

# Breast Cosmesis After Radiotherapy

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Nebraska  
Medicine



# Objectives

- Review components of cosmesis
- Review treatment approaches to improve cosmetic outcomes
- Discuss risk factors for cosmetic changes
- Review patient concerns and perceptions of cosmesis



# Components of Cosmesis

- Shape
- Skin coloration (or discoloration)
- Size
- Fibrosis or contour change
- Position of nipple-areolar complex
- Breast asymmetry

# Cosmetic Assessments



Excellent



Good



Fair



Poor



# Treatment Approaches

- Whole breast radiotherapy
  - Conventional fractionation
  - Hypofractionation
  - Ultra-hypofractionation
- Partial breast radiotherapy
  - Technique
  - Dose



# Best Cosmesis: Avoid Adjuvant RT

- **Holy grail:** find a low risk population where LRR is low enough to avoid adjuvant RT
- CALGB and PRIME II trials suggest low risk of LRR without RT of ~1% per year
  - Age >65-70, ER+, < 2 cm, tamoxifen



# Avoid Adjuvant Radiotherapy Ongoing Trials



## IDEA

- Prospective multicenter trial
- Age 50-69
- Unifocal, stage I, pN0, lumpectomy, margins  $\geq 2$ mm
- ER+/PR+/HER2-
- Oncotype  $\leq 18$
- 200 patients

## PRECISION

- Prospective multicenter trial  
Boston
- Age 50-75
- Unifocal, stage I, pN0, lumpectomy, no tumor on ink, G1-2, ER positive
- PAM50  $< 40$  and luminal A
- 345 patients

## LUMINA

- Prospective multicenter trial  
Canada
- Age  $> 55$
- Unifocal, stage I, pN0, lumpectomy, margins  $\geq 1$ mm, G1-2, no EIC, no LVI
- ER+/PR+/HER2-
- Luminal A by IHC
- 500 patients



# LUMINA Trial

- Eligibility: Age  $\geq 55$ , grade 1-2,  $\leq 2$  cm,  $\geq 1$  mm margin, luminal A by IHC (ER  $\geq 1\%$ , PR  $>20\%$ , HER2 negative and Ki67  $\leq 13.25\%$ )
  - Underwent lumpectomy and received endocrine therapy
- Median follow-up 5 years. N=500
- Median age was 67 and 442 (88%) patients were  $<75$  years.
- Median tumor size was 1.1 cm

Outcome	Events at 5 years	% 5-year Rate (90% CI)
LR	10	2.3 (1.3, 3.8)
Contralateral BC	8	1.9 (1.1, 3.2)
RFS	12	97.3 (95.9, 98.4)
DFS	47 (23 second non-BCs)	89.9 (87.5, 92.2)
OS	13 (1 BC death)	97.2 (95.9, 98.4)





# Hypofractionation- Whole Breast

- Canadian Trial: 50 Gy/25 fractions vs 42.56 Gy/16 fractions
- Cosmesis worsened over time in both arms
- Cosmetic outcome affected by:
  - Time from randomization, older age, and tumor size

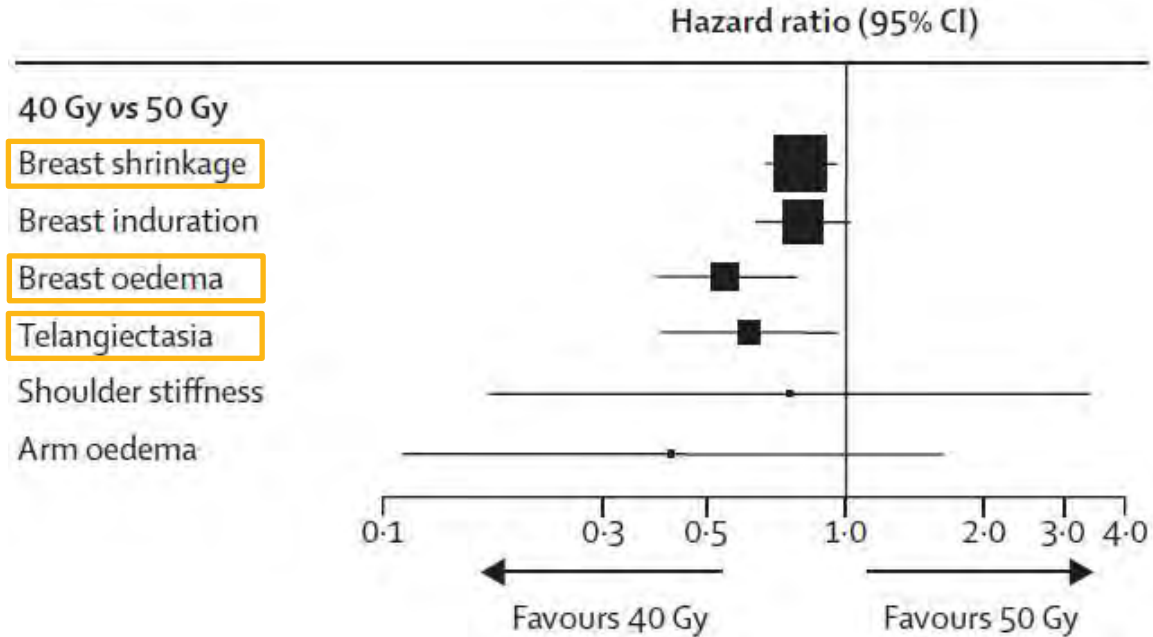
**Table 2. Global Cosmetic Outcome, Assessed According to the EORTC Scale.<sup>‡</sup>**

Rating	5 Yr			10 Yr		
	Standard Regimen (N=423)	Hypofractionated Regimen (N=448)	Absolute Difference (95% CI)	Standard Regimen (N=216)	Hypofractionated Regimen (N=235)	Absolute Difference (95% CI)
	<i>percent of patients</i>		<i>percentage points</i>	<i>percent of patients</i>		<i>percentage points</i>
Excellent	34.3	36.4		27.8	30.6	
Good	44.9	41.5		43.5	39.2	
Fair	17.3	19.0		25.5	25.4	
Poor	3.5	3.1		3.2	4.8	
Excellent or good	79.2	77.9	1.3 (−4.2 to 6.7)	71.3	69.8	1.5 (−6.9 to 9.8)



# Hypofractionation- Whole Breast

- START B Trial
- 40 Gy/15 vs 50 Gy/25
- Median follow up 9.3 years
- Less breast shrinkage with hypofractionation





# Hypofractionation- Whole Breast

- MD Anderson randomized trial
- 42.56 Gy/16 +/- boost vs. 50 Gy/25 +/- boost
- Photographic assessment at one year
- Hypofractionation resulted in improved
  - **Vertical contraction**
    - Associated with poorer cosmesis on patient assessment
  - **Horizontal contraction**



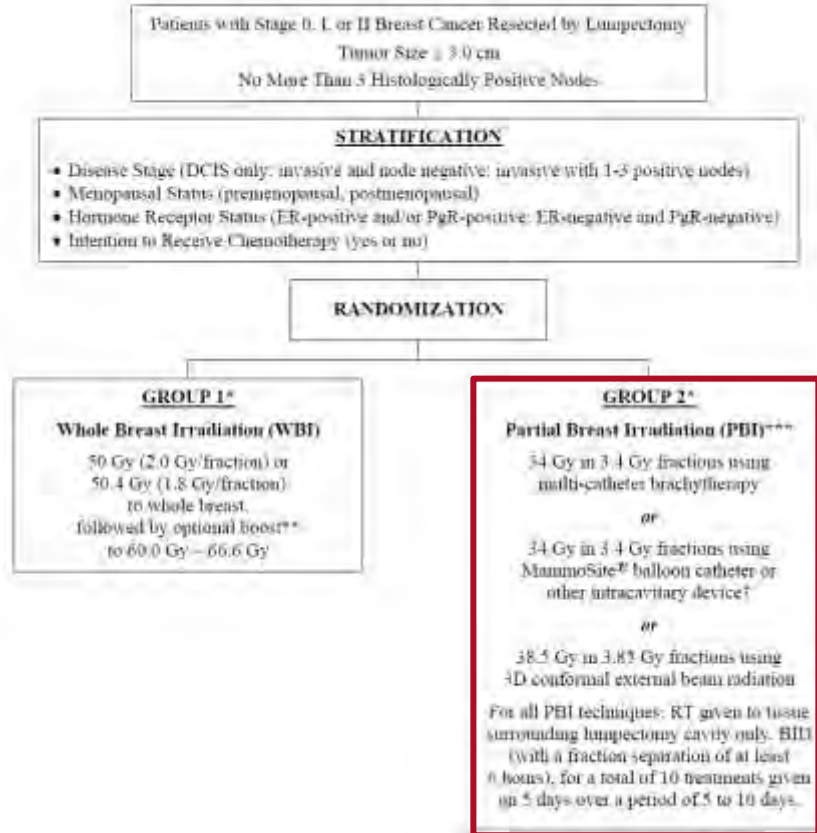
# Hypofractionation- Whole Breast

- Prospective trial, n=109
- Conventional fractionation vs hypofractionation with SIB
- Photographic assessment at baseline and 1 year
- Percent of breast retraction documented
- On MVA, SCV RT (p=0.01), Hypofxn (p=0.03), breast size (p=0.03), boost dose (p=0.46) associated with breast size change





# NSABP B-39/RTOG 0413



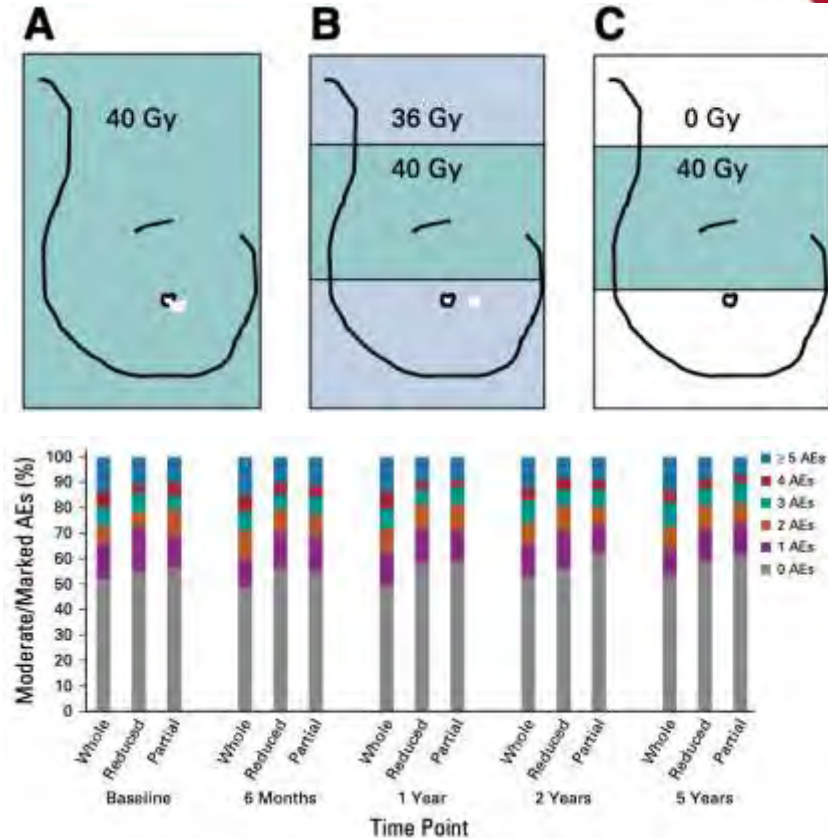
- Partial Breast RT Approaches Vary
  - APBI technique
  - APBI dose
  - Dose/fractionation

Trial	PBI Technique	Dose	Outcomes	Toxicity
GEC-ESTRO(6.5 yr)	HDR/PDR multicatheter	32 Gy/8 BID 30.1 Gy/7 BID	LR: 1.4% (APB) vs 0.8% (WBI) 5-yr survival: 97.3% (APBI) vs. 95.6% (WBI)	Trend for reduced late grade 2-3 skin toxicity with APBI (3.2% vs. 5.7%, p=0.08).
National Inst Onc (10 yr)	HDR multicatheter or electrons	36.4 Gy/7	LR: 4.9% (PBI) vs. 5.1% (WBI) 10-yr survival: 79.7% (PBI) vs. 82.1% (WBI)	Improved excellent/good cosmetic outcome with PBI (81% vs. 63%). HDR patients had better cosmetic outcome than WBI (85% vs. 67%).
Florence (10 yr)	IMRT	30 Gy/5 QOD	LR: 1.5% (PBI) vs. 1.5% (WBI) 5-yr survival: 99.4% (APBI) vs. 96.6% (WBI)	APBI fewer acute & late skin toxicity compared to WBI (p=0.0001, p=0.004, respectively): APBI improved patient and physician-rated cosmesis (p=0.05).
RAPID (8 yr)	3D-CRT	38.5 Gy/10 BID	LR: 3.0% (PBI) vs. 2.8% (WBI)	Grade 1/2 toxicities increased with APBI (p<0.001). Fair/poor cosmesis worse by 17% in APBI vs WBI.
NSABP/RTOG (10 yr)	Varied	38.5 Gy/10 BID 34 Gy/10 BID	LR 10-yr: 4.6% (PBI) vs. 3.9% WBI)	No difference in late toxicity/cosmesis
IMPORT LOW (5 yr)	3D Tangents	40 Gy/15 QD	LR: 0.5% (PBI) vs. 1.1 % (WBI)	Improved breast appearance and breast firmness for PBI arm (p=0.007/p=0.0001)

# IMPORT LOW- Patient Reported Outcomes



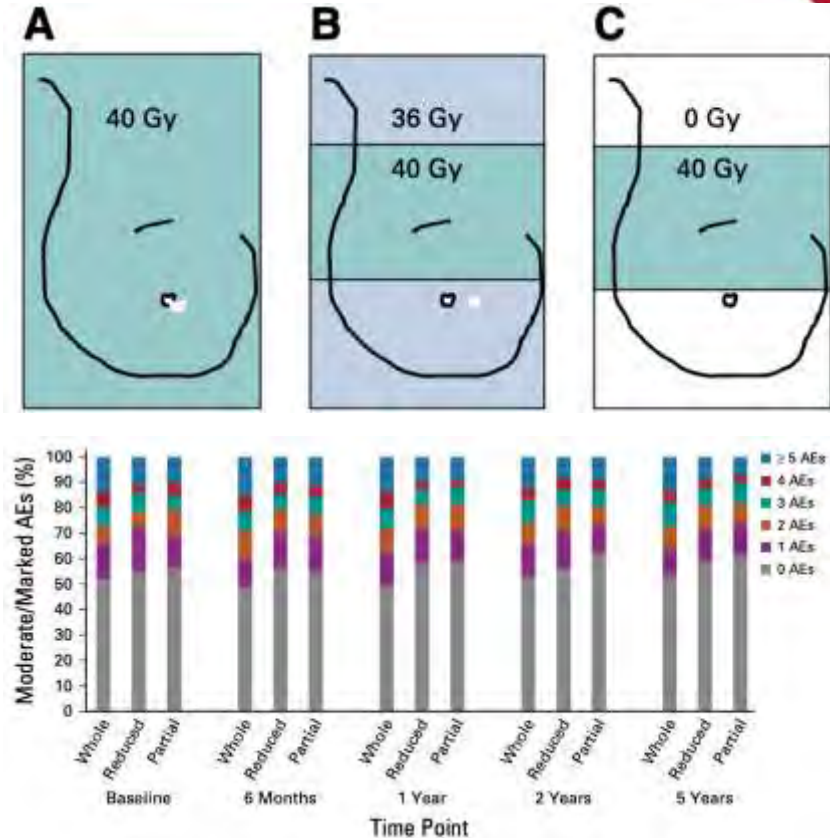
- PRO substudy of IMPORT LOW
  - Largest study of PROM
- Most AEs decreased over time
- Breast shrinkage was only AE that increased over time
- Cosmetic change was most common reported AE



# IMPORT LOW- Patient Reported Outcomes



- Adverse events associated:
  - Breast size
  - Larger surgical defect
  - Axillary surgery extent
  - Concurrent diagnosis of anxiety/depression
  - Young age



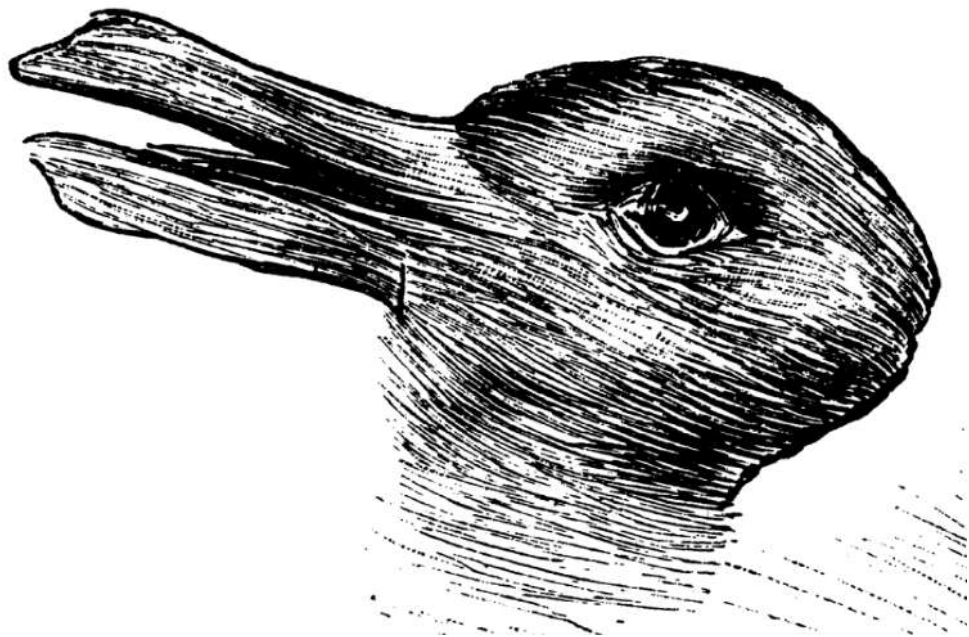




Convenience

Cosmesis





# NSABP B-39/RTOG 0413



<b>Patient Assessment</b>	<b>Site MD Agreement with Patient</b>	<b>DP Review Agreement with Patient</b>
Excellent/Good	89%	85%
Fair/Poor	45%	32%

# Global Cosmetic Score- NSABP B-39/RTOG 0413



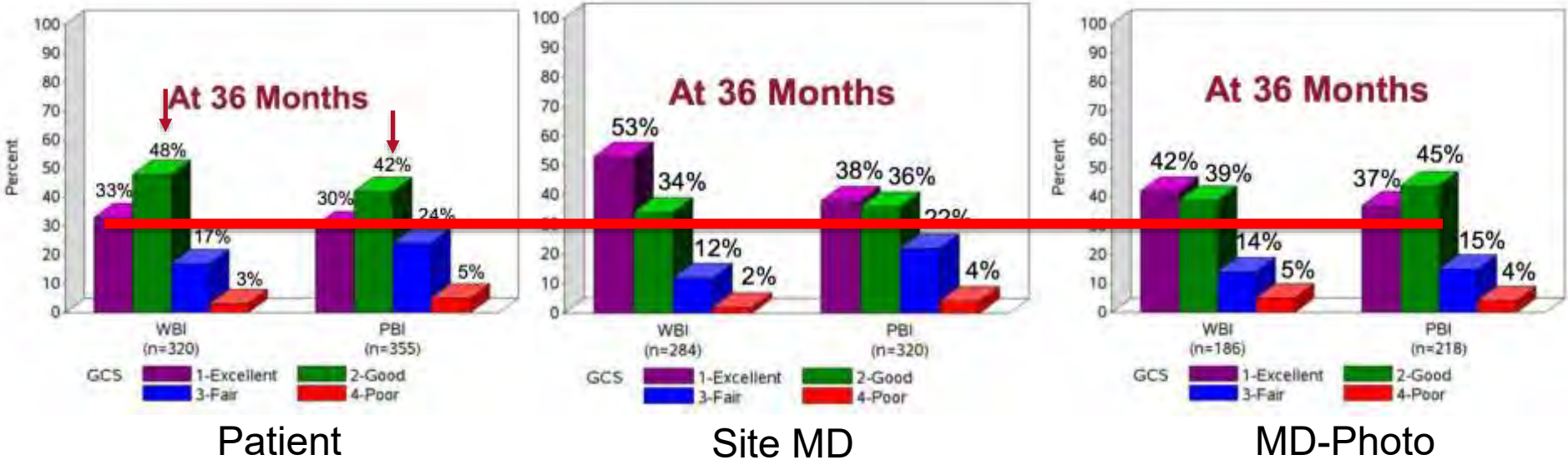
- More MDs rated cosmesis “excellent” versus patients

# Global Cosmetic Score- NSABP B-39/RTOG 0413



- More MDs rated cosmesis “excellent” versus patients
- More patients rated cosmesis “good” versus MDs

# Global Cosmetic Score- NSABP B-39/RTOG 0413



- More MDs rated cosmesis “excellent” versus patients
- More patients rated cosmesis “good” versus MDs
- More patients rated cosmesis “fair” versus MDs



STEPHANIE KLEIN-DAVIS | The Roanoke Times

Mellisa Williamson, 35, a Bullitt Avenue resident, worries about the effect on her unborn child from the sound of jackhammers.

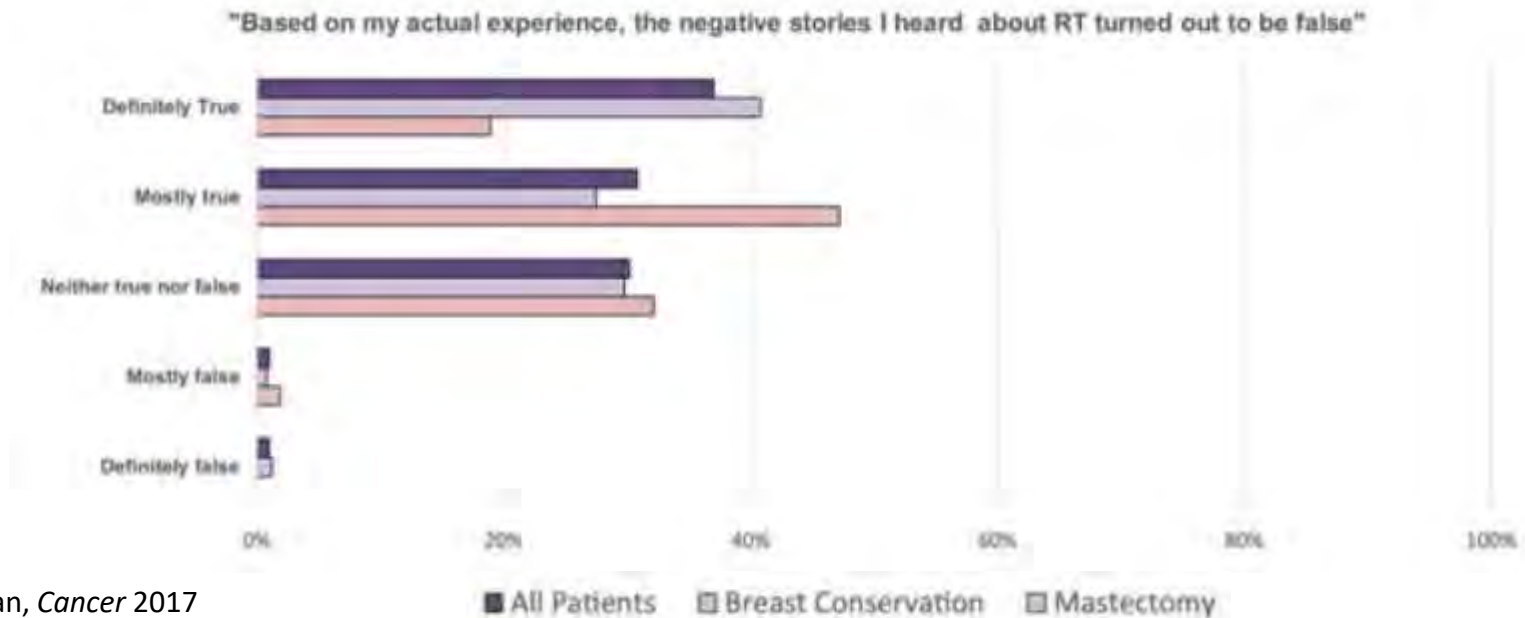
## **TRAFFIC:** Official says wait for end result





# Patient Fears and Expectations

- 80-85% of patients report the severity of acute and late side effects were better than expected

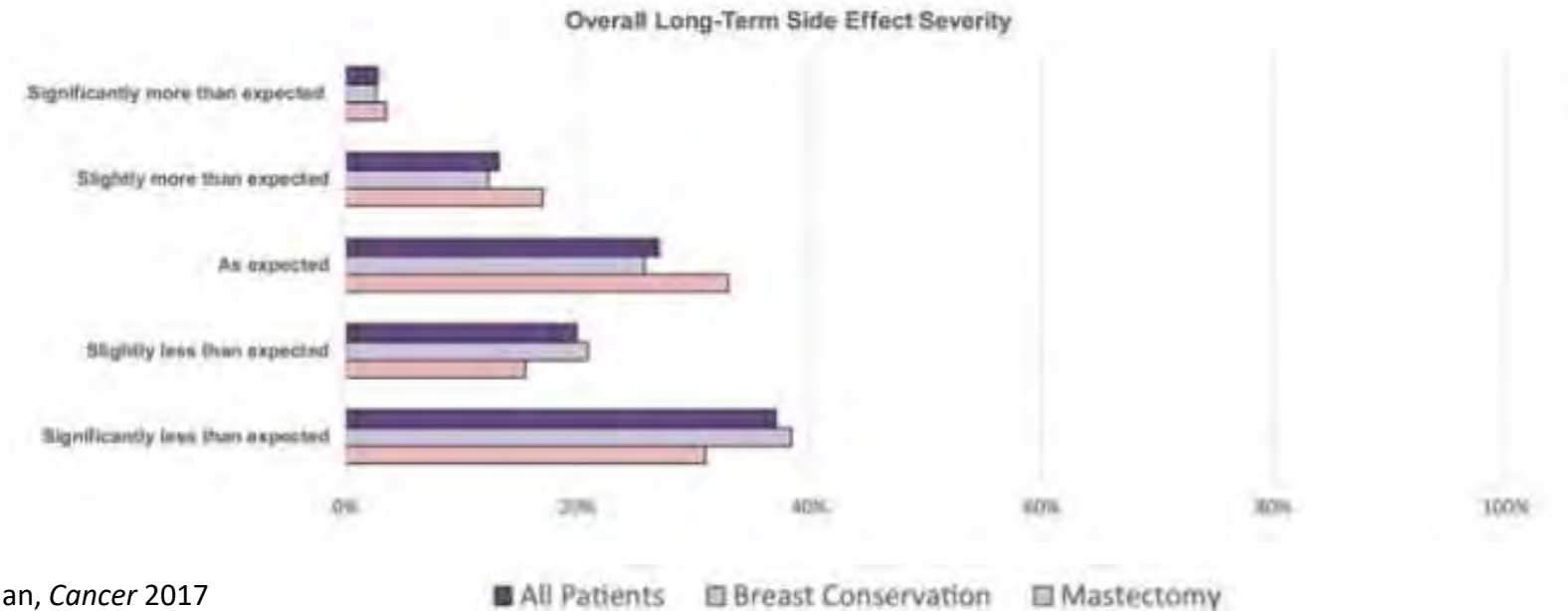






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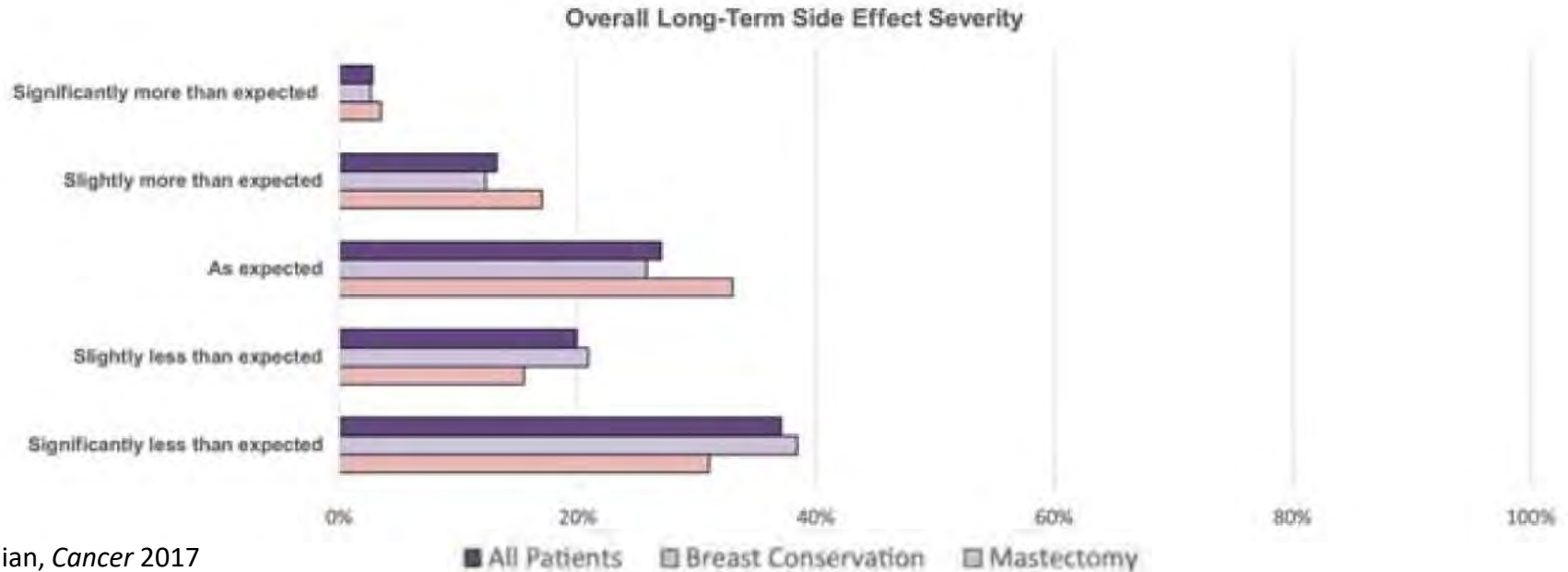
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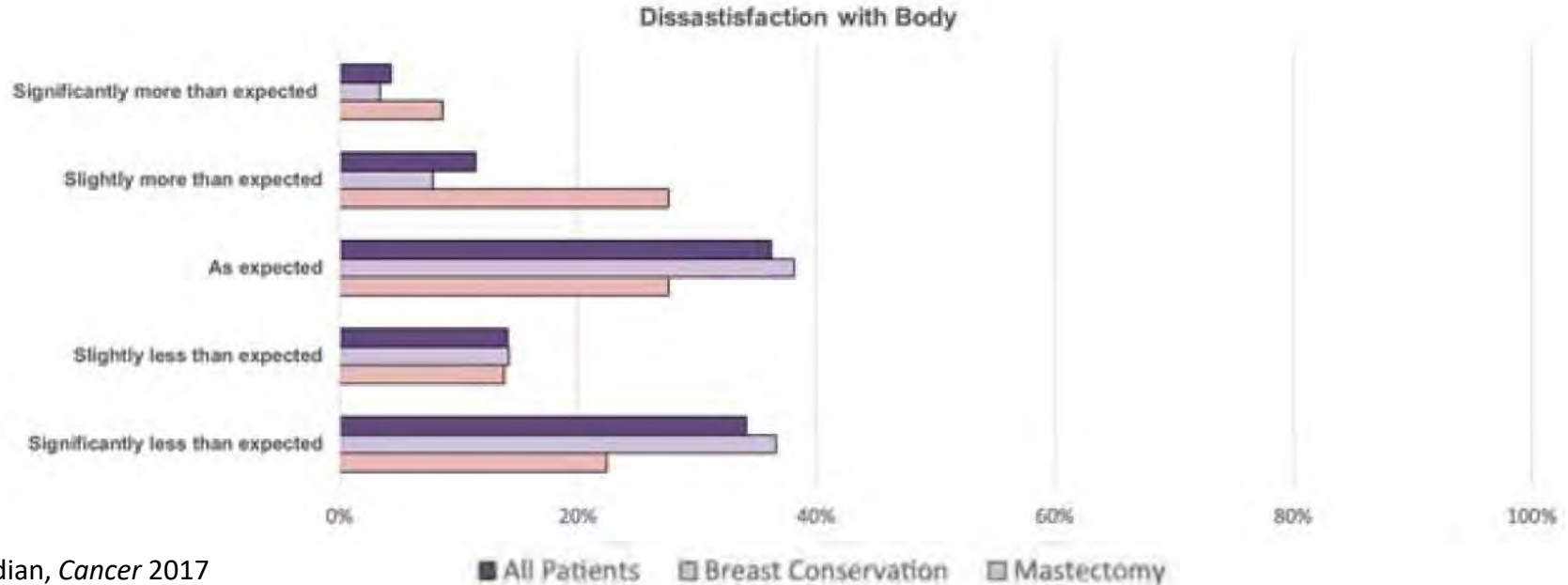
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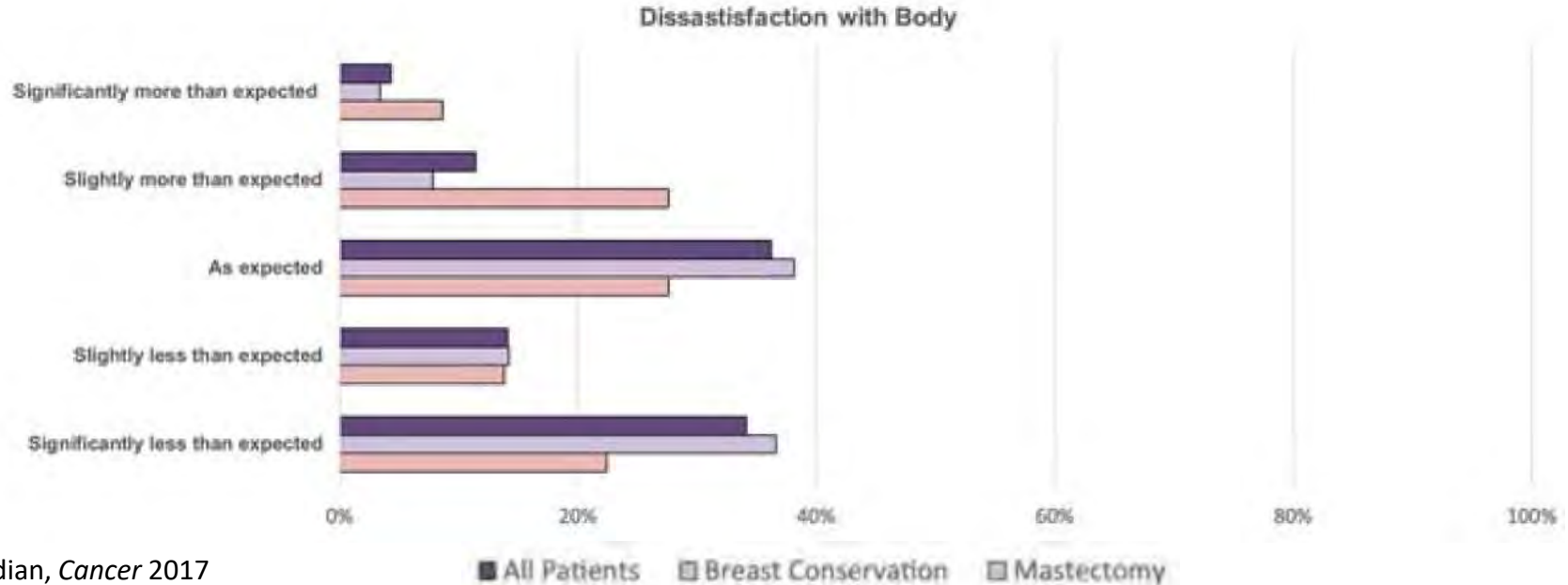
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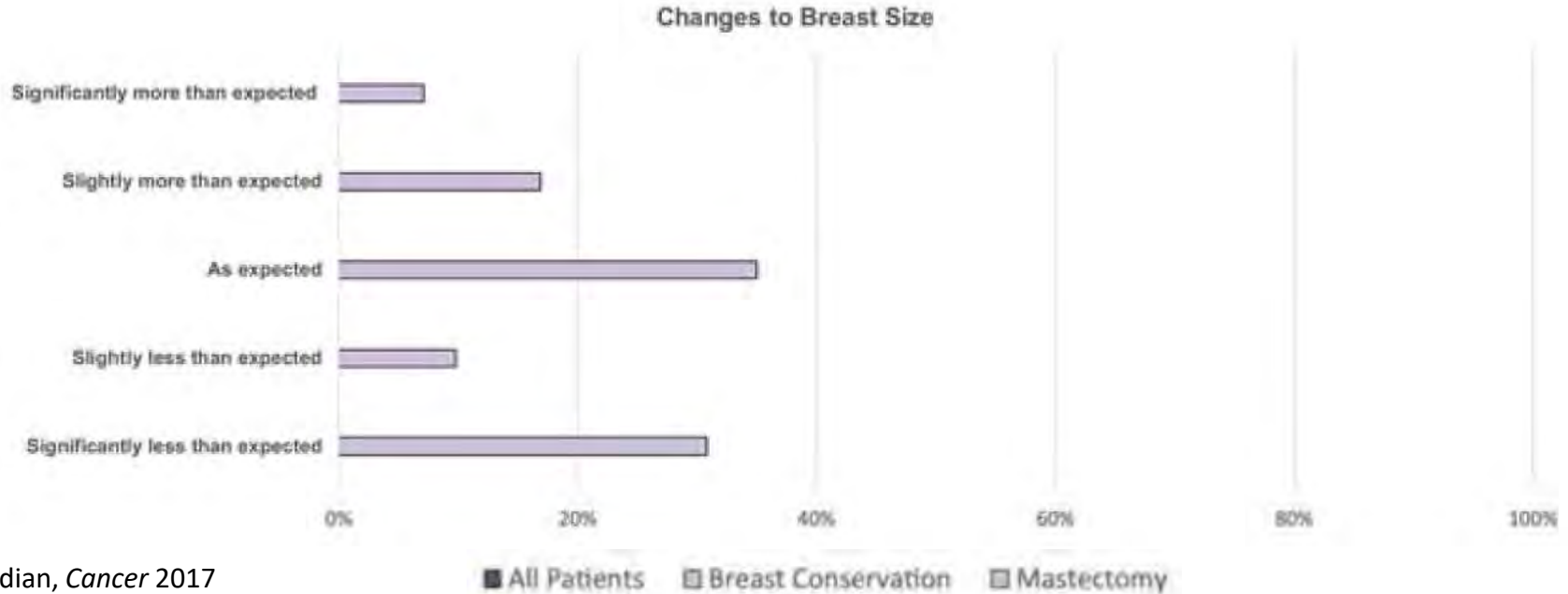
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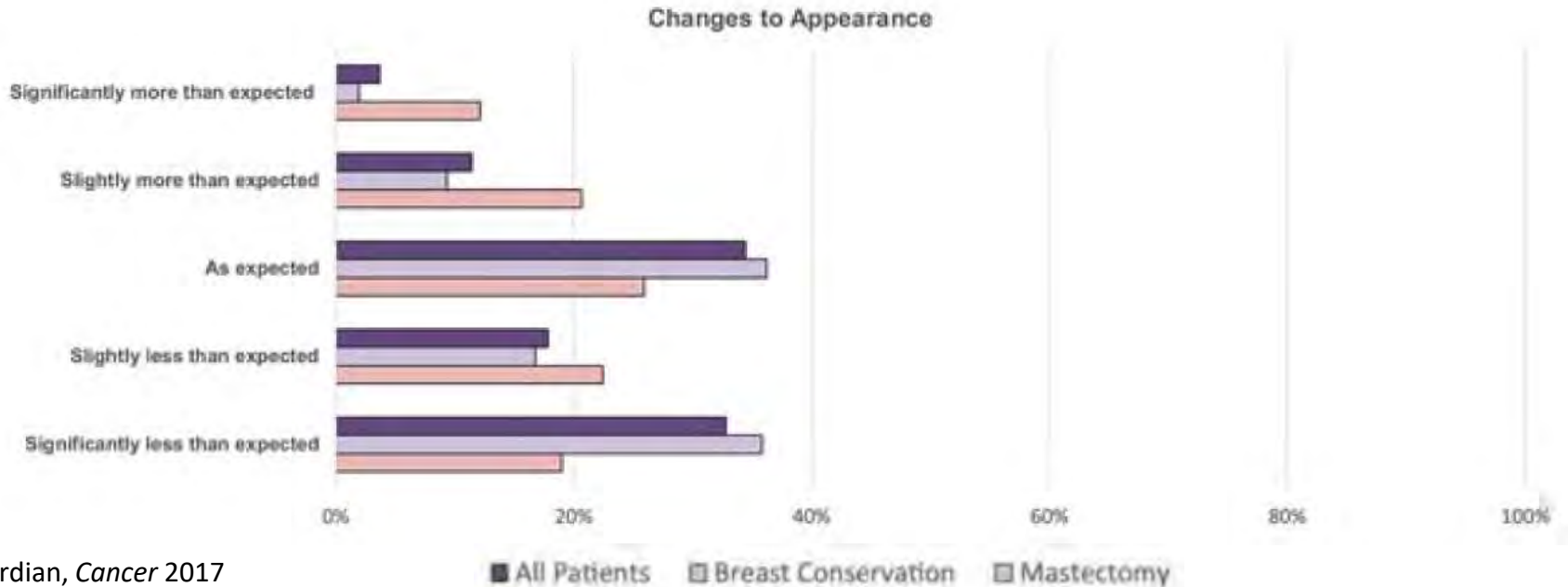
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# Cosmetic Outcome is Multifactorial



- Receipt of chemotherapy
- Duration of neoadjuvant chemotherapy
- Axillary lymph node surgery
- Dosimetric parameters
- Breast volume
- Surgical changes



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