
40.1 Introduction

Almost two-thirds of solid tumors occur in elderly patients [1]. Among them, breast cancer is largely represented, and women aged 70 years and over have the highest incidence and mortality from breast cancer of any age group.

In recent decades, breast reconstruction has been not offered to the elderly population owing to the reluctance of clinicians concerned about attendant serious comorbidities. The elderly are often considered unfit for reconstruction owing to an inaccurate estimation of operative risk. Unfortunately, no consensus exists on therapy for elderly cancer patients. Treatments are influenced by unclear standards and are usually less aggressive both for surgical and for medical options. Moreover, it has been demonstrated that many older women with breast cancer have received treatments that are not generally considered to be appropriate care [2]. Fortunately, nowadays the behavior is changing, as people are living much longer and are healthier. In addition, the survival rate for breast cancer is improving also in elderly patients, so a larger proportion of patients are living with the long-term consequences of their treatment. For these reasons, the consideration of breast reconstruction should be offered to elderly patients in order to improve their quality of life.

40.2 Definition and Characteristics of the Elderly

Conventionally, the “elderly” have been defined as those with a chronological age of 65 years or more, with those from 65 to 74 years old being referred as “early elderly” and those over 75 years as “late elderly.” [3]

There are several major physiologic changes of aging that affect the central nervous system, the cardiovascular system, the respiratory system, and many other systems. When the general risk of anesthesia is quantified with the classification of the American Society of Anesthesiologists (scored from I to IV), most elderly patients fall in class II or class III. Elderly patients also have poor Karnofsky performance status [4, 5]. The elderly should have more careful preoperative and postoperative assessment and more often probably require intensive care management to reduce the surgical risk. They are also vulnerable to the adverse effects of anesthesia because of their reduced margin of safety. Acute and chronic medical conditions, nutritional status, and level of activity needed to be taken into consideration.

40.3 Psychological Benefits and Quality of Life

In general, there is a clear psychological benefit and quality of life benefit for breast reconstruction regardless of the age group. However, there are only a few reports focusing on quality of life assessment, and most used general health questionnaires rather than specific ones [6–8]. Giroto et al. [7] reviewed 316 consecutive women older than 65 years of age (400 reconstructions) with breast cancer undergoing mastectomy with reconstruction. Their outcomes were assessed with use of a self-reported questionnaire (SF-36) addressing health-related quality of life, body image, and physical functioning. Concerning the overall quality-of-life issues after reconstruction, older patients with breast reconstruction had better outcomes than age-matched

F. de Lorenzi (✉)
Division of Plastic Surgery, European Institute of Oncology,
Milan, Italy
e-mail: francesca.delorenzi@ieo.it

V. Lohsiriwat
Faculty of Medicine, Department of Surgery, Siriraj Hospital,
Mahidol University, Bangkok, Thailand
e-mail: lohshiriwat@gmail.com

general population patients and previously reported mastectomy-only patients (older than 55 years). Specifically, elderly patients had better outcomes in the subscales that are strongly influenced by one's mental health. However, when compared with prior data for younger patients undergoing mastectomy and reconstruction, the older patients had worse outcomes in the areas related to physical function [7].

40.4 Oncologic Safety

Breast cancer surgery is associated with a low risk of operative morbidity and mortality when compared with more difficult and longer surgical procedures. Wherever feasible, older women with reasonable life expectancy should be treated with standard surgical procedures applicable to younger patients, including the choice of breast conservation or mastectomy where appropriate; breast reconstruction or oncoplastic procedures should be included in the options available.

Unfortunately, the review study by Kiderlen et al. [9] noted that the proportion of elderly patients who received radiotherapy after conservative treatment decreased with age in all countries. Moreover, in all countries the proportion of patients who do not receive axillary surgery increased with age. They observed large international differences in the treatment of elderly early-stage breast cancer patients, with the most surprising result being the large proportion of the elderly who did not undergo surgery at all.

Smith et al. [10] demonstrated that breast cancer outcomes have preferentially improved in women aged less than 75 years. Focused research is needed to improve outcomes in older women. However, this conclusion might be the consequence of undertreatment of the elderly resulting in poorer survival. Better screening tools and programs and more effective adjuvant chemohormonal and targeted therapy with lower toxicity are being developed and should be researched in the elderly to achieve a significant improvement in survival rate [11].

40.5 Type of Reconstruction

40.5.1 Breast Conservative Treatment

Breast conservative treatment is largely indicated for elderly patients since the favorable tumor biohistology characteristics in the elderly cohort make the local recurrence rate lower than in the general population [12, 13]. Although the large majority of quadrantectomies do not require an oncoplastic approach, in about 10–15 % of cases it is necessary to improve the cosmetic result [14–16]. In fact, wide glandular resections can induce deformities and

volume and shape asymmetry between the two breasts, such as glandular defects or scar retraction as well as nipple–areola complex [17] dislocations. An oncoplastic approach may avoid these asymmetries and the difficulties of glandular reshaping after breast irradiation justify an immediate partial reconstruction. Most of the deformities can be avoided using simple tricks without any specific training in plastic surgery: optimal positioning of the scar, transposition of the nipple–areola complex to avoid dislocation, better evaluation of the symmetry. In other cases, specific knowledge of reconstructive techniques is mandatory. Schematically, there are two fundamentally different approaches: volume displacement and volume replacement procedures.

Volume displacement procedures combine resection with a variety of different breast reduction and reshaping techniques, according to the location of the tumor. Volume replacement procedures combine resection with immediate reconstruction by using local flaps, such as glandular, fasciocutaneous, and mini-muscle flaps. Glandular flaps are feasible and safe in the case of glandular and very dense breasts. In the case of a fatty breast with low radiologic density, as elderly patients usually have, a really careful evaluation is mandatory and glandular flaps are more often contraindicated since there is a very high risk of necrosis after fat undermining and mobilization. Implant replacement is indicated only in selected cases, when intraoperative exclusive irradiation is delivered [8]. In the case of fatty breasts and large resection, mammoplasty procedures should be preferred if simple closure of the lumpectomy cavity is not feasible. Surgical reshaping after quadrantectomy for wide glandular excisions (oncoplastic techniques) can be offered in elderly patients [18, 19]. Oncoplastic surgery increases the oncologic safety of breast conservative treatment as a much larger volume can be excised and wider surgical margins can be achieved [19, 20].

In the case of poor results after conservative treatment, an easy and simple technique to correct and replace the defects is fat grafting. Fat grafting is largely used also in the elderly cohort; it can be performed in a second operative procedure, after the external irradiation has been delivered, usually with the patient under local anesthesia and with minimal scarring. Several ongoing studies are in the process demonstrating the safety of lipotransfer in cancer patients [21–23].

40.5.2 Mastectomy

Many types of mastectomy can be safely offered to elderly patients, such as total mastectomy with immediate or delay reconstruction, skin-sparing mastectomy, and nipple–areola-sparing mastectomy with immediate reconstruction

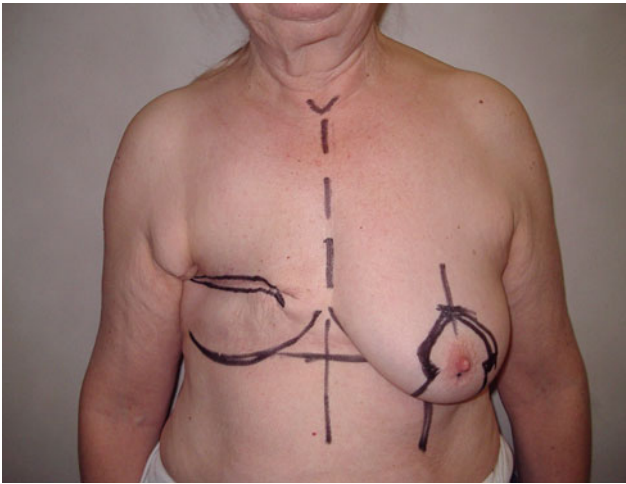


Fig. 40.1 A 73-year-old woman after right mastectomy



Fig. 40.3 A 73-year-old woman. Result after latissimus dorsi flap reconstruction (donor site)



Fig. 40.2 A 73-year-old woman. Result after delayed reconstruction with a latissimus dorsi flap and planning of nipple-areola complex reconstruction



Fig. 40.4 A 73-year-old woman. Final result

[24]. Reconstruction includes implant-based and flap-based techniques (Figs. 40.1, 40.2, 40.3, 40.4).

Implant reconstruction is easy, with a short operating time, no donor site morbidity, and relatively quick recovery. Respecting and evaluation of the vascularity of the mastectomy flaps is mandatory in the immediate setting to prevent marginal flap necrosis, wound dehiscence, secondary healing, and implant exposure. Additional operations after the primary procedure are usually necessary since aesthetic outcomes deteriorate over time [18, 25, 26], but mostly these procedures can be performed with the patient under local anesthesia, including changing and removal of the implant and nipple and areola reconstruction (Figs. 40.5, 40.6).

In our experience, flap reconstructions are generally limited to those patients who have received preoperative radiotherapy, since radiation adversely affects the outcomes

of implant-based reconstructions, and in those cases of wide mastectomies requiring flap repair. In the future, in the era of perforator flaps reducing donor side morbidity for strength and function, the number of elderly patients requiring this kind of reconstruction will probably increase.

Age alone should not be considered as the sole factor when selecting the type of reconstruction for patients. Nevertheless, comorbidities, the patient's condition, and concomitant factors together with the patient's opinion and tumor stage should influence the type of reconstruction. In addition, not all breast cancer patients will definitely require reconstruction. Some elderly patients who are at high risk from surgery refuse reconstructive surgery, and those with limited social lives may prefer an external prosthesis to cope with the mutilation of mastectomy.



Fig. 40.5 An 86-year-old woman. Preoperative view



Fig. 40.6 An 86-year-old woman after skin-sparing mastectomy with immediate prosthesis reconstruction

Giroto et al. [7] reported that elderly women are less likely to complete nipple–areola complex reconstruction compared with a younger cohort. Our study demonstrated that only 15.5 % of elderly patients completed their reconstructions with the creation of the nipple–areola complex.

40.5.3 Complications

Data from the literature demonstrate that breast reconstruction is safe in elderly patients although it is well known that the risk of perioperative complications is proportionately increased because the number of comorbidities (i.e., hypertension, coronary artery disease, cerebrovascular disease,

chronic lung disease, diabetes, and congestive heart failure) [27] and the relative risk of severe complications and death are significantly greater in the geriatric population than in the younger cohort. It is mandatory to address the overall status of the elderly patient when reconstructive options are being considered. Certainly, the overall health condition, comorbidities, patient expectations and motivations, and tumor stage clearly affect the decision for reconstruction.

In our series [17], most of our elderly patients had an implant-based reconstruction with a low percentage of postoperative complications: no adverse events were observed in the postoperative period. Infection occurred in 6.34 % of patients, partial necrosis of the mastectomy flap in 5.5 %, total implant removal in 12.24 %—due to infection (5.8 %), exposure (1.9 %), or capsular contracture (4.2 %).

In contrast, Lipa et al. [8] reported a series of breast reconstructions in older women, with most of them being autologous flap reconstructions. They described a remarkably high complication rate associated with implant-based reconstructions. Fewer complications resulted from autogenous tissue reconstruction than from prosthetic reconstruction.

Howard-McNatt et al. [28] reported on 89 women older than 60 years having mastectomy and reconstruction (both implants and flaps). They concluded that age should not be a contraindication for breast reconstruction in elderly women.

40.6 Conclusion

Advanced age (in itself) is not a contraindication to breast reconstruction, and breast reconstruction can be successfully performed on well-selected patients. The safety of reconstruction together with improvements in life expectancy increases the incentive to allow older women with breast carcinoma to be reconstructed without major barriers related to age, functional status, and social support. Future cancer research should be conducted in the elderly to provide more confidence in cancer treatment and to decrease undertreatment in elderly patients.

References

1. Audisio RA, Bozzetti F, Gennari R, Jaklitsch MT, Koperna T, Longo WE et al (2004) The surgical management of elderly cancer patients: recommendations of the SIOG surgical task force. *Eur J Cancer* 40(7):926–938
2. Gennari R, Curigliano G, Rotmensz N, Robertson C, Colleoni M, Zurrada S et al (2004) Breast carcinoma in elderly women: features of disease presentation, choice of local and systemic treatments compared with younger postmenopausal patients. *Cancer* 101(6):1302–1310

3. Orimo H (2006) Reviewing the definition of elderly. *Nihon Ronen Igakkai Zasshi* 43(1):27–34
4. Woodfield JC, Beshay NM, Pettigrew RA, Plank LD, van Rij AM (2007) American Society of Anesthesiologists classification of physical status as a predictor of wound infection. *ANZ J Surg* 77(9):738–741
5. Mak PH, Campbell RC, Irwin MG (2002) physical status classification: inter-observer consistency. *American Society of Anesthesiologists. Anaesth Intensive Care* 30(5):633–640
6. Bowman CC, Lennox PA, Clugston PA, Courtemanche DJ (2006) Breast reconstruction in older women: should age be an exclusion criterion? *Plast Reconstr Surg* 118(1):16–22
7. Giroto JA, Schreiber J, Nahabedian MY (2003) Breast reconstruction in the elderly: preserving excellent quality of life. *Ann Plast Surg* 50(6):572–578
8. Lipa JE, Youssef AA, Kuerer HM, Robb GL, Chang DW (2003) Breast reconstruction in older women: advantages of autogenous tissue. *Plast Reconstr Surg* 111(3):1110–1121
9. Kiderlen M, Bastiaannet E, Walsh PM, Keating NL, Schrodi S, Engel J et al (2012) Surgical treatment of early stage breast cancer in elderly: an international comparison. *Breast Cancer Res Treat* 132(2):675–682
10. Smith BD, Jiang J, McLaughlin SS, Hurria A, Smith GL, Giordano SH et al (2011) Improvement in breast cancer outcomes over time: are older women missing out? *J Clin Oncol* 29(35):4647–4653
11. Muss HB, Busby-Whitehead J (2011) Older women with breast cancer: slow progress, great opportunity, now is the time. *J Clin Oncol* 29(35):4608–4610
12. Bouchardy C, Rapiti E, Fioretta G, Laissue P, Neyroud-Caspar I, Schafer P et al (2003) Undertreatment strongly decreases prognosis of breast cancer in elderly women. *J Clin Oncol* 21(19):3580–3587
13. Beadle BM, Woodward WA, Buchholz TA (2011) The impact of age on outcome in early-stage breast cancer. *Semin Radiat Oncol* 21(1):26–34
14. Rietjens M, Urban CA, Rey PC, Mazzarol G, Maisonneuve P, Garusi C et al (2007) Long-term oncological results of breast conservative treatment with oncoplastic surgery. *Breast* 16(4):387–395
15. Petit JY, De Lorenzi F, Rietjens M, Intra M, Martella S, Garusi C et al (2007) Technical tricks to improve the cosmetic results of breast-conserving treatment. *Breast* 16(1):13–16
16. Rietjens M, De Lorenzi F, Veronesi P, Intra M, Venturino M, Gatti G et al (2006) Breast conservative treatment in association with implant augmentation and intraoperative radiotherapy. *J Plast Reconstr Aesthet Surg* 59(5):532–535
17. Klein C, Schalla S, Schnackenburg B, Bornstedt A, Hoffmann V, Fleck E et al (2003) Improvement of image quality of non-invasive coronary artery imaging with magnetic resonance by the use of the intravascular contrast agent Clariscan (NC100150 injection) in patients with coronary artery disease. *J Magn Reson Imaging* 17(6):656–662
18. Clough KB, Kaufman GJ, Nos C, Buccimazza I, Sarfati IM (2010) Improving breast cancer surgery: a classification and quadrant per quadrant atlas for oncoplastic surgery. *Ann Surg Oncol* 17(5):1375–1391
19. Clough KB, Lewis JS, Couturaud B, Fitoussi A, Nos C, Falcou MC (2003) Oncoplastic techniques allow extensive resections for breast-conserving therapy of breast carcinomas. *Ann Surg* 237(1):26–34
20. Kaur N, Petit JY, Rietjens M, Maffini F, Luini A, Gatti G et al (2005) Comparative study of surgical margins in oncoplastic surgery and quadrantectomy in breast cancer. *Ann Surg Oncol* 12(7):539–545
21. Petit JY, Botteri E, Lohsiriwat V, Rietjens M, De Lorenzi F, Garusi C et al (2012) Locoregional recurrence risk after lipofilling in breast cancer patients. *Ann Oncol* 23(3):582–588
22. Petit JY, Lohsiriwat V, Clough KB, Sarfati I, Ihrat T, Rietjens M et al (2011) The oncologic outcome and immediate surgical complications of lipofilling in breast cancer patients: a multicenter study—Milan-Paris-Lyon experience of 646 lipofilling procedures. *Plast Reconstr Surg* 128(2):341–346
23. Lohsiriwat V, Curigliano G, Rietjens M, Goldhirsch A, Petit JY (2011) Autologous fat transplantation in patients with breast cancer: “silencing” or “fueling” cancer recurrence? *Breast* 20(4):351–357
24. Petit JY, Gentilini O, Rotmensz N, Rey P, Rietjens M, Garusi C et al (2008) Oncological results of immediate breast reconstruction: long term follow-up of a large series at a single institution. *Breast Cancer Res Treat* 112(3):545–549
25. Clough KB, O’Donoghue JM, Fitoussi AD, Vlastos G, Falcou MC (2001) Prospective evaluation of late cosmetic results following breast reconstruction: II. Tram flap reconstruction. *Plast Reconstr Surg* 107(7):1710–1716
26. Clough KB, O’Donoghue JM, Fitoussi AD, Nos C, Falcou MC (2001) Prospective evaluation of late cosmetic results following breast reconstruction: I. Implant reconstruction. *Plast Reconstr Surg* 107(7):1702–1709
27. De Lorenzi F, Rietjens M, Soresina M, Rossetto F, Bosco R, Vento AR et al (2010) Immediate breast reconstruction in the elderly: can it be considered an integral step of breast cancer treatment? The experience of the European Institute of Oncology, Milan. *J Plast Reconstr Aesthet Surg* 63(3):511–515
28. Howard-McNatt M, Forsberg C, Levine EA, Defranzo A, Marks M, David L (2011) Breast cancer reconstruction in the elderly. *Am Surg* 77(12):1640–1643