Intraoperative Radiation Therapy for Breast Cancer: Thinking Outside the Box

Melodie Lain, MHA, RT;
Donna Lash, RN Care Coordinator
WHY

- Under utilized state of the art brachytherapy suite
- Innovative differentiating patient centered service
- Collaborative relationships with the breast team and anesthesia team
Goals / Advantages of IORT

- High dose of radiation to tumor bed
- Low dose to surrounding tissue (short range)
- Surgical removal of most radio resistant tissue
- High RBE radiation used (low-energy)
- Time: Irradiation immediately after excision, before residual cells can repopulate
- Geometric miss odds: IORT << external beam

Disadvantages of IORT

LOGISTICS

Simultaneous cooperation between:
- Surgical oncology & surgical nursing
- Radiation oncology, dosimetrist, & nurse
- Medical physics
- Anesthesiology

A single room with dual purpose
- Shielded room with linac/HDR/other
- Operating room
Clinical Trials: Breast

2 principal phase III trials:
- TARGIT: Electronic brachy (Intrabeam, 50 kV)
- ELIOT: Electrons

Targit Trial Conclusions
- Stable results with long follow-up
- Local recurrence rates higher than WBRT
- Overall mortality lower than WBRT
- Non-cancer deaths reduced (cardiovascular etc)

Eliot Trial Conclusions
- Quadrantectomy
- Used because histology of margins not available at time of RT
- Local recurrence rate is higher than surgery + conventional RT
- Protection of lung, contralateral breast vs conventional RT

ELIOT + TARGIT Disadvantages
- No image-based planning
- Quadrantectomy (ELIOT)
- Late toxicity risk from high 1 fx dose to large volume (ELIOT)
- Low dose 1 cm from applicator (5-7 Gy) (TARGIT)
UVA HDR-IORT Study

Eligible Patient

- Excision of primary tumor
- Sentinel node biopsy +/- axillary dissection
- IORT (12.5 Gy x 1)

No adverse criteria → Treatment complete

Involved margins → Re-excision of margins + WBI

Extensive intraductal component or nodal involvement → Whole breast irradiation (WBI)

Initiate follow-up

Patients will stay on follow-up until initiation of new treatment
UVA HDR-IORT Study

- Single-arm pilot study: 30 patients
- Previous excision, positive margins...
- Re-excision + IORT
- Performed in brachy suite
- Show advantages of CT-on-rails for HDR-IORT Contura multichannel brachy applicator
- More sparing possible than with single channel
- 12.5 Gy x 1 fx
- Compare to: 3.4 Gy x 10 fx brachy
- 95% coverage of PTV (Planned Target Volume)
- OARs: heart, chest wall, skin (Organs At Risk)

Evaluation
- Cosmesis
- Quality of Life
- Toxicity & Safety
Moving Out of the OR

Considerations

• Space
• Supplies
• Funding
• Staffing
• Scheduling
• Patient Workflow
• Information Workflow
Space
CT on Rails and Recovery Area
Considerations

Supplies
Surgical Instruments, bovie, mayo stands, kick bucket, gel pad, step stool, pharmacy, catheters, needles, thermals, dressings, drains, sutures, disposable scrubs, sterile gloves and gowns, formalin cups, white boards, avagard.

Staffing
Breast surgeon, Radiation Oncologist, Physicist, Dosimetrist, Nurse, CT sim tech, Surgery tech, Anesthesia

Scheduling
Staff availability, brachytherapy room schedule, verify appointment with patient, post case to the OR, communication
Funding

Minimal startup cost

Instruments
- $200 per pan

Supplies
- $235 per tote
- $37 box disposable scrubs
- $50 Miscellaneous

Additional staff
- $174 per case/surgery tech
- $155 per case RN circulator

Charges
- $15,905 IORT
- $36,721 External Beam (16 fx)
Patient Workflow

- Radiation
- Oncology
- Appt
- Clinical
- Trial
- Consult
- Education
- Procedure
- Scheduled
Treatment Day

- Patient Arrival
- Meet Teams
- Anesthesia
- Treatment Planning
- Balloon Placement
- Surgical Procedure
- Radiation Treatment
- Catheter removal Closure
- Recovery Discharge

UVA Nurses...We Make the Difference!
Information Workflow

Registration & Documentation
- Paper
- A2K3
- Epic
- Mosaiq

Billing
- Breast Cancer
- Anesthesiology
- Radiation Oncology

Follow up
- Next day
- 2-4 week
- 3 month
- 6 month

“There’s an error in my bill. You accidentally sent it to someone who has no money.”
Minor Adjustments

Other Minor Adjustments Included:
- Additional Surgical Supplies
- Debriefing
- Backup Coverage
- Additional Procedure Day
- Gel Pad

Continues to be a work in progress
Implementation

• First case in December 2013
• Length of procedure 6 hours
• Treatment was successful

Conclusions

• Performed 28 procedures
  • No adverse effects
  • Patient satisfaction
  • Expand Clinical Trial