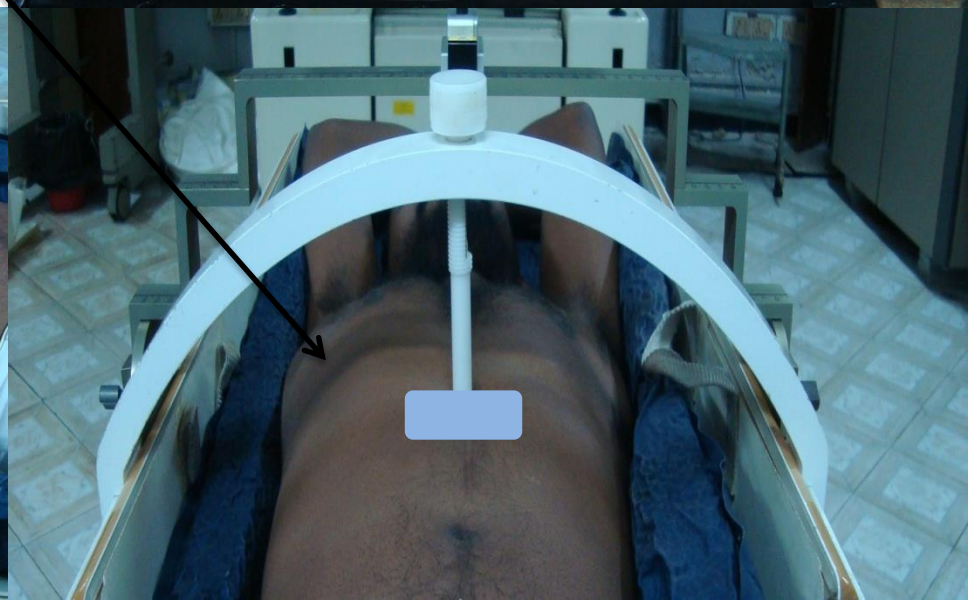
Kahin pe Nigahen Kahin pe Nishana paradigm:



Respiratory Movement of Liver or Lung

- Lines are visible on CT slices
- Patients position in vacloc and chest laser markers
- Diaphragm control if movements more than 1 cm on fluroscopy

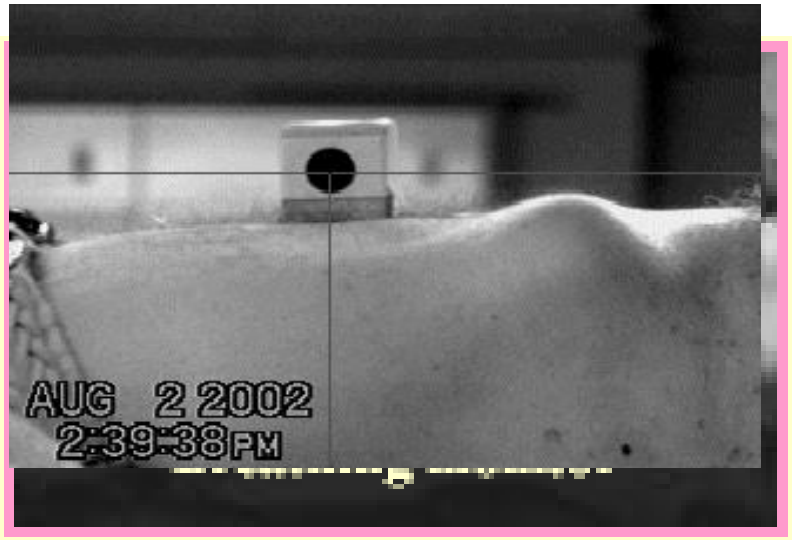


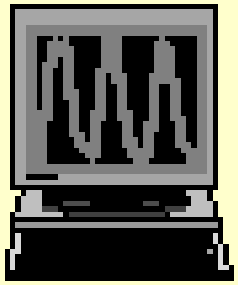


Respiratory Gating System:
Varian Real-time Position Management (RPM)

Components:

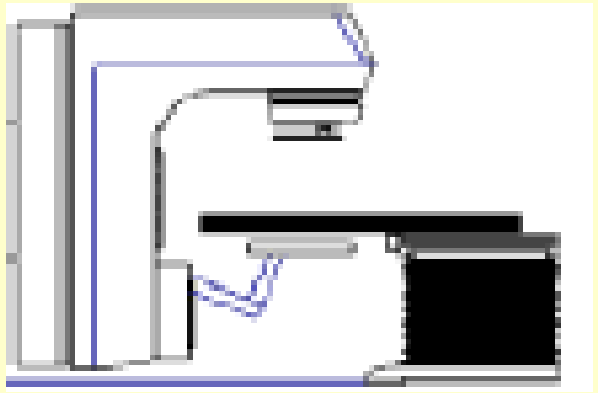
- **Reflective external Marker placed on abdomen or chest**
- **Infrared illuminator/CCD camera**
- **Workstation to process signals & generate trigger for CT/simulator/ linac**





On/off

Control workstation



Treatment machine

With good Radiation Therapy we can help SURGEONS MOVE

FROM RADICAL TO ORGAN PRESERVATION