

# CONTRALATERAL PROPHYLACTIC MASTECTOMY AND SIMULTANEOUS BREAST RECONSTRUCTION WITH IMPLANTS: ANALYSIS OF 12 CASES IN CONTEXT OF THE CURRENT TRENDS

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## ABSTRACT

The contemporary tendency for increase of prophylactic surgical procedures as part of the sophisticated treatment of breast cancer is the foundation for the present study. Evaluation of risk factors for developing contralateral breast cancer, factors for an increase in prophylactic mastectomies and indications for performing those operations are briefly commented. Analysis of 12 cases of the author's surgical practice is presented regarding treatment approach from the oncological, reconstructive and aesthetic point of view. Results, complications, alternative methods, clinical importance and possible future aspects are discussed.

**KEYWORDS:** breast reconstruction implants, contralateral prophylactic mastectomy, breast cancer

## Introduction

History of previous breast cancer (BC) is a well-known risk factor for the development of BC in the primarily uninvolved breast. Long-term follow-up of women with unilateral BC shows around 0,6-1% risk for contralateral breast cancer (CBC) on an annual basis, with a cumulative risk of 17% for 20 year period since the primary diagnoses [1,2].

Despite the evidence in support of the adjuvant drug therapy for risk reduction of developing CBC according to the data of SEER, the number of patients undergoing contralateral prophylactic mastectomy (CPM) increases from 1,8% in 1993 to 4,5%

in 2003. The reasons for that 150% increase, without signs of plateau effect, are not entirely clarified [3,4].

The tendency is equally observed in cases of in situ carcinoma (from 6% to 18% between 1998 and 2005), as well as for the invasive tumors (from 4% to 11% for the same period). Half of the women with unilateral BC and BRCA ½ mutations in the US had the CPM done, which differs strikingly from Europe and Israel where the number is merely 10% [5,6,7].

## Evaluation of risk of developing CBC

The desire to reduce the risk of developing breast cancer is the core reason for CPM. In this respect, precise risk assessment is of vital importance. Taking into account the genetic tests and various statistical models for risk stratification (Gail, Claus, BRCAPRO, etc.), more women are classified as high risk for the illness. Risk level varies depending on the age, family history, hormonal status, some tumor characteristics and other factors [1,7,8,9].

Despite the massive progress reached concerning molecular level changes involved in cancerogenesis, at present risk-control strategies are not designed for the individual and step purely on a population basis.

As a preventive option CPM is chosen mostly by women with

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history of previous breast cancer, especially if they are BRCA ½ mutation carriers or have family history of BC [1,10,11]

### Factors for the increase of CPM

Increased frequency of CPM is explained by multiple factors and is directly connected with several features of the patient, the primary tumor, as well as some particularities of the contemporary diagnostic and treatment process.

(A) On behalf of the patients [2,5,10,12-16]: young age (less than 50 y.o.); white race; family history; highly educated women; higher socio-economic status; additional (private) health insurance; patients with depression; previous breast biopsy with high risk lesions (atypical hyperplasia, LCIS); desire (will) of the patient.

(B) On behalf of the primary tumor [6,10,12,17-18] of critical importance are Lobular carcinoma (in 30% of cases involves the contralateral breast); multicentric cancer; ER (-) tumor; triple negative primary cancer; previous radiotherapy.

(C) Contemporary diagnoses and treatment trends [4,5,8,10]: BRCA 1 or BRCA 2 mutations – calculated risk for CBC after ten years is 43% and 35% respectively; more frequent utilization of MRI; increased capacity of recent surgery, including the opportunity for immediate reconstruction; female surgeons. Up

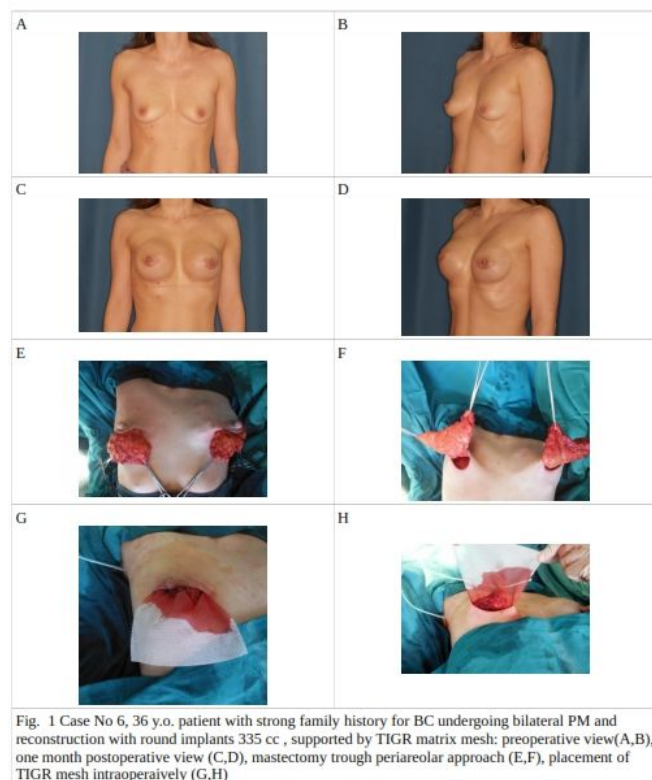


Fig. 1 Case No 6, 36 y.o. patient with strong family history for BC undergoing bilateral PM and reconstruction with round implants 335 cc, supported by TIGR matrix mesh: preoperative view (A,B), one month postoperative view (C,D), mastectomy trough periareolar approach (E,F), placement of TIGR mesh intraoperatively (G,H)

to present time, according to the majority of investigations, patients features (age, education, socio-economic status) are more robust indicators for CPM in comparison to factors on behalf of the tumor itself. It is suggested that a considerable number of women take a pro decision CPM in an attempt to “take control of their life,” conquer the fear of CBC and avoid frequent mammography for follow-up control [19].

### Indications for CPM

Despite the fact that CPM is well established in clinical practice since the nineties of the 20th century, relative few recommendations are at the disposal of general practitioners and decisions taken by patients are sometimes contradictory. In the US National Comprehensive Cancer Network (NCCN) recommends limitation of CPM only to high-risk patients with CBC, while the Society of Surgical Oncology (SSO) suggested CPM in 2007 also for cases where control of the contralateral breast is severe (increased density, presence of obscure calcifications) as well as to improve symmetry in patients undergoing reconstruction [4,19,20]. During the last decade screening for BC has attracted

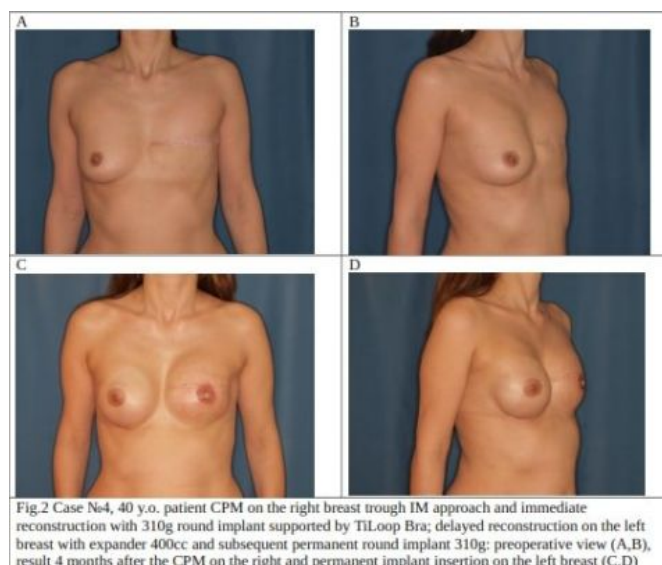


Fig.2 Case No 4, 40 y.o. patient CPM on the right breast trough IM approach and immediate reconstruction with 310g round implant supported by TiLoop Bra; delayed reconstruction on the left breast with expander 400cc and subsequent permanent round implant 310g; preoperative view (A,B), result 4 months after the CPM on the right and permanent implant insertion on the left breast (C,D)

considerable public attention which combined with the growing fear of the disease has lead to introduction of several synonyms of CPM, such as ‘risk-reducing mastectomy’, ‘worry-reducing’ and ‘appearance enhancing’ [19].

Meanwhile, the benefit of CPM related to overall mortality of BC patients is unclear. Patients, however, tend to overestimate the risk of CBC, which requires doctors of several fields e.g. oncologists, plastic and breast surgeons, geneticists and clinical psychologists to consult and inform them in most professional and suitable manner [4,21].

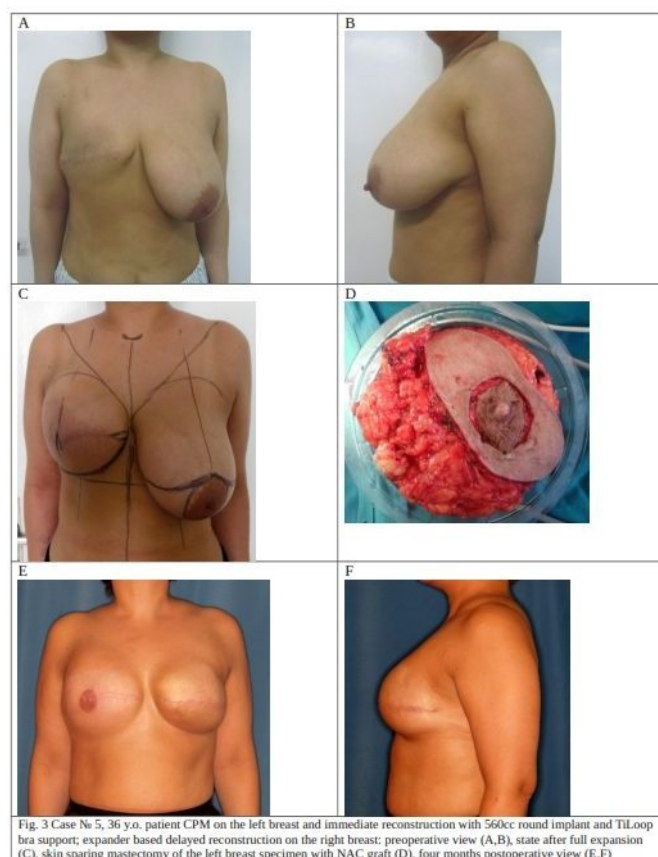
### MATERIALS AND METHODS

Conventional mastectomy with or without delayed reconstruction, skin-sparing or nipple-sparing mastectomy is considered equal regarding life expectancy and frequency of local recurrence [8]. With CPM, the risk to encounter invasive occult BC is around 2%. Therefore routine sentinel lymph node biopsy is not recommended. Nevertheless, patients with early invasive lobular carcinoma are at a higher risk for CBC during CPM, and that option should be taken into account in those cases, as well as when contralateral axillary lymph nodes are palpable [1,6,9].

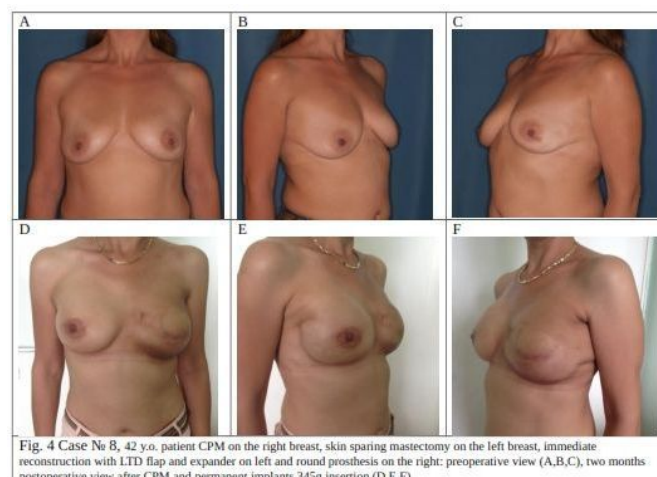
Unilateral and bilateral prophylactic mastectomy when indicated, in combination with implant-based reconstruction in one operative time, leads to significant risk reduction on one hand and allows achievement of good aesthetic breast appearance on the other [7,22,23,24,25]. The critical importance of the final results has the proper implant coverage and their containment in the correct position. To obtain that goal implants are placed

in a submuscular plane and variable techniques are proposed [23,24,26,27,28].

## Results



Nipple-sparing mastectomy is our preferred method for CPM. During a four year period (2011-2015), twelve patients had undergone CPM with simultaneous reconstruction with implants. Average patients age was 40y 6m, ranging from 34 to 51. In one patient with family history and limited demand, bilateral prophylactic subcutaneous mastectomy and immediate reconstruction was done '(fig.1A-D)'. Another four patients were subjected to bilateral subcutaneous mastectomy because of verified via biopsy BC. Three of them underwent immediate simultaneous reconstruction. In the last case implantation was performed a couple of weeks earlier and during the operation, suspicious lesion on the left breast was excised and confirmed to be cancer. Sentinel lymph node biopsy (SLNB) was performed in eight patients with breast cancer. In three cases were performed axillary lymph node dissection (ALND). The treatment of the patients was administered using the guidelines and protocols about staging, and HER2 status of the tumor and subsequent follow-up was for the two-year period. To achieve better implant position and the consequent optimal aesthetic result, additionally titanium mesh (TiLOOP® Bra, pfm medical, Germany) was used in four cases '(fig.2)' and synthetic resorbable mesh (TIGR matrix® Novus Scientific, Uppsala, Sweden) in one instance '(fig.1G-H)'. In one patient '(fig.3)' with conventional mastectomy on the right and expander based delayed reconstruction, skin-sparing CPM was done on the left, with immediate implant reconstruction. Because of the large



ptotic breast measuring 1080g, NAC was transferred as a free graft. In three patients LTD pedicle flap was used in combination with the implant to achieve a reliable reconstruction. Two of the flaps were used for a delayed reconstruction after Roe therapy was part of BC treatment. The last case involved a simultaneous skin-sparing mastectomy and delayed primary reconstruction with expander and LTD flap '(fig.4)'. Details concerning the reconstructive approach and primary tumor in our series are given in Table 1.

High satisfaction rate among patients was observed after CPM with immediate reconstruction and the final aesthetic outcomes were superb in  $\frac{3}{4}$  of the cases. Complications, requiring additional surgical procedure were encountered in 4 patients ( $\frac{1}{3}$  – 33.3%). Those included two cases of edge necrosis with wound dehiscence, one total NAC necroses and one skin flap necroses in a patient with high-grade breast ptosis. The complication rate in our series is comparable to the literature data [8,29,30].

Prophylactic mastectomies with immediate implant-based reconstruction are technically demanding procedures and are associated with some typical problems. Most common according to one study [26] are capsule formation, poor aesthetic result, and inadequate tissue resection. Careful planning and meticulous surgical technique help a lot avoiding those pitfalls equally in small, medium and large size breasts [21,23, 25,28].

A useful alternative to implant-based immediate breast reconstructions is autologous perforator flaps-based immediate and delayed repairs on various indications [31].

## Discussion

### Clinical importance of CPM

According to some studies, CPM is considered to diminish the rate of CBC with as many as 95% amongst the women with a history of unilateral breast cancer. At present, it is not yet clear what is the influence of CPM on the overall survival rate of the patients. It is possible that survival from the disease is of benefit to certain subgroups of patients undergoing CPM, like ER-negative for example [4,17,32].

For women less than 40 y.o., in 3-57% of the cases, high-risk pathology is encountered (atypical hyperplasia, DCIS, LCIS) in the removed breast specimen, and those lesions are more frequent in patients with a family history [33]. It is worth noticing the fact, that the rate of occult invasive carcinoma varies from

**Table 1** Patients distribution according to age, procedure, diagnosis and complications.

Case No	Age	Procedures	Complications	Primary diagnoses
1	51	CPM + implant (left); delayed LTD + implant (right)	Skin flap necrosis	Invasive LC (right)
2	35	CPM + implant + TiLoopBra (left); delayed LTD + implant (right)	no	Invasive LC (right)
3	48	CPM + implant (right); delayed - expander and subsequent implant (left)	no	BC -G1 (IDC) (left)
4	40	CPM + implant + TiLoopBra (right); delayed-expander and subsequent implant (left)	no	BC -G1 (IDC) (left)
5	37	CPM + implant + TiLoopBra (left); delayed-expander and subsequent implant (right)	no	BC –G3 (IDC) (right)
6	36	Bilateral subcutaneous mastectomy + implant based reconstruction + TIGR mesh	no	Fibrocystic changes; strong family history of BC
7	34	Bilateral subcutaneous mastectomy + TiLoopBra; implants previously placed	marginal skin necrosis	BC - G1
8	42	CPM + implant (right); delayed primary LTD + expander subsequent permanent implant (left)	no	BC – G2 (IDC)
9	34	CPM + implant (right); delayed implant based reconstruction (left)	marginal skin necrosis	BC – G3 (IDC)
10	37	Bilateral subcutaneous mastectomy + implants based reconstruction	Left NAC necrosis	BC – G1 (left)
11	44	Bilateral subcutaneous mastectomy + implant based reconstruction	no	Invasive LC (left)
12	49	Bilateral subcutaneous mastectomy + implant based reconstruction	no	LCIS (right) + DCIS

2,8% to 5% after CPM [3].

As far as patient motivation is concerned to choose CPM as an option, according to one investigation in 98% of the cases, women desire risk reduction of the future development of CBC and in 94% the goal is an improvement in overall survival rate. Despite that, according to the same research analysis, only 18% of women with breast cancer and CPM live longer, than patients without contralateral prophylactic mastectomy [13]. Provided long-term aspects are considered, 81-94% of women are content with CPM performed, and 93% are convinced to have taken a well-informed decision. It is worth noticing that most scientific research involves high-risk patients, and, therefore, precise estimations might not reflect the situation among women without cancer pathology [1,4,21,30,34] correctly.

Surgical complications, unsatisfactory aesthetic results, diminished sexuality and insufficient information about the effectiveness of alternative methods are reported in 14-17% of cases [19]. The reoperation rate following CPM varies from 27% to

49% between the series [8,29,30,32].

### **Alternatives to CPM**

Preventive strategies offered contemporary involve a change of lifestyle (diet, physical activity), observation and precise follow-up by means screening programs, as well as pharmacological prevention with antiestrogens and aromatase inhibitors. Most medications available at present market e.g. '(Tamoxifen, Raloxifene, Exemestane)' have proven prophylactic activity only in tumors with positive hormonal receptors.

Advantages, if any of CPM over chemotherapy are unclear, due to lack of randomized studies, comparing those two strategies [8,34,35].

### **Conclusion**

It is quite obvious and understandable that women diagnosed with unilateral breast cancer have increasing worry about the



health of the other breast. Despite the higher rate of CPM, unfortunately, most of the data we have at present is retrospective and restricted methodologically. Nevertheless, many studies demonstrate risk-reducing and benefit for the disease-free period, and high satisfaction with the aesthetic result achieved as well, in particular, patient groups.

Further prospective research works connected to CPM will help to elucidate short and long-term benefits and risks. Also, it might be expected, that accumulating practical experience and refining the surgical technique, will lead to the achievement of optimal medical and psychosocial results.

## Authors' Statements

### Competing Interests

Authors declare hereby no conflict of interests in relationship to the full text of this article.

## References

1. Zakaria S, Degnim AC. Prophylactic Mastectomy. *Surg Clin N Am* 87 (2007) 317–331.
2. Unukovych D, Sandelin K, Liljegren A, Arver B, Wickman M, Johansson H, et al. Contralateral prophylactic mastectomy in breast cancer patients with a family history: A prospective 2-years follow-up study of health-related quality of life, sexuality and body image. *European Journal of Cancer* (2012) 48, 3150–3156.
3. Boughey JC, Hoskin TL, Degnim AC, Sellers TA, Johnson JL, Kasner MJ, et al. Contralateral Prophylactic Mastectomy is Associated with a Survival Advantage in High-Risk Women with a Personal History of Breast Cancer. *Ann Surg Oncol* (2010) 17:2702–2709.
4. Brewster AM and Parker PA. Current Knowledge on Contralateral Prophylactic Mastectomy Among Women with Sporadic Breast Cancer. *The Oncologist* 2011;16:935–941.
5. Grimmer L, Liederbach E, Velasco J, Pesce C, Wang CH, Yao K. Variation in Contralateral Prophylactic Mastectomy Rates According to Racial Groups in Young Women with Breast Cancer, 1998 to 2011: A Report from the National Cancer Data Base. *J Am Coll Surg* 2015;221:187e196.
6. Morrow M. Prophylactic mastectomy of the contralateral breast. *The Breast* 2011, S3, S108–S110.
7. Rueth NM, McMahon M, Arrington AK, Swenson K, Leach J, Tuttle TM. Preoperative risk assessment among women undergoing bilateral prophylactic mastectomy for cancer risk reduction. *Ann Surg Oncol*. 2011, 18(9): 2515–2520.
8. Chagpar AB. Prophylactic Bilateral Mastectomy and Contralateral Prophylactic Mastectomy. *Surg Oncol Clin N Am* 2014, 23, (3) 423–30.
9. Lizarraga IM, Sugg SL, Weigel RJ, Scott-Conner CEH. Review of risk factors for the development of contralateral breast cancer. *The American Journal of Surgery*, 2013, 206, (5) 704–708.
10. Soran A, Polat AK, Johnson R, McGuire KP. Increasing trend of contralateral prophylactic mastectomy: What are the factors behind this phenomenon? *The Surgeon* (2014), 12, (6), 316–22.
11. Khurana KK, Loosmann A, Numann PJ, Khan SA. Prophylactic mastectomy: pathologic findings in high-risk patients. *Arch Pathol Lab Med*. 2000, 124(3):378–381.
12. Damle S, Teal CB, Lenert JJ, Marshall EC, Pan Q, McSwain AP. Mastectomy and Contralateral Prophylactic Mastectomy Rates: An Institutional Review. *Indian J Surg Oncol* (April–June 2011) 2(2):133–140.
13. Rosenberg SM, Tracy MS, Meyer M, Sepucha K, Gelber S, Hirshfield-Bartek J, et al. Perceptions, knowledge, and satisfaction with contralateral prophylactic mastectomy among young women with breast cancer: A cross-sectional survey. *Ann Intern Med*. 2013 September 17; 159(6): 373–381.
14. Tracy MS, Rosenberg SM, Dominici L, Partridge AH. Contralateral prophylactic mastectomy in women with breast cancer: Trends, predictors, and areas for future research. *Breast Cancer Res Treat*. 2013 August; 140(3) 447–52.
15. Yakoub D, Avisar E, Koru-Sengul T, et al. Factors associated with contralateral preventive mastectomy. *Breast Cancer: Targets and Therapy* 2015;7 1–8.
16. Goin MK, Goin JM. Psychological reactions to prophylactic mastectomy synchronous with contralateral breast reconstruction. *Plast Reconstr Surg*. 1982, 70(3):355–359.
17. Brewster AM, Bedrosian I, Parker PA, Dong W, Peterson SK, Cantor SB, et al. The Association Between Contralateral Prophylactic Mastectomy and Breast Cancer Outcomes by Hormone Receptor Status. *Cancer*. 2012 November 15; 118(22): 5637–5643.
18. Graves KD, Peshkin BN, Halbert CH, DeMarco TA, Isaacs C, Schwartz MD. Predictors and Outcomes of Contralateral Prophylactic Mastectomy Among Breast Cancer Survivors. *Breast Cancer Res Treat*. 2007 September; 104(3): 321–329.
19. Beesley H, Holcombe C, Brown SL, Salmon P. Risk, worry and cosmesis in decision-making for contralateral risk-reducing mastectomy: Analysis of 60 consecutive cases in a specialist breast unit. *The Breast* 22 (2013) 179–184.
20. Quan G, Pommier SJ, Pommier RF. Incidence and outcomes of contralateral breast cancers. *The American Journal of Surgery* (2008) 195, 645–650.
21. Frost MH, Hoskin TL, Hartmann LC, Degnim AC, Johnson JL, Boughey JC. Contralateral Prophylactic Mastectomy: Long-Term Consistency of Satisfaction and Adverse Effects and the Significance of Informed Decision-Making, Quality of Life, and Personality Traits. *Ann Surg Oncol*. 2011 October; 18(11): 3110–3116.
22. Sahin I, Isik S, Alhan D, Yildiz R, Aykan A, Ozturk E. One-staged silicone implant breast reconstruction following bilateral nipple-sparing prophylactic mastectomy. *Aesthetic Plastic Surg*. 2013, 37(2):303–311.
23. Jarrett JR, Cutler RG, Teal DF. Aesthetic refinements in prophylactic subcutaneous mastectomy with submuscular reconstruction. *Plast Reconstr Surg*. 1982, 69(4): 624–631.
24. Jarrett JR, Cutler RG, Teal DF. Subcutaneous mastectomy in small, large, or ptotic breasts with immediate submuscular placement of implants. *Plast Reconstr Surg*. 1978, 62(5):702–705.

25. Rubin LR. Prophylactic mastectomy with immediate reconstruction for the high-risk woman. *Clin Plast Surg.* 1984, 11(2):369-381.
26. Woods JE, Verheyden CN. Pitfalls and problems with subcutaneous mastectomy. *Mayo Clin Proc.* 1980, 55(11):687-693.
27. Bayram Y, Kulahci Y, Irgil C, Calikapan M, Novan N. Skin-reducing subcutaneous mastectomy using a dermal barrier flap and immediate breast reconstruction with an implant: a new surgical design for reconstruction of early-stage breast cancer. *Aesthetic Plast Surg.* 2010, 34(1): 71-77.
28. Maillard GF, Garey LJ. An improved technique for immediate retropectoral reconstruction after subcutaneous mastectomy. *Plast Reconstr Surg.* 1987, 80(3):396-408.
29. Murphy JA, Milner TD, O'Donoghue JM. Contralateral risk-reducing mastectomy in sporadic breast Cancer. [www.thelancet.com/oncology](http://www.thelancet.com/oncology) Vol 14 June 2013.
30. Barton MB, West CN, Liu IL, Liu IL, Harris EL, Rolnick SG. Complications following bilateral prophylactic mastectomy. *J Natl Cancer Inst Monogr.* 2005;(35):61-66.
31. Hamdi M, Blondeel P, Van Landuit K, Tondut T, Monstrey S. Bilateral autogenous breast reconstruction using perforator free flaps: a single center's experience. *Plast Reconstr Surg.* 2004, 114(1):83-89.
32. Bedrosian I, Hu CY, Chang GJ. Population-Based Study of Contralateral Prophylactic Mastectomy and Survival Outcomes of Breast Cancer Patients. *J Natl Cancer Inst* 2010;102:401-409.
33. Isern AE, Loman N, Malina J, Olsson H, Ringberg A. Histopathological findings and follow-up after prophylactic mastectomy and immediate breast reconstruction in 100 women from families with hereditary breast cancer. *EJSO* 2008, 34 1148 – 1154.
34. Zendejas B, Moriarty JP, O'Byrne J, Degnim AC, Farley DR, Boughey JC. Cost-Effectiveness of Contralateral Prophylactic Mastectomy Versus Routine Surveillance in Patients With Unilateral Breast Cancer. *J Clin Oncol* 2011, 29 ( 22) 2993-3000.
35. Newman LA, Kuerer HM, Hunt KK, Vlastos G, Ames FC, Ross MI, Singletary E. Prophylactic Mastectomy. *J Am Coll Surg*, Vol. 191, No. 3, September 2000, 322-330.