Surgical Decision Making and Psychosocial Outcomes in Young Gene Mutation Carriers with Breast Cancer: The Patients Perspective

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Background

Gene Mutation carriers (ie. BRCA 1/2) have an elevated lifetime risk of breast cancer, including bilateral disease

Management of breast cancer in mutation carriers can include bilateral mastectomy as one method to manage risk, but is not oncologically superior

The impact of gene mutation status on surgical decision making in young women is unclear

Aim

To understand factors that influence receiving a mastectomy compared to breast conserving surgery (BCS) in this population, and their psychosocial impact

Methods

Prospective RUBY cohort of Canadian women <40 years of age with breast cancer. Out of 1528 enrolled, we included 700 with complete survey and clinical data

Variables Collected:
- Demographics
- Type of surgery
- Patient reported attitudes/ psychosocial outcomes

Data Analysis:
- Descriptive statistics
- Univariate analysis: Chi square, t tests
- Multivariable logistic regression with mastectomy as the outcome variable, excluding 120 individuals who were not eligible for BCS

Results

Table 1: Clinicodemographic and treatment characteristics by gene mutation status

Characteristic	Gene-Mutation n(%), n=171	Non-Mutation n(%), n=511	VUS n(%), n=18	p value
Age at Diagnosis[1]	35 (32-38)	37 (34-39)	36 (33-36.8)	**<0.001**
Ethnicity, mother				
Caucasian	130 (76)	381 (75)	13 (72)	
African	2 (1.2)	10 (2)	0 (0)	
Hispanic	1 (0.6)	4 (0.8)	0 (0)	0.4
Indigenous	2 (1.2)	6 (1.2)	0 (0)	
Other	24 (14)	86 (17)	4 (22)	
Unknown	12 (7)	19 (3.7)	0 (0)	
Family history of Breast cancer	39 (22.8)	63 (12.3)	1 (5.6)	**0.002**
Nulliparous	54 (32)	135 (26)	4 (22)	
Multiparous	106 (62)	326 (64)	11 (61)	0.4
Unknown	11 (6)	50 (10)	3 (17)	
OCP use				
Yes	136 (80)	407 (80)	13 (72)	0.3
No	22 (13)	46 (9)	3 (17)	
Unknown	13 (7)	58 (11)	2 (11)	
Bilateral Breast Cancer	10 (6)	8 (2)	----	**0.007**
Tumor Size				
Under 2cm	91 (53)	244 (48)	9 (50)	0.8
2-5cm	63 (37)	213 (42)	7 (39)	
Over 5cm	17 (10)	54 (10)	2(11)	
Node Status				
N0	125 (73)	377 (74)	15 (83)	
N1	35 (21)	89 (17)	3 (17)	0.1
N2	4 (2)	2 (0.4)	0 (0)	
N3	0 (0)	8 (1.6)	0 (0)	
Unknown	7 (4)	35 (7)	0 (0)	
Multifocal tumor	41 (24)	136 (27)	7 (39)	0.6
Multicentric tumor	14 (8)	43 (8)	2 (11)	0.9
Tumor Subtype				
ER/PR+ HER2-	72 (43)	226 (44)	9 (50)	
HER2+	30 (18)	157 (31)	4 (22)	**<0.001**
Triple negative	56 (33)	83 (16)	4 (22)	
Not Performed	11 (6)	45 (9)	1 (6)	
Surgery	141 (83)	284 (56)	9 (50)	**<0.001**
Mastectomy	30 (18)	227 (44)	9 (50)	
Breast Conserving Surgery				
Contralateral Mastectomy	107 (63)	129 (25)	4 (22)	**<0.001**

1= median (IQR); 2= mean score (standard deviation)

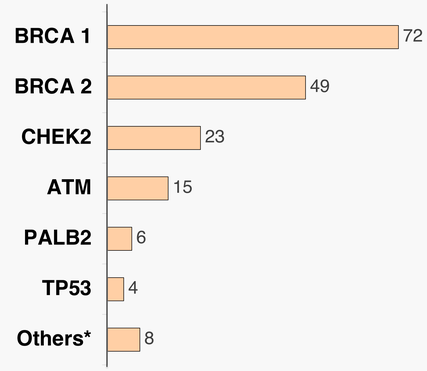

Figure 1: Prevalence of genetic mutations

Factors impacting receipt of mastectomy

- Strong association with **having a genetic mutation**, OR 4.54 (p<0.000001)
- **Preference for wanting breasts removed**, OR 9.74 (p<0.000001) compared to those who wanted to preserve breasts. Patients with **no opinion** OR 2.4 (p=0.0003)
- **Less likely if higher education level,** OR 0.40, 0.49, 0.43 for college, university and graduate degrees, p= 0.01, 0.04, 0.02

Table 2: Patient reported measures by gene mutation status

Characteristic	Gene-Mutation n(%)[1]	Non-Mutation n(%)[2]	VUS n(%)[3]	p value
Breast Cancer knowledge				
None/limited	84 (49)	308 (60)	13 (72)	0.073
Good	78 (46)	184 (36)	2 (11)	
Excellent	9 (5)	19 (4)	3 (17)	
Education Level				
High school	22 (13)	58 (11)	0 (0)	
Technical school	42 (25)	138 (27)	3 (16)	0.2
University	73 (43)	183 (36)	10 (56)	
Graduate School	34 (20)	132 (26)	5 (28)	
Attitudes towards Breast Surgery				
Wanted both breasts removed	54 (32)	106 (21)	4 (22)	
Wanted breast removed	10 (6)	53 (10)	2 (11)	**0.047**
No opinion	69 (40)	228 (45)	5 (28)	
Wanted to preserve breasts	38 (22)	124 (24)	7 (39)	
Anxiety – GAD score (pre)[1]	7 (4-11)	6 (3-10)	9.5 (6.2-13.5)	0.067
Clinical depression (pre)[2]	65 (38)	184 (36)	10 (56)	0.2
BREASTQ breast satisfaction (pre)[2]	58.8 (22)	59.1 (19.4)	49.8 (20.1)	0.16
BREASTQ psychosocial (pre)[2]	58.6 (16.6)	61.7	55.3 (24.5)	0.067
Anxiety – GAD (post)[1]	7 (4-11)	6 (3-10)	7 (2.8-9.2)	0.5
Clinical depression (post)[2]	64 (37)	173 (34)	7 (39)	0.7
BREASTQ Breast Satisfaction (post)[2]	54.1 (20.7)	59.5 (21)	55.3 (24.5)	**0.028**
BREASTQ Psychosocial (post)[2]	55.8 (17)	63.1 (19.6)	57.8 (18.8)	**<0.001**

Conclusion

In young women with breast cancer, genetic mutation status increases the chance of receiving a mastectomy. The post-treatment psychosocial outcomes for women with a genetic mutation are worse compared to those who do not have a mutation. Lower education levels and lack of a preference for breast conservation was associated with mastectomy, which highlights the opportunity clinicians have, to ensure their pre-treatment counseling considers the psychosocial impact of mastectomy in this population.

SPHERE Strategies for Precision Health in Breast Cancer

RUBY reducing the burden of breast cancer in young women

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