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So, as a Breast Surgeon, what has Changed?
What has Changed:

- LN
  - Part of the lymphatic system, located all over our body
  - Function to produce lymphocytes to filter and fight infection and cancers
  - Breast cancer spreads by the LN to the rest of the body
What has Changed:

• LN
  • ALND standard of care
Lymph Node Levels

- 3rd level
- Pectoral minor m.
- 1° level
- 2nd level

Stefano Pacifici 2013
What has Changed:

• LN
  • ALND standard of care
  • SLNB as standard of care NSABP B-32
SLN Biopsy
What has Changed:

- LN
  - ALND standard of care
  - SLNB as standard of care NSABP B-32
  - SLNB only with BCT, Z10, Z11, B32 etc
  - SLB after Neoadjuvant chemo, ACOSOG 1071, SENTINA
  - Axillary XRT only?
Grossly Cancerous Lymph nodes
What has Changed:

• Margins – a rim of healthy tissue all the around the tumor
  • 1 cm
  • 2 mm
  • 1 mm
  • 2/2014, No ink on tumor, B-06

• Chemo
  • Yes for all tumors over 1 cm
  • Genomic profiling, Oncotype, mammoprint etc.
  • Neoadjuvant chemo
  • Duel therapies, ie. triple+
Genetics
Genetics

• In the US ~ 1 in 8 women will develop Breast Cancer in their life time
  • ~ 14%
  • 1 in 6 if you include DCIS
• About 5-10% of these Breast Cancers are recognizably inherited
• The vast majority of Breast Cancers are spontaneous at 90-95%
  • Greatest risk factor is being an adult women
Understanding Genetics

- Everyone has BRCA 1&2 genes
  - They function to REPAIR mutations/DNA damage
    - Thereby stopping BCA from developing

But......BRCA 1&2 are only the tip of the iceberg

- June 13, 2013
- SNP or NGS (next-generation sequencing)
Other Genes

- ATM: DNA repair gene
- TP53: production of a protein that inhibits tumor growth
  - Li-Fraumeni Syndrome - BCA, sarcomas, brain tumors, leukemia
- PALB2: partner and localizer for BRCA 2, DNA repair gene
  - 2014 published data that PALB2 increases risk of BCA 5-9 times, almost equal to BRCA 2 risk levels
  - Also cause of Fanconi anemia and increased risk for other CA
- CHEK2: production of a protein that inhibits tumor growth, also increase risk for BCA and Li-Fraumeni Syndrome
  - Receives signals from damaged DNA via ATM
- BARD1, BRIP1, MRE11A, NBN, RAD 50, RAD51c and RAD51D: are genes involved in Fanconi Anemia
  - DNA repair and homologous recombination and interact with BRCA 1&2
  - Confer a 3 fold increased risk of BCA
  - RAD51C and D are associated with an increased risk of ovarian CA of 9-10%
- MUTYH (MAP): risk of colorectal CA up to 80%, endometrial CA and GI CA
- NF1: associated with Neurofibromatosis type 1
  - 3-5 time increased risk for BCA
- PTEN: helps regulate cell growth
  - Cowden Syndrome (larger head circumference)
  - Associated with increased risk for benign and malignant breast tumors
- CDH1: production of cell binding protein, associated with stomach CA and increased risk for ILC of 39-52%
- MRE11A: works with RINT1 to for a DNA repair complex
- NBN: along with RAD50 and MRE11A assist with DNA repair forming a DNA repair complex
Who Should Get Tested

- Anyone diagnosed with BCA under 50
- Triple “-” BCA before the age of 60
- 2 first degree relatives with BCA
- Family history of early onset BCA, 45-50 or under
- Personal or family history of ovarian
- Ashkenazi Jewish (Eastern Europe)
- FMHx of male BCA
- Pancreatic CA associated with FMHx of breast or ovarian CA
Risk Evaluation and the High Risk Program

Breast High Risk Clinical Evaluations

- evaluate patient’s individualized risk factors
- counsel them on lifestyle changes or medications that may decrease risk
- arrange for supplemental screening if indicated
- In women at high risk due to BRCA mutation, very strong family history, prior high risk breast biopsy (such as atypical ductal hyperplasia or LCIS) and certain rare genetic disorders, risk-reducing medical therapies may be offered.
- Genetic testing may be undertaken if indicated based on risk models.
Surgically, What has Changed:

• And……… how we perform breast surgery
  • Mastectomies
  • Oncoplastics
  • Mammoplasty
  • Reconstruction
History of Breast Surgery

• 460 B.C., Hippocrates, suggested that cancer was caused by the excess of black bile
• Ancient Greek and Egyptians described Breast Cancer 3,500 years ago, “bulging tumors of the breast that have no cure”, Edwin Smith and George Ebers papyri
• Early groups favored cauterization
• Roman treatment of choice was excision
• Renaissance popularized several devices for rapid removal of the breast
• The breast guillotine, Gerard Tabor, 1721:
Breast Surgery

- William S. Halsted, (Johns Hopkins)
  - Performed the first “radical mastectomy”, ie the Halsted procedure, in 1882
  - At that time, surgery was the breast cancer patient’s only option
  - Radical mastectomy: entire breast removed, with surrounding tissue, lymph nodes and the pectoral muscles
Below: Halsted incision and final cut.
So, as a Breast Surgeon, what has Changed:

- 1900’s: Halsted Radical Mastectomy
- 1960’s: Modified Radical Mastectomy (Madden)
  - 1980’s: MRM (NSABP B04)
  - 1980’s: BCS (NSABP B06 - only 3% “elsewhere failures”)
- 1990’s: SSM (Toth and Lappert)
  - 1990’s: SSM (Grant Carlson, Lisa Newman, et al)
- 1999: Prophylactic Subcu. Mastectomy (Hartmann)
- 2003: NSM (Gerber, Petit, Sacchini, Crowe, et al)
History of Breast Surgery

• Most (~64%) newly diagnosed BCA patients choose BCT (lumpectomy followed by radiation)
• Not always the case
  • Forty years ago, radical mastectomy was the standard of care
  • “Halsted” philosophy regarding the pathology of cancer persisted from the 1800 to the mid 1950’s
History of Breast Surgery

- 1967, Dr. Fisher became the first chair of National Surgical Adjuvant Breast and Bowel Project (NSAPB)
- Two landmark studies:
  - First
  - NSABP-04, 1971, the first randomized trial in America that compared radical mastectomy with simple mastectomy or simple mastectomy followed by radiation therapy
  - Published in 1974, showed that the survival benefit equal regardless of which type of treatment (Radical Mastectomy or simple mastectomy) they underwent
Radical Mastectomy
Unilateral Simple Mastectomy

Patient with redundant skin

Patient less than 1 week post right simple mastectomy
History of Breast Surgery

• 1967, Dr. Fisher became the first chair of National Adjuvant Breast and Bowel Project (NSAPB)

• Two landmark studies:
  • Second
  • NSABP 06, showing *equivalent survival* with lumpectomy and XRT as mastectomy allowing for BCT
Equivalent *Survival*

not

Equivalent *Recurrence*
Breast Conservation Recurrence and Survival

Breast conservation is a safe method in patients with small cancer of the breast. Long-term results of three randomized trials on 1,973 patients.

U. Veronesi¹, B. Salvadori, A. Luini¹, M. Greco, R. Saccozzi, M. del Vecchio, L. Mariani, S. Zurrida¹, F. Rilke. European Journal of Cancer Volume 31, Issue 10, September 1995, Pages 1574–1579
Breast Conservation Recurrence and Survival

• Analyzed 1,973 patients
• Treated in three consecutive randomized trials
  1. Halsted/Radical mastectomy
  2. Quadrantectomy plus radiotherapy
  3. Lumpectomy plus radiotherapy
  4. Quadrantectomy without radiotherapy
• Compare outcomes in terms of local recurrence rate and overall survival
• Follow up 82 months, or 6.8 years
Breast Conservation Recurrence

- Halsted mastectomy and quadrantectomy plus radiotherapy had low annual rates of local recurrence (0.20 and 0.46, respectively).
- Lumpectomy plus radiotherapy and quadrantectomy without radiotherapy had significantly higher annual rates of local recurrence (2.45 and 3.28, respectively).
- Patients under 45 years of age had a much higher incidence of local recurrences, while in women over 55 years local recurrences were much less frequent.
Breast Conservation Survival

Overall survival curves were identical in the four groups

No survival benefit of one treatment of another
Then What’s the Risk of a Contralateral for a woman with a history of breast cancer

• Risk of contralateral breast cancer in patient with H/O Breast cancer is decreasing........ Why?
• 1985 started adjuvant chemo and endocrine therapy (ie., tamoxifen)
• Current risk of developing contralateral breast cancer for post menopausal women is
  • .2%/year which is decreasing from .5%/year
Breast Conservation

**Patient age:** 37
**Description:** Six months after right breast lumpectomy and whole breast radiation therapy for invasive cancer.

**Patient age:** 39
**Description:** Five years after left lumpectomy and whole breast radiation therapy for invasive cancer.
Breast Conservation

**Patient age:** 65
**Description:** Two years after right breast lumpectomy and whole breast radiation therapy for invasive cancer. Some skin needed to be removed because the tumor was very close to the skin.

**Patient age:** 50
**Description:** One year after right breast lumpectomy and whole breast radiation therapy for invasive cancer.
So why would any one still have a Mastectomy?
Breast Surgery

• Mastectomy, retains an important place
  • Unacceptable cosmetic result with lumpectomy
  • Need for local control of the disease or survival benefit
  • In breast/local recurrence
  • Patient preference
• Reconstructive breast surgery
  • Significantly improves psychological morbidity associated with breast cancer surgery
• As soon as there was mastectomy, there was the birth of reconstruction
Breast Surgery

• Modern Breast Surgery Brought......
  • 1991, First Skin Sparing Mastectomies
    • 2010 data showing no increased risk of local recurrence for properly selected patients
  • Flap Reconstruction
• Today a woman who thirty years ago would have been left with almost no chance of reconstruction can have a relatively symmetrical result.
  • Decisions relating to the method of reconstruction depend on many variables
Mastectomy - Genetics
Nipple Sparing Mastectomy with Implant reconstruction

**Patient:** 39 years old, Multifocal.

**Description:** a. Before, b. after mastectomy with placement of expanders, and c. less than 2 weeks after placement of implants/completion reconstruction.
Small Breasted
Breast Surgery

- The evolution of breast cancer surgery demonstrates important principles when evaluating any surgical procedure
  - Need to thoughtfully consider both the patient and the disease
  - Decisions are made best as part of a multidisciplinary team
  - With regard to the breast cancer
    - type, size, determination of its spread to lymph nodes or metastatic sites, and whether it is hormonally responsive
    - Tumor size is crucial as is breast size,
    - Genetic
Breast Surgery

So........

What do patients want and think about all this?

What have we learned about working with our patients?
Surgical Treatment of Early Stage Breast Cancer
National Cancer Database - ACS

Albornoz/Matros et al PRS in press
Contralateral Prophylactic Mastectomy
Convention and Trends: By STAGE

Holds true regardless of stage

Tuttle Y M et al. JCO 2007; 25: 5203-5209
Contralateral Prophylactic Mastectomy
Convention and Trends: By AGE

Kurian et al. JAMA 2014
California CA registry
Satisfaction with unilateral and Bilateral Reconstruction

Patient-Reported Aesthetic Satisfaction with Breast Reconstruction during the Long-Term Survivorship Period

Fig. 1. Cross-sectional graph of percentage of satisfaction with reconstructed breast appearance over time, adjusted for age, stage, radiation, unilateral or bilateral procedure, nipple reconstruction, and symmetry procedure.

Alderman et al. PRS 2009

Satisfaction with Implant Breast Reconstruction

Mean BREAST-Q Satisfaction with Breasts

<table>
<thead>
<tr>
<th></th>
<th>Unilateral Reconstruction</th>
<th>Bilateral Reconstruction</th>
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<tbody>
<tr>
<td>N</td>
<td>112</td>
<td>182</td>
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Mean follow-up 4.5 years

King, Morrow, SSO 2013

Albornoz/Matros et al PRS 2013

Pusic SABCS 2014
RECONSTRUCTION

Option 1: Flap Reconstruction

Option 2: Tissue Expander/Implant

Albornoz/Matros et al PRS 2013
Pusic SABCS 2014
“What provides the best match?”

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<th>UNILATERAL MASTECTOMY</th>
<th>BILATERAL MASTECTOMY</th>
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<tbody>
<tr>
<td><strong>FLAP</strong></td>
<td>![Image of unilateral flap]</td>
<td>![Image of bilateral flap]</td>
</tr>
<tr>
<td><strong>IMPLANT</strong></td>
<td>![Image of unilateral implant]</td>
<td>![Image of bilateral implant]</td>
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</tbody>
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Who Made the Decision about Surgery \((n=556)\)

Rosenberg et al, SABCS 2013
Partridge SABCS 2014
So, as a Breast Surgeon, what has Changed:

EVERYTHING!!
The True Scary Side of Breast Cancer

• We used to think Breast Cancer was a local disease, one size fits all
  • But we found sometime women with small tumors did worse than we expected and some with larger tumors did better.........why?
• Biology!!!!!!
• What makes breast cancer scary is it’s ability to spread/cancer becomes deadly when it distantly metastasizes
Biology matters!

• Breast Cancer is a systemic disease
• Not just a local disease and thus surgery alone or surgery and radiation are not the entire answer
What’s Changed

• When I trained.............
  • Patients always had surgery first
  • After completion of surgery the pt was sent to the medical oncologist
  • After completion of chemotherapy they were sent to a radiation oncologist
  • Lastly, the pt was sent to a plastic surgeon, if they asked and not until “surgery” was complete
Team Work!!!!

• Now...... we approach this disease, and all aspects of its treatment, from a **multidisciplinary approach**

• We work with our *patients*, understanding their needs, issues and expectations

• We work hand in hand with our *plastic surgeons*
  
  • Choosing the surgical and reconstructive approach together

• We form our care plans and strategies together with our *Medical and Radiation Oncology* colleges to choose the best plan for each individual patient
Why We do This.... So one day she doesn’t have to
Thank you