Prophylactic Mastectomy & Reconstructive Implications

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Prophylactic Mastectomy

- Surgical removal of one or both breasts to reduce the risk of developing breast cancer
- 90% risk reduction in high risk patients
    - Moderate-Risk Group (FH)
      - 89% reduction in breast cancer occurrences
      - 100% reduction in breast cancer deaths
    - High-Risk Group (strong FH, genetic component)
      - 90% reduction in breast cancer occurrences
      - 81% to 94% reduction in breast cancer deaths
Candidates

- Personal breast cancer history
- Genetic susceptibility eg BRCA, Li-Fraumeni, Cowden’s
- Strong family history – mother, sister, daughter, <50 yrs
- LCIS – increased risk of invasive disease
- Chest XRT before <30 yrs
- Breast changes – widespread calcifications, dense breasts, multiple biopsies
Prophylactic Mastectomy Rates

- Rising trend in CPM
  - Institutional & national
    - stage I-III
    - 4.2% → 11.0%, 1998 – 2003
    - Young patient age, white race, lobular histology, and previous cancer diagnosis
    - DCIS
    - 6.4% → 18.4%, 1998 – 2005
    - Young age, white race, recent year of diagnosis, LCIS
Prophylactic Mastectomy Rates

- Rising trend in CPM
    - Stage 0 – III, U Pittsburgh
    - Pre-op MRI doubled rate (4.7% vs 9.2%)
    - Stage 0 – III, Sloan-Kettering
    - 6.7% → 24.2%, 1997 – 2005
    - 13% of pts = BRCA or mantle XRT
    - Independent predictors: white race, immediate breast reconstruction, FH, MRI at diagnosis, age <50 yrs, noninvasive histology, failed attempt at breast conversation
Prophylactic Mastectomy Rates

- Rising trend in BPM
  - No current breast cancer diagnosis
  - 9% – 17% of candidates
  - “Angelina Jolie effect”

- Majority of patients seek immediate breast reconstruction
Patient Factors

  - 639 cancer-free women, 1960 – 1993, BPM @ Mayo Clinic
  - High risk vs moderate risk
  - Retrospective, study-specific questionnaire

- Reasons for choosing BPM
  - 98% >1 reason
  - Family history (93% vs 60%)
  - Physician advice
  - Nodular breasts
  - Worrisome biopsies
  - Psychological/emotional concerns
Patient Factors

- Outcomes
  - Mean 14.5 yrs post-op
  - 70% satisfied/very satisfied with results
  - 19% dissatisfied/very dissatisfied
  - 67% would have the surgery again
  - Strongest correlation with high satisfaction:
    - perceived improved body appearance ($r=0.49; P<.001$)
    - improved self-esteem ($r=0.38; P<.001$)
    - limited impact on sexual relationships ($r=0.32; P<.001$)
    - lower level of stress in life ($r=0.27; P<.001$)
  - Dissatisfaction associated with:
    - physician advice as primary reason for surgery
Patient Factors

- Frequency of psychological and social outcomes:

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Favorable Effects</th>
<th>No Change</th>
<th>Adverse Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-esteem (n = 559)</td>
<td></td>
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<tr>
<td>Satisfaction with Appearance (n = 559)</td>
<td></td>
<td></td>
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<tr>
<td>Feelings of Femininity (n = 558)</td>
<td></td>
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<tr>
<td>Sexual Relationship (n = 554)</td>
<td></td>
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<tr>
<td>Emotional Concern About Developing Breast Cancer (n = 563)</td>
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<tr>
<td>Stress in Life (n = 557)</td>
<td></td>
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<tr>
<td>Overall Emotional Stability (n = 562)</td>
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</table>
Prophylactic Mastectomy Options

- Proven oncologic safety
- Lymph node surgery (incl. SLNB) not indicated
- Keys to cosmesis if reconstruction planned:
  - limited incisions
  - skin envelope preservation
  - coordinated team approach

<table>
<thead>
<tr>
<th>Mastectomy</th>
<th>Parenchyma</th>
<th>NAC</th>
<th>Skin envelope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total / Simple</td>
<td>Removed</td>
<td>Removed</td>
<td>Removed</td>
</tr>
<tr>
<td>Skin-sparing (SSM)</td>
<td>Removed</td>
<td>Removed</td>
<td>Preserved</td>
</tr>
<tr>
<td>Nipple-sparing (NSM)</td>
<td>Removed</td>
<td>Preserved</td>
<td>Preserved</td>
</tr>
</tbody>
</table>
Variable Scarring

Total

SSM

NSM
(subcutaneous)
Prophylactic Mastectomy Risks

- Immediate risks of surgery
  - skin flap/NAC necrosis
- Loss of sensation
- Inability to breastfeed
- Breast cancer
Reconstructive Goals

- What do patients want?
  - age
  - family status
  - activity
  - “natural” vs “enhanced”

- Short time to completion

- Low complication rates
  - immediate
  - long-term

- Longevity of reconstruction
Reconstruction Timing

- Immediate – same time as SSM / NSM
- Delayed – any time after mastectomy
- Immediate reconstruction usually far preferable
  - psycho-social impact
  - cosmesis
  - # of procedures
- Typically ≥2 procedures
Reconstruction Options

- Implants + “biologic matrix”
  - staged (expanders)
  - direct-to-implant (”One-Step”)

- Tissue
  - back flap – Latissimus dorsi
  - abdominal flap – DIEP / SIEA / TRAM
  - buttock flap – SGAP / IGAP
  - thigh flap – TUG / PAP
  - fat grafting
Reconstruction Risks

- Inability to perform reconstruction
- Reconstructive failure
- Multiple procedures
- Revision surgery (implants)
Implant Reconstruction

• Most common method nationally

• Typically at least 2-stages (tissue expander)
  • biologic matrix, eg:
    • Alloderm®, FlexHD® – cadaveric
    • Strattice® – porcine
  • expansion process
  • expander/implant exchange ± fat grafting
  • ± nipples

Direct-to-implant – “Alloderm One-Step”
• avoids expansion process
• 5% revision rate in best candidates
## Implant Reconstruction

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
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</thead>
<tbody>
<tr>
<td>Short surgery</td>
<td>Ripples</td>
</tr>
<tr>
<td>Recovery</td>
<td>Capsular contracture</td>
</tr>
<tr>
<td>One surgical site</td>
<td>Cold</td>
</tr>
<tr>
<td>Enhancement</td>
<td>Breast animation</td>
</tr>
<tr>
<td>Local surgeons</td>
<td>Revision surgery</td>
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</tbody>
</table>
Biologic Matrix

- One or two-stage
- Creation of a sling
- Support / stability / coverage
- Re-define IMF / shaping
- Any incision
  - lateral ± peri-areolar
  - IMF
2-Stage Implant + Fat Grafting

Before

After
2-Stage Implant + Fat Grafting

Before

After
“One-Step” Candidates

- BPM patients only
- Nipple-sparing mastectomy
- No or minimal breast ptosis
- No previous breast / chest radiation
- BMI – need for fat grafting?
- Co-morbidities
- Smoking
BPM & Alloderm One-Step

Before

After
BPM & Alloderm One-Step

Before

After
# Autologous Tissue Reconstruction

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood supply</td>
<td>*Technical – training, team</td>
</tr>
<tr>
<td>Natural, warm</td>
<td>Morbidity</td>
</tr>
<tr>
<td>Durability</td>
<td>Donor site</td>
</tr>
<tr>
<td>Forgiving (mastectomy flaps)</td>
<td>Recovery</td>
</tr>
<tr>
<td>Donor site</td>
<td>Reimbursement</td>
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- Pedicled flaps – Latissimus, TRAM
- *Microsurgery – DIEP, SIEA, GAP, TUG, PAP
- Fat grafting
Perforator Flap Reconstruction

DIEP

SIEA

GAP

TUG
DIEP Flap

- **Deep Inferior Epigastric Perforator**
- Gold standard
- Evolution of the TRAM
  - lower abdominal fat and skin only, NO muscle sacrifice
- Preferred reconstruction method if adequate tissue
  - reliable
  - natural
  - donor site
- >500 flaps per year, <1% flap failure rate
DIEP & SIEA Flap
Candidates

- Previous abdominal surgery?
  - abdominoplasty
  - c-section NOT contraindication
  - scars – pencil doppler, CTA

- Comorbidities
  - DM
  - HTN
  - Obesity

- Pro-thrombotic conditions / family history DVT

- Smoking
DIEP Flap Surgery

- Multiple stages
  - Stage 1 – Reconstruction
    - 2 microsurgeons
  - Stage 2 – Revision surgery
    - breast symmetry
    - fat grafting
    - nipple reconstruction
    - abdominal contouring
    - scar revision
  - Stage 3 – Nipple-areola micropigmentation
Sensory Nerve Reconstruction

Sensory nerve included with flap
Flap Transplant to Chest
DIEP Donor Site Advantages

- Improve abdominal contour
- Preserve rectus innervation
- Unlike TRAM flap, low risk bulge/hernia (1% vs 16%)
BPM (NSM), L DIEP, R Implant

Before

After
L IDC, B SSM & DIEP flaps

Before

After
R IDC, B NSM & DIEP Flaps

Before

After
Recurrent R IDC, B SSM & DIEP Flaps

Before

After
R delayed, CPM & DIEP Flaps

Before

After
Fat Grafting

- Very useful adjunct
- “Enhanced” – Oncologic safety?
Conclusions

- Prophylactic mastectomy is on the rise

- Positive outcomes:
  - High patient satisfaction
  - Decreased emotional concern about developing breast cancer
  - Favorable psychological and social outcomes

- Many reconstructive options:
  - Immediate reconstruction offers excellent cosmetic results
  - Specialized, coordinated team approach crucial for perforator flap procedures
  - Evolving field – stem cells
Thank You

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