

Intrabeam: a new method of partial breast irradiation

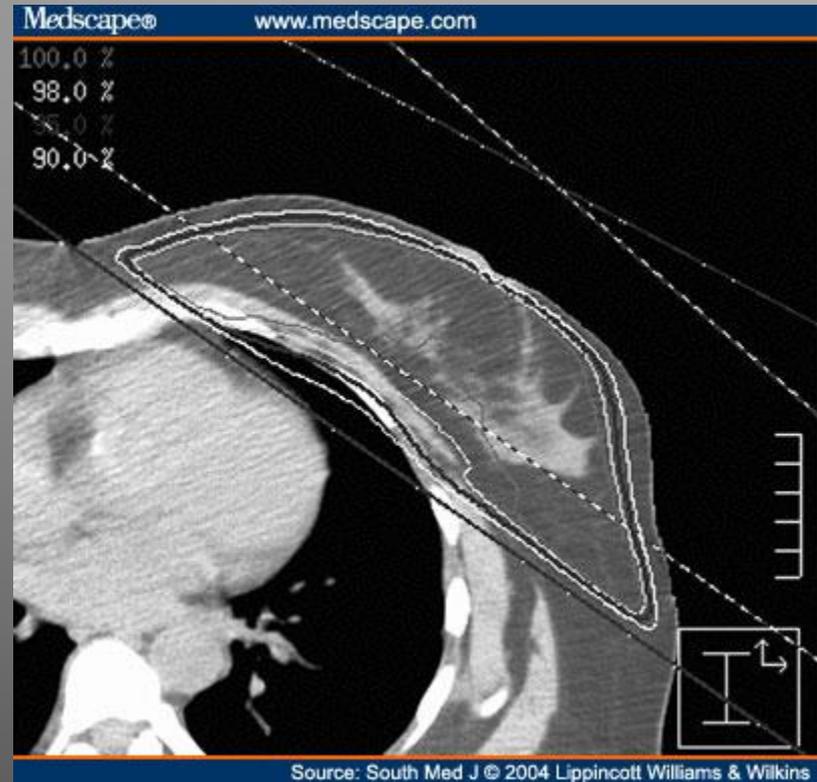
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Goals of discussion

- ▶ Describe partial breast irradiation (PBI) and discuss why it is being used.
 - ▶ Detail methods of performing partial breast irradiation.
 - ▶ Explain how the Intrabeam works and its advantages and disadvantages.
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Radiation therapy for breast cancer

- ▶ Patients have the option of either mastectomy or breast preservation therapy (BPT) for operable tumors.
- ▶ In BPT, patients have a lumpectomy and receive 6 ½ weeks of radiation to the whole breast.



Who is eligible for breast preservation therapy?

- ▶ Classically the size cutoff was 4 cm but recent consensus conference stated that any size is eligible as long as clear margins are obtained with an acceptable cosmetic result; NCCN states that tumors > 5 cm are a “relative” contraindication to BPT.
- ▶ If multicentric tumors can be excised in a single specimen with clear margins (including in situ disease) and the imaging shows no other suspicious lesions, the patient is still a candidate.
- ▶ No absolute age cutoff; NCCN 2008 guidelines states that women ≤ 35 years have a relative contraindication.
- ▶ Prior chest XRT and pregnancy are absolute contraindications while active connective tissue disease, especially lupus and scleroderma are relative contraindications.

Where are we in 2010?

- ▶ Majority (~ 85%) of women who present with breast cancer are eligible for breast preservation therapy (BPT).
 - ▶ Women who have lumpectomies don't always receive their radiation therapy even though it always will decrease the chance of the cancer returning.
 - ▶ Women don't receive their XRT after preserving surgery because of age, distance, payer, race and type of hospital (academic vs community).
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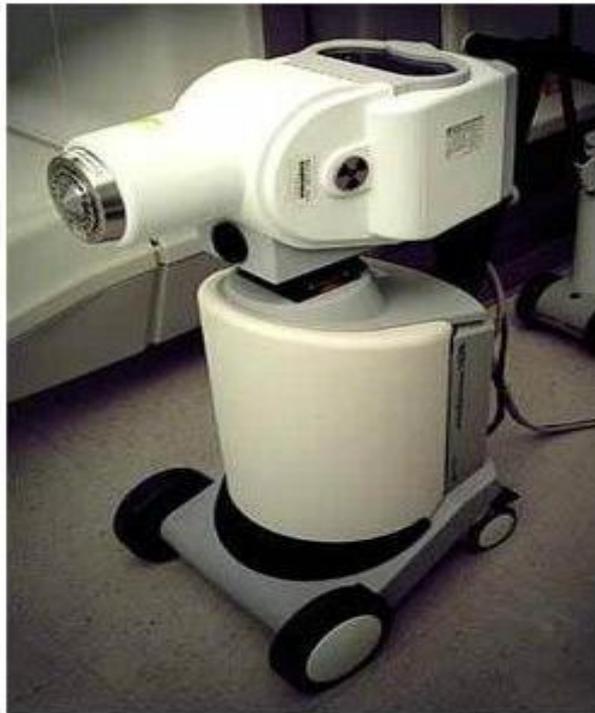
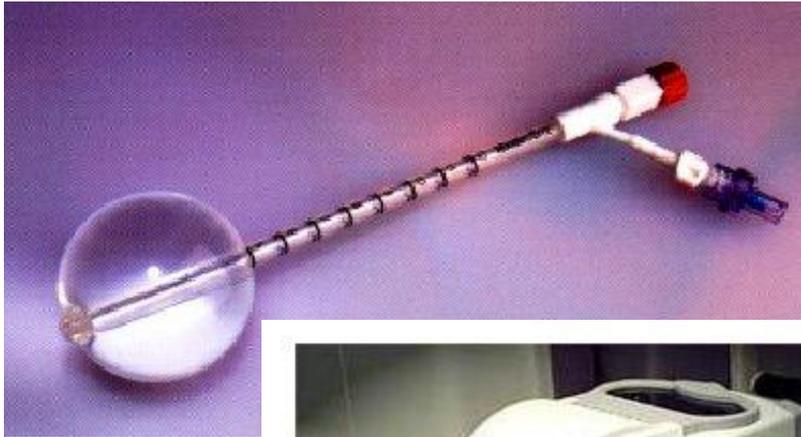
Why partial breast irradiation (PBI)?

- ▶ Rationale is that by having a therapy that can be completed in a short period of time (e.g. 1 week) more patients can be eligible for BPT.
 - ▶ Majority of recurrences seen in those pts not receiving XRT occur at or near tumor bed so rest of breast may not need treatment.
 - ▶ Treating less of the breast may produce fewer side effects, specifically pain and fatigue.
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How is PBI performed?

- ▶ Several methods now available including brachytherapy, 3D conformal, IORT, protons.
 - ▶ Most of the experience has been with brachytherapy with some institutions having 10 years of experience.
 - ▶ With brachytherapy, 3D conformal and protons, the treatment takes one week to complete with treatments given twice daily.
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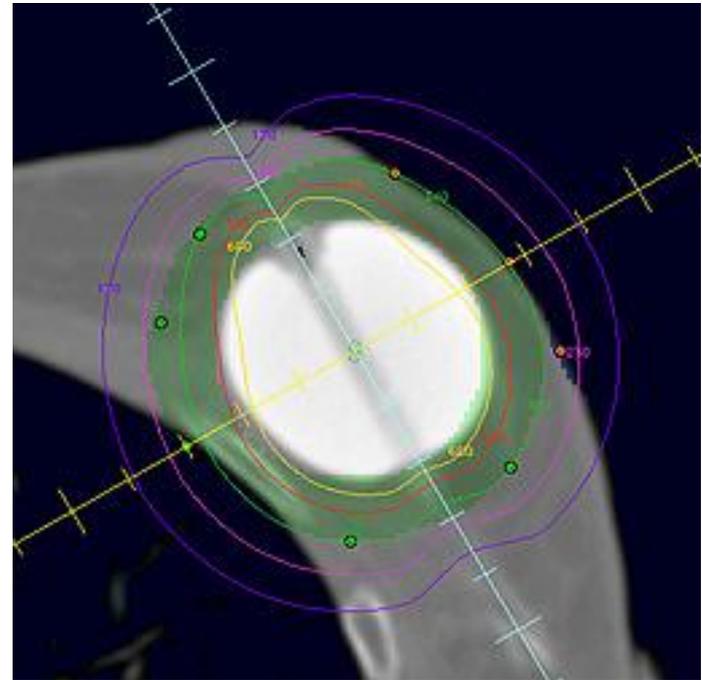
MammoSite brachytherapy



- ▶ Balloon is placed into surgical cavity.
- ▶ Balloon available in spherical and elliptical shapes.
- ▶ Balloon sizes are 4–5 cm.
- ▶ Ten fractions given in 5 days, 34 Gy.

Difficulties with Mammosite

- ▶ Balloon must conform to cavity shape without air gaps. Device explanted in ~ 10–15% of pts.
- ▶ Ideal is to have 7 mm b/w balloon and skin to decrease risk of erythema.
- ▶ Very dependent on surgical placement.



Intraoperative Radiation Therapy for PBI

- ▶ TARGIT trial is comparing whole breast irradiation to IORT delivering a single dose of 20 Gy. Primary accrual is in Europe.
 - ▶ Using the Intrabeam Photon Radiosurgery System, 50 kV x-rays.
 - ▶ Trial has nearly completed enrollment with a target of 2200 patients.
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Advantages of Intrabeam

- ▶ The source of radiation is placed directly in the surgical cavity so there should be no “misses”.
 - ▶ There is greater biologic killing effect on the tumor cells when the dose is given as a single large dose.
 - ▶ The treatment is complete in one treatment.
 - ▶ Even for those patients who still require whole breast irradiation, having the Intrabeam treatment decreases overall treatment length by 1 ½ weeks.
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Disadvantages of the Intrabeam

- ▶ Depth of penetration: limited coverage with dose distribution. Patient must have complete excision.
 - ▶ Margin status: since the depth of penetration is not very deep, the patient must have negative margins. This means that they require a second procedure after the initial lumpectomy to have the procedure performed.
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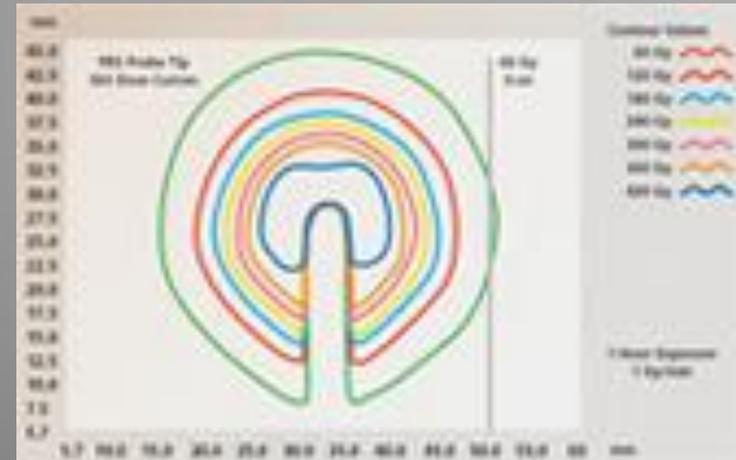
What is the Intrabeam?

- ▶ Small accelerator that generates electrons and produces x-rays.
- ▶ X-rays are 50 kV in energy; can be shielded with x-ray shielding.
- ▶ The device is portable.



Intrabeam applicators

- ▶ Reusable spheres that are placed in the cavity.
- ▶ Allow for spreading out dose in a spherical distribution.
- ▶ Come in sizes from 1.5– 5 cm.



Other uses for Intrabeam

- ▶ Originally designed for treatment of brain tumors.
- ▶ May have application in any surgical site where a cavity is at risk for having residual cancer cells at the margin.

