Brachytherapy in Carcinoma of Lung & Esophagus

Dr. D.N. Sharma

Associate Professor

Department of Radiation Oncology

All India Institute of Medical Sciences

Brachytherapy in non small cell lung cancer

- Limited practice
- Used in selective patients
- Highly conformal treatment
- Complicated technique
- Skilled procedure

Brachytherapy in NSCLC

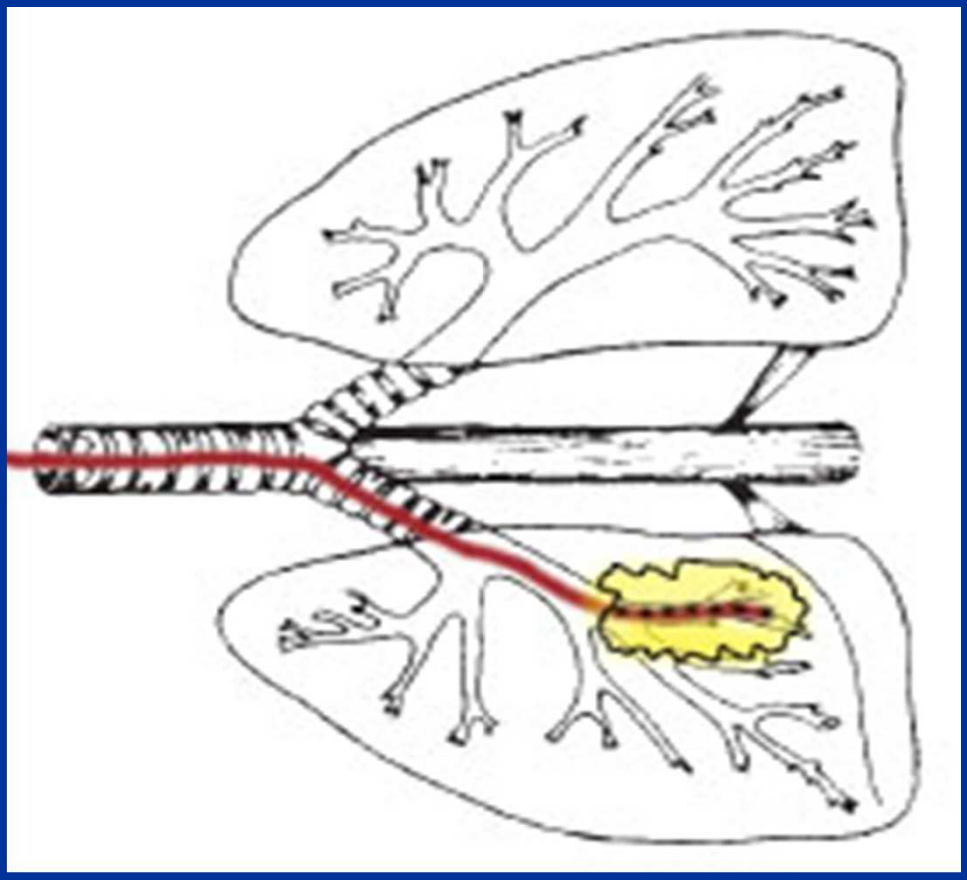
- Brachytherapy alone
  - As definitive treatment alone
  - As palliative treatment
- Combined with EBRT (dose escalation/boost)
- Combined with surgery

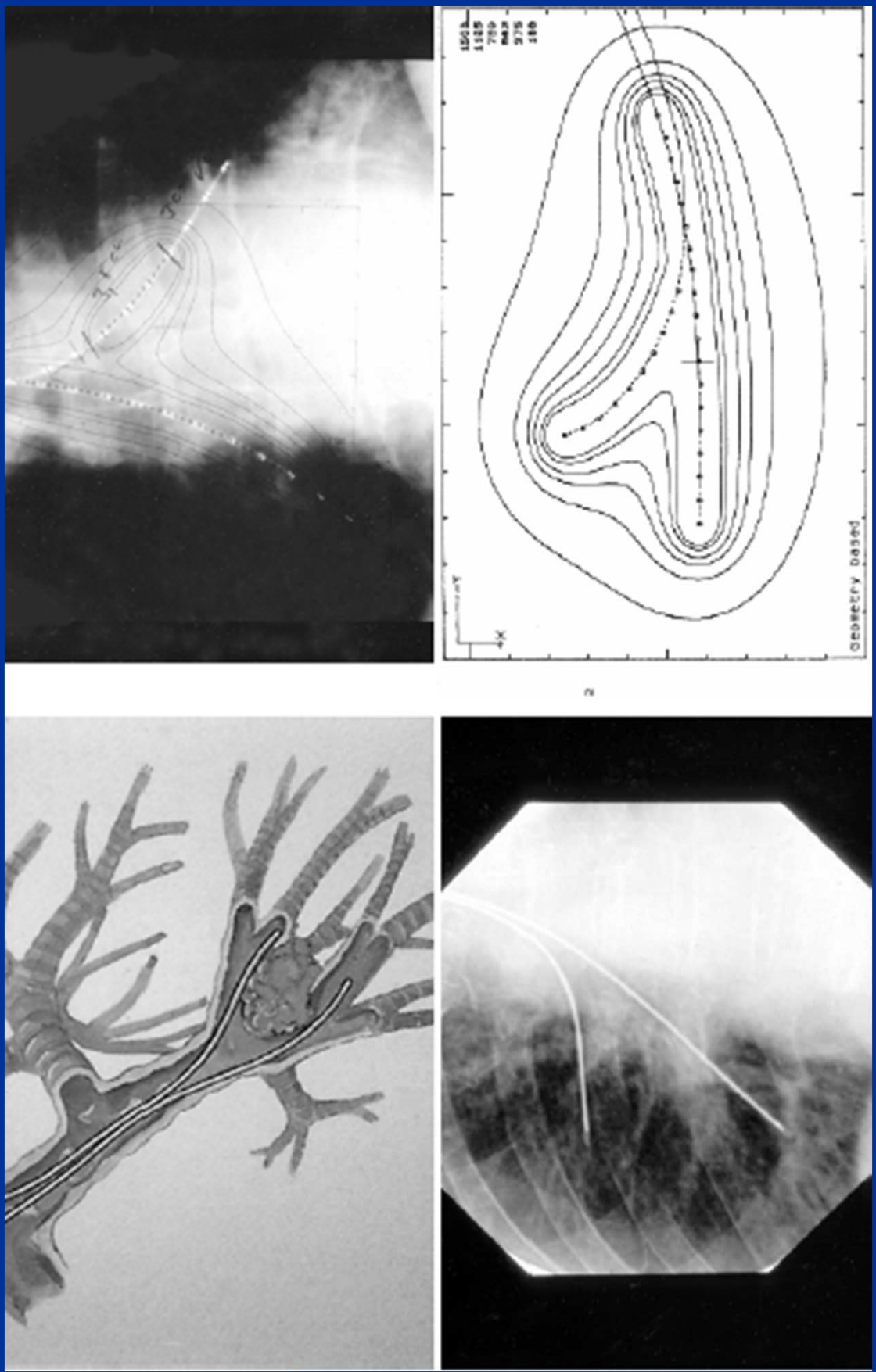
Types of Brachytherapy for NSCLC

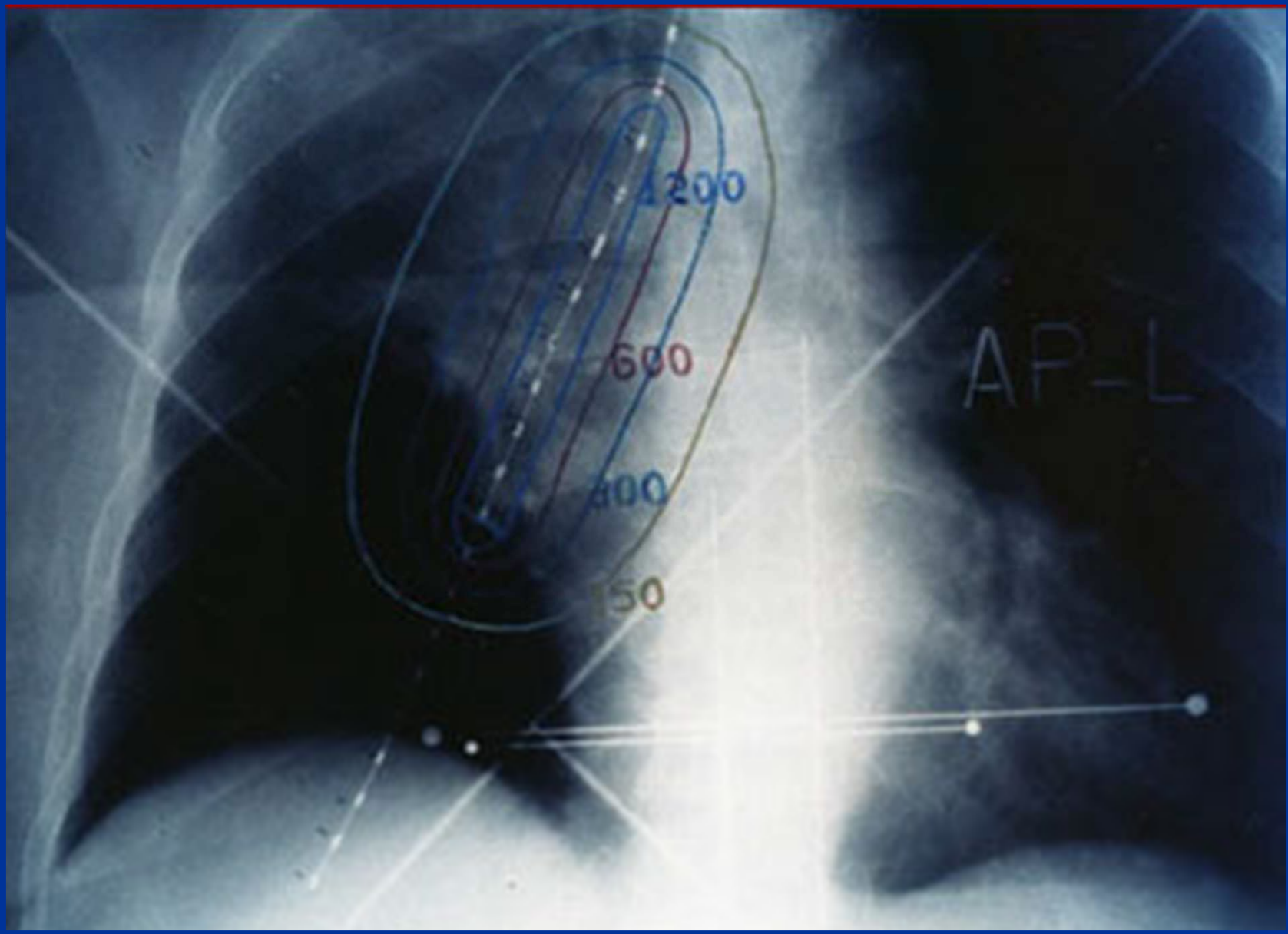
- Intraluminal/ endobronchial
- Interstitial
    - Trans-cutaneous
    - Intraoperative
    - Perioperative

ILRT

- Curative Intent Along With ERT
- Palliative Intent
- Emergency Management
    - SVC
    - Bleeding




1500
1125
750
375
188
Geometry based


1200
600
400
50
AP-L

Risk of Hemoptysis with ILRT: Literature

Author	n	HDR-Dose (Gy)	Ref.Point	Previous EBRT ?	Massive hemoptysis (%)
Seagren	20	1 * 10 Gy	@ 10 mm	Yes	28 %
Mehta 1	31	4 * 4 Gy	@ 10 mm	Yes	3 %
Roach 1	17	30 Gy LDR	@ 5 mm	Yes	0 %
Bedwine	32	3 * 6 Gy	@ 10 mm	Yes	32 %
Aygun 1	60	4 * 5 Gy	@ 10 mm	Yes	15 %
Sutedja	31	3 * 10 Gy	@ 10 mm	Yes	32 %
Gollins 1	402	1 * 15-20Gy	@ 10 mm	No (324)	8 %
Hennequ	149	4-6 * 7Gy	@ 10 mm	Yes	7.4 %
Speiser a (24)	295	3 * 10 Gy 3 * 7.5 Gy	@ 10 mm @ 10 mm	Yes Yes	6.3 % 8.6 %

Interstitial Brachytherapy

- Complicated procedure, but very precise method of radiation delivery
- Done under CT Guidance
- Suitable for peripheral lesions
- Very limited experience in the literature


08/06/2006


08/06/2006

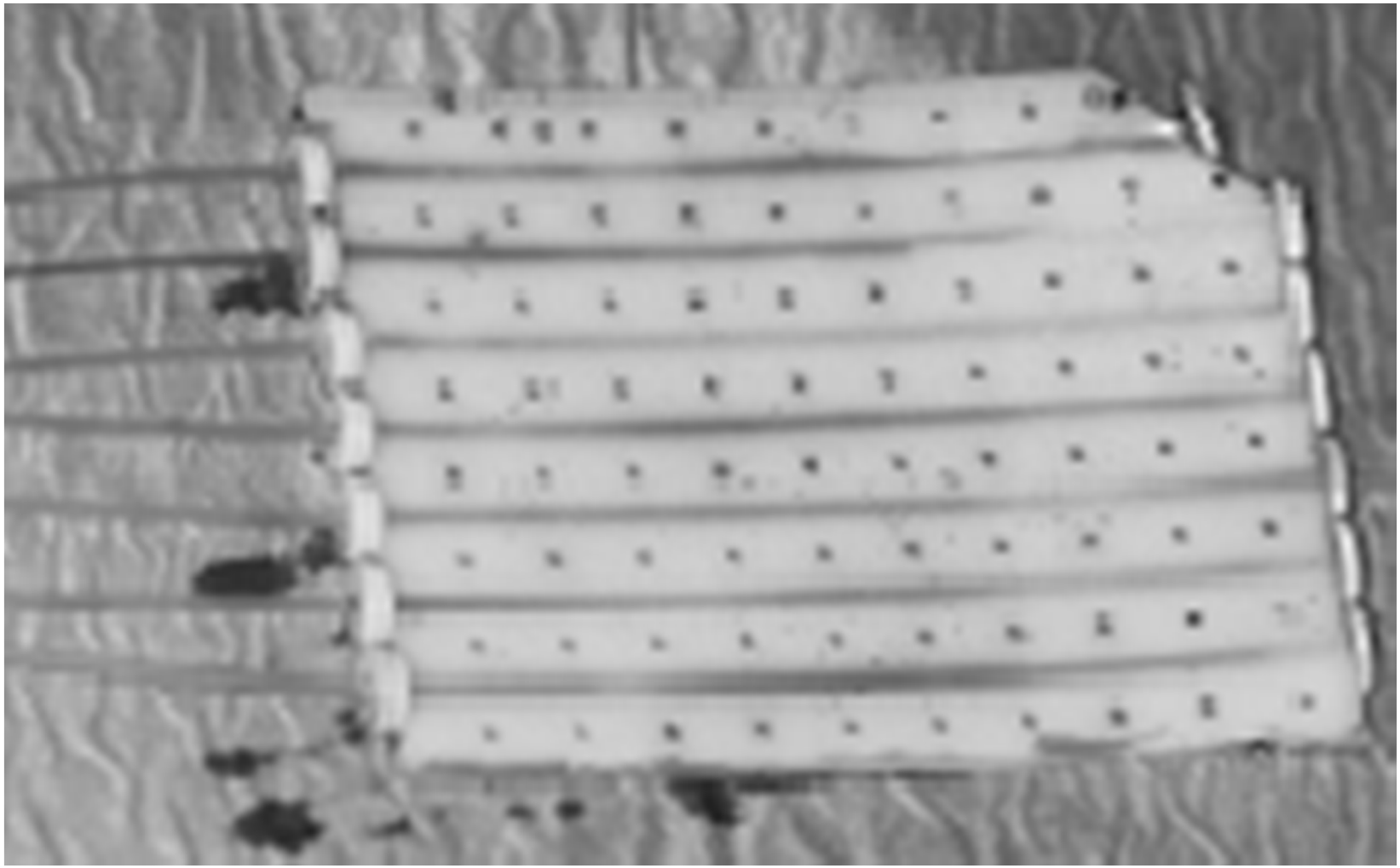
DR BRA IRCH, AIIMS


08/06/2006

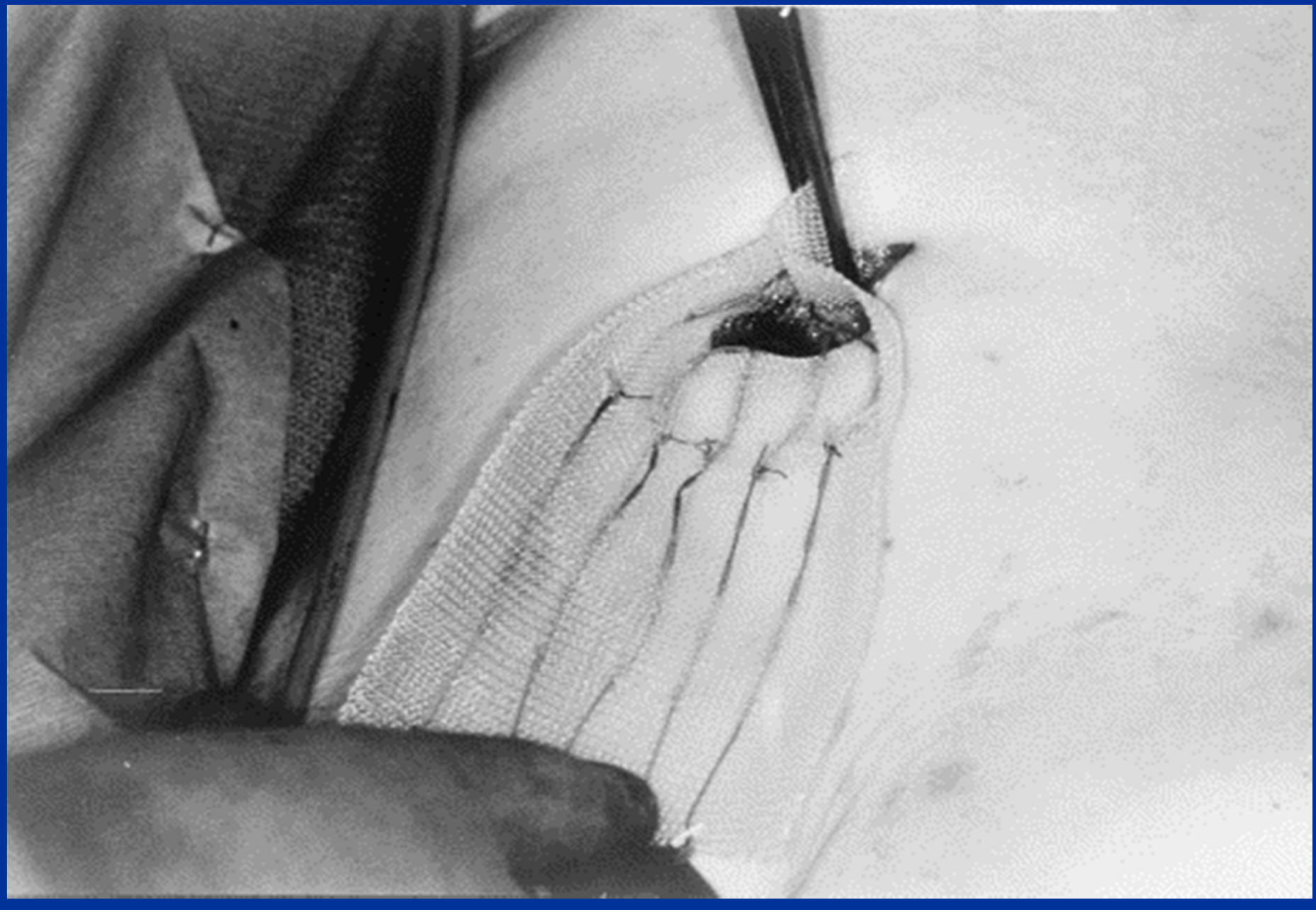
Intra-operative RT

- Relatively new technique of RT
- Not yet established
- Fraction Size 10-20Gy followed by EBRT

Intraoperative Radiotherapy



Permanent brachytherapy implant



Brachytherapy for Carcinoma of Esophagus

- Brachytherapy alone
  - For palliative treatment
  - For definitive treatment
- Brachytherapy + EBRT : For boost

Performed in the form of Intraluminal RT (ILRT)

Intraluminal Radiotherapy (ILRT)

Rationale

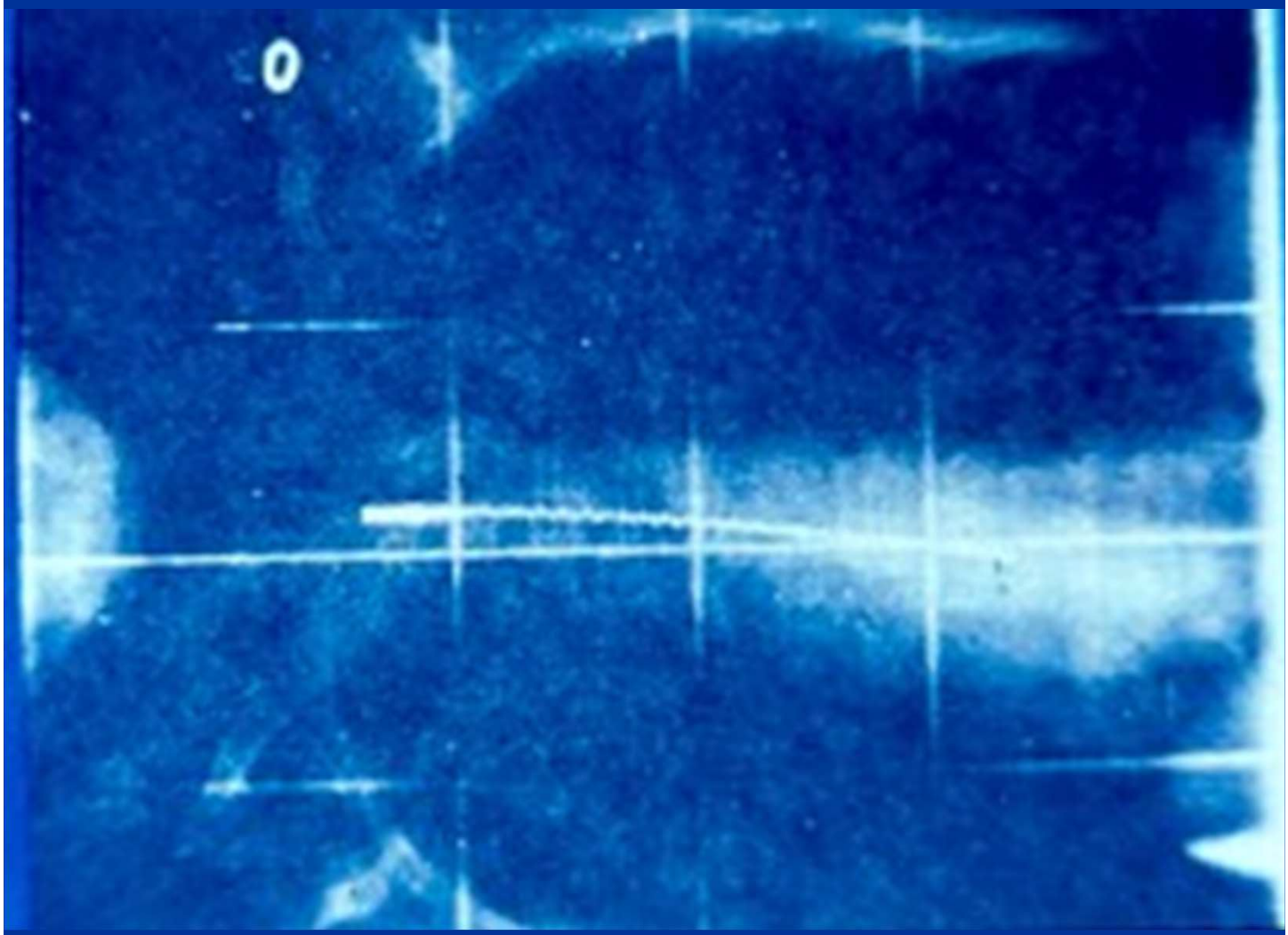
- Dose fall off is very sharp, hence minimal doses to surrounding organs
- Higher dose can be given in shorter time

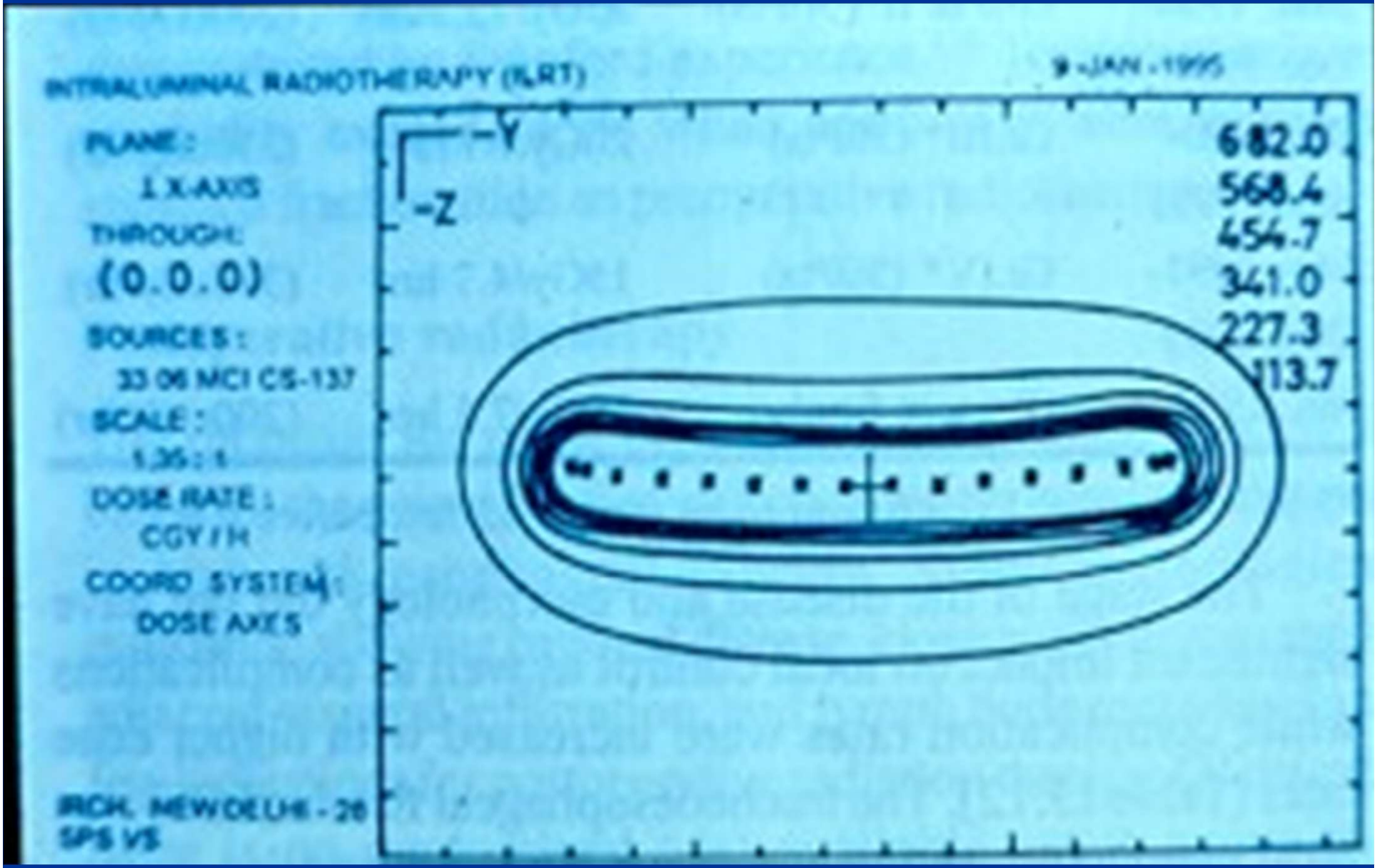
Procedure

- Endoscopic assessment → Insertion of esophageal applicator (Rowland's applicator) → Source loading on Remote afterloading unit

Dose

12-15 Gy at 0.5-1.0 cm (LDR)


0


INTRALUMINAL RADIOTHERAPY (ILRT)
9-JAN-1995
PLANE :
⊥ X-AXIS
THROUGH:
(0.0.0)
SOURCES :
33.06 MCI CS-137
SCALE :
1.35 : 1
DOSE RATE :
CGY / H
COORD SYSTEM :
DOSE AXES
-Y
-Z
682.0
568.4
454.7
341.0
227.3
113.7
IRCH, NEW DELHI - 26
SPS VS

Contraindications for ILRT

- Severe stenosis where applicator can’t be negotiated
- T.O. fistula
- Primary tumor > 10 cm long
- Gross mediastinal L. adenopathy
- Pts with skip lesions
- Extension to cardia

Pall ILRT: AIIMS Data*

- 34 cases treated with ILRT (LDR)
- With or without previous EBRT
- Dose 12-15 Gy (LDR)
- Swallowing capacity improved in 60% pts
- Incidence of post RT stenosis : 11%

* Trop Gastroenterol 1996

Literature

- Dinshaw et al. ILRT+5FU…JSO 1991

  After 50 Gy EBRT, 50 pts randomised to ILRT alone vs ILRT + 5FU, 2 yr surv : 15% vs 22%.

- Sur et al. Role of HDR ILRT. IJROBP 1992

  After 35 Gy EBRT, 50 pts randomised to

  - further 20 Gy EBRT vs.
  - HDR ILRT 12 GY (2x6Gy weekly F)

  1-yr survival : 44% vs. 78% (p value<0.001).

- Vivekanandam et al. EBRT+ILBT. Am J Clin Oncol

  59 pts treated by 36 Gy EBRT+30 Gy ILBT (LDR)

  1-yr surv= 24%, Mean surv=9.6 mo

American Brachytherapy Society Guidelines

- EBRT : 45-50 Gy by Conventional Fractionation
- ILRT after 2-3 wks of EBRT completion
- HDR : 5 Gy once a week X 2
- LDR : 20 Gy single session, 0.4-1.0 Gy/hr
- Dose prescription at 1.0 cm from mid-source or mid-dwell position

Conclusion (Brachy in Lung Cancer)

- Limited role but highly conformal
- Practiced in few centers
- Endobronchial brachytherapy is the main form
- Intra-operative and percutaneous Brachy requires special skill and expertise
- Limited studies in literature

Conclusion (Brachy in Esophageal Cancer)

- Technically it is relatively easier
- Mainly used for palliation: effective
- For escalating the dose after EBRT
- Risk of stenosis stricture after ILRT : 20-30%

Thank You