Original Study

Long-Term Follow-up of Immediate Latissimus Dorsi Flap Reconstruction After Neoadjuvant Chemotherapy and Radiotherapy for Invasive Breast Cancer

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Abstract

We present a monocentric retrospective study in which we evaluated the therapeutic sequence including mastectomy with immediate breast reconstruction using latissimus dorsi flap after chemotherapy and radiotherapy. With a median follow-up of more than 5 years, our study suggests it possible to envisage the realization of this "inverted sequence" in the patients who wish it after discussion in a multidisciplinary team meeting.

Background: The treatment sequence involving a mastectomy and immediate breast reconstruction (IBR) via the latissimus dorsi flap technique after chemotherapy and radiotherapy is not common. Our experience of this alternative to the standard treatment at our institute is reported herein. **Patients and Methods:** This was a single-center, retrospective study. We enrolled patients who received this so-called "inverse" sequence for invasive, non-metastatic breast cancer between 2009 and 2016. **Results:** Fifty-two patients, aged between 24 and 65 years, with a mean body mass index of 24.5 underwent this treatment. Most involved T2 (59.6%, n = 32), multifocal (55.8%, n = 29) tumors, and 57.7% (n = 30) of the patients presented with axillary lymph node involvement. All patients had received sequential chemotherapy and 50 Gy of radiation. Pathological complete response (pCR) was found in 51.3% (n = 20), of cases in the traditional inverse sequence group, using Chevalier and Sataloff classifications (T and N pCR). Postoperatively, 1 patient required surgical revision because of a hematoma, 42 (80.8%) presented with lymphocele, 3 had impaired would healing, and 2 had more than 5 cm of skin necrosis on the front flap. Median follow-up was 61.9 months and the median time between diagnosis and surgery was 9.7 months. Three patients presented with metastases, 2 with local recurrence, and 1 patient died of cancer. No contralateral or lymph node recurrence was discovered. **Conclusion:** This treatment sequence, the feasibility of which was shown in this study, is an alternative for patients who want an IBR to avoid the time spent without one breast. This practice requires upstream multidisciplinary cooperation for optimal patient screening.

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Introduction

The treatment sequence involving mastectomy with immediate breast reconstruction (IBR) performed at the end of treatment of nonmetastatic invasive carcinoma (after preoperative chemotherapy and radiotherapy) is a relatively recent procedure,[1] which is not practiced very frequently, and is limited to a few sites.[1-5]

This therapeutic strategy shortens the time between the oncology treatments and the reconstruction. The presurgery information time is prolonged, however, but this alternative sometimes allows increased acceptance of the mastectomy.

An IBR actually has several advantages, including cosmetic results,[6,7] psychological effect for patients,[8,9] and also physical[10] and economic[11,12] effects. According to the data from the literature, there seems to be no further local recurrence after an IBR, compared with a mastectomy only, with no IBR.[13-16]

Although there are formal contraindications to this so-called "inverse" therapeutic strategy, including locally advanced tumors and inflammatory breast cancers, the indications and contraindications are not clearly defined. The histological prognostic parameters and the TN stage of the tumor, as well as the morphology and the patient's potential comorbidities should be considered. Foremost among the patient-related indications are those who request an IBR via the latissimus dorsi flap (LDF) technique with no comorbidities (smoking, diabetes, obesity), whereas the oncology-related indications include skin-sparing mastectomies.

This so-called "inverse" sequence, compared with a standard sequence, should also adhere to the time between the end of the radiotherapy and the surgery, so that the tissue is in good condition. Additionally, it requires an IBR via a flap, because of the high level of complications with a prosthesis alone in this indication (delayed healing, necrosis of the spared skin, prosthesis exposure).[5] The initial lymph node status of the illness should be known at the time of diagnosis, to adjust the radiotherapy.

The aim of this study was to assess this therapeutic sequence in the treatment of cancer patients at our institute.

Patients and Methods

Study Design

This was a single-center, retrospective, observational study that enrolled women with invasive breast cancer and an indication for a mastectomy, radiotherapy, and chemotherapy with or without hormone therapy, between November 2009 and November 2016. We also enrolled patients who initially had lumpectomy surgery but required a subsequent mastectomy (poor margins, diffuse ductal carcinoma in situ [DCIS]). The exclusion criteria included breast inflammation, the presence of remote metastases, and a contraindication for autologous or heterologous LDF reconstruction. The treatment of patients was systematically discussed in a multidisciplinary meeting. The patients' clinical data were collected.

Postoperative treatment was analyzed in terms of days of hospital admission and postoperative complications. We also collected data on the time between each treatment in the sequence and the total duration of treatment, as well as the duration of follow-up. Moreover, 2 groups of patients were analyzed: the "traditional inverse sequence" (TIS) and the inverse sequence after an initial lumpectomy (IL) as a result of poor margins.

The data were collected while rendering the identity of the patients anonymous, in compliance with bioethics laws.

Treatment Sequence

All patients were treated with this sequence, starting with chemotherapy with anthracyclines (FEC [fluorouracil, epirubicin, cyclophosphamide]) and taxanes, then radiotherapy, delivering a 50-Gy dose to the breast, internal lymph nodes, and the supra- and subclavicular regions, but not the axilla. The indication for chemotherapy was decided on the basis of the usual criteria inherent to the patient and the tumor: size, Elston and Ellis histological grade, presence or lack of hormone receptor (HR) expression, HER2 status, and axillary lymph node status. Targeted therapy with trastuzumab was also used for patients with a positive HER2 status. Finally, the treatment sequence ends with a total skin-sparing mastectomy and an autologous or heterologous IBR via the LDF technique, with a prosthesis. Some patients had initially had breast-conserving surgery, such as a lumpectomy, before switching to the previously described sequence. The indications for a skin-sparing mastectomy were failed conservative treatment, an overly high ratio between the size of the tumor and that of the breast, the presence of a multicentric lesion or an invasive tumor associated with diffuse DCIS. The axillary lymph node status was assessed, clinically and via ultrasound, before any treatment. In patients who had a conservative surgery (lumpectomy), sentinel lymph node removal, more or less associated with an axillary lymph node dissection (AD), was performed.

Histological Prognostic Criteria

The tumor characteristics (location, size, histological type, histological grade, stage of the illness per Tumor, Node, Metastases staging, HR expression, and HER2 status) were also recorded. The threshold of positivity for HR expression was set at 10% using immunohistochemistry. The pathological response of the tumor and the lymph nodes after neoadjuvant treatment was assessed per the Chevalier[17] and Sataloff[18] classifications.

Cosmetic Evaluation

The cosmetic result was assessed by the surgeon using a 5-point scale (rated from not satisfied to completely satisfied) at 6 months after surgery. Voluntary, we did not include the cosmetic evaluation at the postoperative consultation (at 3 weeks after surgery) to avoid bias due to immediate complications such as lymphocele or hematoma, which could be modified in the subjective evaluation.

Statistics

Data were summarized using frequency and percentage for categorical variables and median and range for continuous variables. Comparisons between groups were performed using the χ^2 or Fisher exact test for categorical variables and the Mann−Whitney test for continuous variables. All reported P values are 2-sided. For all

statistical0- tests, differences were considered significant at the 5% level. Statistical analyses were conducted using STATA 13 software (StataCorp, College Station, TX).

Results

Patient and Tumor Characteristics

Of the 59 identified patients who underwent this type of sequence, 52 patients were enrolled, and 7 patients were excluded: 2 patients had a metastasized illness and 5 patients had not received the complete initial treatment sequence (Figure 1).

The median age of the patients was 45.5 (range, 24-65) years and the median body mass index was 24.55 (range, 18.1-45.9). Only 23.5% of the patients (n = 12) were "active" smokers. For 77.8% (n = 28), the bra size corresponded to a chest diameter of 90-95 cm and more than 70% (n = 32) had a cup size bigger than B.

Clinically, 59.6% (n = 31) of the tumors corresponded to cT2 and most patients (n = 30; 57.7%) presented with clinical axillary lymph node involvement. The tumors were multifocal in 55.8% (n = 29) of cases (Table 1). The tumors were primarily of histological Grade 3, in 72.5% of cases (n = 37). In 5.9% (n = 3) of cases, the tumors were triple-negative (58.8%; n = 30) were HR-positive (HR$^+$)/HER2$^-$ and 35.3% (n = 18) were HER2$^+$ (Table 1).

Treatment Sequence

All patients had a minimum of 3 cycles of FEC 100 and 3 cycles of docetaxel, as well as radiotherapy. Of all patients, 34.6% (n = 18) received targeted therapy with trastuzumab.

All surgical procedures consisted of a skin-sparing mastectomy and AD (except for 2 patients who did not have an AD because the sentinel node [SN] was negative). An IBR via the LDF technique was performed in all cases. A prosthesis was implanted in 23.5% of

cases (n = 12; median size: 225 [range, 135-360] cc). In terms of adjuvant treatment, 80.8% (n = 42) of patients had postoperative hormone therapy.

Pathological Complete Response

Pathological complete response (pCR) was found in 51.3% of cases in the TIS group, using Chevalier[17] and Sataloff[18] classifications (T and N pCR). In terms of lymph node response, the pCR rate was 64.3% (n = 27), using Sataloff classification.

Cosmetics Evaluation

The subjective cosmetics evaluation was assessed by the surgeon in 82.69% (43/52). In two-thirds of cases, the cosmetic result was satisfied (55.8%, n = 24) or completely satisfied (20.9%, n = 9) at 4 months after the surgery. The cosmetic result was not satisfied in 16.3% (7/43); for most of those patients, it was because of the hardness of the flap and the skin.

Complications and Follow-up

Lymphocele of the mastectomy site or the LDF was observed in 80.8% of cases (n = 42), 3 patients experienced impaired healing, and 2 patients presented with more than 5 cm of skin necrosis. One patient required surgical revision in the 7 days after the surgery, as a result of a hematoma (Table 2).

Median follow-up was 61.9 months (95% confidence interval [CI], 52.7-65.4 months]). During follow-up, 3 patients presented with remote metastases, 2 patients presented with local recurrence, and 1 patient died. No contralateral or lymph node recurrence was discovered during follow-up (Table 3). The time between the various treatment sequences are presented in Table 4.

Analysis and Comparison of the IL and TIS Groups

An analysis of the IL and TIS groups was performed, which allowed a comparison between the TIS (75% of patients; n = 39) and the inverse sequence after an IL (25% of patients; n = 13) as a result of poor margins. Of the latter patients, 11 had an AD during the IL (the SN was positive during extemporary analysis) and 2 patients did not have an AD because there was no SN involvement. The patients in the IL group were significantly older (median age, 52 [range, 39-63] years in the IL group vs. 44 [range, 24-65] years in the TIS group; P = .01) with clinically smaller tumors (100% T1 and T2; P < .0001) and lower rates of lymph node involvement (30.8% vs. 66.7%; P = .0410). Histological comparison of the tumors revealed no significant difference between the 2 groups, apart from HER2 status, which had significantly higher representation in the TIS group than in the IL group: 43.6% (n = 17) of patients in the TIS group versus 7.7% (n = 1) of patients in the IL group (P = .02).

A significant difference was also observed between the number of chemotherapy cycles: patients in the TIS group received more cycles of FEC and docetaxel than patients in the IL group.

Concerning cosmetics results, there were no difference between groups. Within the TIS group (n = 39), the cosmetic result was satisfied (53.1%, n = 21) or completely satisfied (18.8%, n = 7) and within the IL group (n = 13), the cosmetic result was satisfied (63.6%, n = 8) or completely satisfied (27.3%, n = 4) at 4 months after the surgery.
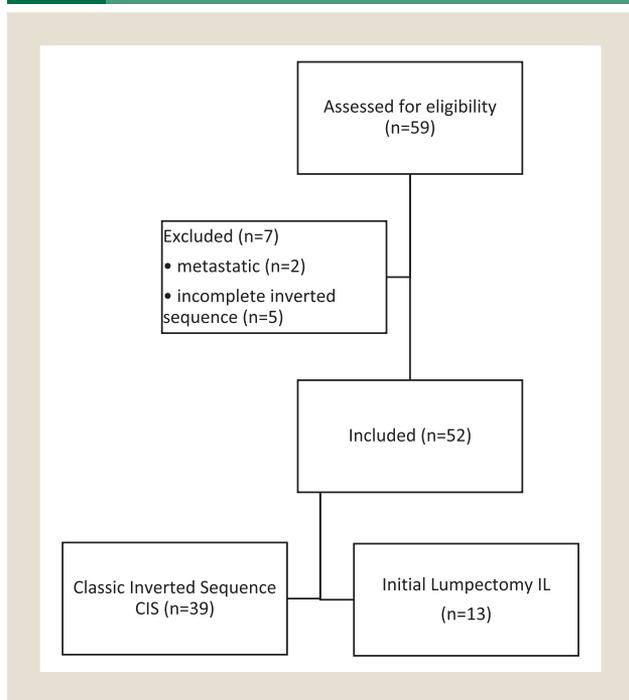

Figure 1   Study Enrollment

Assessed for eligibility (n=59)

Excluded (n=7)
• metastatic (n=2)
• incomplete inverted sequence (n=5)

Included (n=52)

Classic Inverted Sequence CIS (n=39)

Initial Lumpectomy IL (n=13)

Table 1 Population and Tumor Characteristics

Characteristic	Overall Population (n = 52)	TIS (n = 39)	IL (n = 13)	P
Median age (range)	45.5 (24-65)	44 (24-65)	52 (39-63)	**.01**
Median BMI (range)	24 (18-46)	25.2 (20-46)	23.1 (18-32)	NC
Smoker (n = 51)	12 (23.1%)	11 (28.2%)	1 (7.7%)	.15
T Clinical Tumor Size (n = 52)				**<.01**
T0	1 (1.9%)	1 (2.6%)	0	
T1	6 (11.5%)	0	6 (46.2%)	
T2	31 (59.6%)	24 (61.5%)	7 (53.8%)	
T3	12 (23.1%)	12 (3.8%)	0	
T4	2 (3.8%)	2 (5.1%)	0	
N Clinical Lymph Node Involvement (n = 52)				.40
N0	21 (4.4%)	12 (3.8%)	9 (69.2%)	
N+	31 (59.6%)	27 (69.2%)	4 (30.8%)	
Nx	1 (1.9%)	1 (2.6%)	0	
Multifocal	29 (55.8%)	23 (59.0%)	6 (46.2%)	.42
HR$^+$ (n = 51)	41 (8.4%)	31 (79.5%)	10 (83.3%)	1.00
HER2 status	18 (34.6%)	17 (43.6%)	1 (7.7%)	**.02**
Histology (n = 52)				.69
Ductal	36 (69.2%)	28 (71.8%)	8 (61.5%)	
Lobular	5 (9.6%)	3 (7.7%)	2 (15.4%)	
Other	11 (21.2%)	8 (2.5%)	3 (23.1%)	
Histological Grade (n = 51)				.07
II	14 (27.5%)	8 (20.5%)	6 (50.0%)	
III	37 (72.5%)	31 (79.5%)	6 (50.0%)	

Bold values indicate statistically significant (P < .05).
Abbreviations: BMI = body mass index; HR = hormone receptor; IL = initial lumpectomy; NC = not calculated; TIS = traditional inverse sequence.

The median time between the cancer diagnosis and the date of the final mastectomy was a month longer in the IL group: 10.5 months versus 9.5 months. The median duration of hospital admission after the mastectomy and IBR was 6 days for the IL group and 7 days for the TIS group (insignificant result; *P* = .82).

The median duration of follow-up was longer for the TIS group than for the IL group: 63.3 months (95% CI, 53.1-67.0) versus 51.7 months (95% CI, 41.8-67.2).

Discussion

To our knowledge, this study is one of the first case series using this treatment sequence in breast cancer, with a median follow-up of more than 5 years, and enrolled 2 patient populations that could receive this type of treatment (TIS and IL). This treatment sequence remains an uncommon practice.

In terms of postoperative complications, a significant rate of lymphocele cases affecting the mastectomy site and/or the LDF was observed in our patient population, but a low rate of impaired healing and skin necrosis. These levels are relatively low compared with those observed in the study by Zinzindohoué et al,[2] which revealed higher levels. The context was different, however, because this study was specifically investigating cutaneous complications such as LDF necrosis: 5 cases of skin necrosis among the 83 patients, of which 3 were smaller than 2 cm^2, 1 was between 2 and 10 cm^2, and one was larger than 10 cm^2. In terms of the very high lymphocele rate, in our study, all lymphocele surgical sites were taken into account (mastectomy site, axillary region, and LDF site) regardless of the presence of drainage, which might explain the lower rate of lymphocele observed in the other studies: 54% in the study by Paillocher et al[4] 1 month after the surgery, and 19.3% in the study by Giacalone et al.[3] In the study by Michy et al,[1] an 80% rate of dorsal lymphocele (n = 12 of 15) in cases of autologous LDF and a 22% rate (n = 7 of 32) in cases of heterologous LDF were observed. Additionally, Giacalone et al[3] assessed the benefit of this

Table 2 Postoperative Complications

Postoperative Complication	Overall Population (n = 52)	TIS (n = 39)	IL (n = 13)	P
Skin necrosis > 5 cm	2 (3.8%)	2 (5.1%)	0	1.0
Impaired healing	3 (5.8%)	2 (5.1%)	1 (7.7%)	1.0
Lymphocele	42 (80.8%)	30 (76.9%)	12 (92.3%)	.4
Surgical revision	1 (1.9%)	1 (2.6%)	0	1.0

Abbreviations: IL = initial lumpectomy; TIS = traditional inverse sequence.

Table 3 Oncological Events During Follow-up

Oncological Event	Overall Population (n = 52)	TIS (n = 39)	IL (n = 13)	P
Lymph node recurrence	0	0	0	NC
Local recurrence	2 (3.8%)	1 (2.6%)	1 (7.7%)	NC
Metastases	3 (5.8%)	2 (5.1%)	1 (7.7%)	NC
Cancer-related death	1 (1.9%)	1 (2.6%)	0	NC

Abbreviations: IL = initial lumpectomy; NC = not calculated; TIS = traditional inverse sequence.

type of treatment sequence in a prospective study comparing a group of 26 patients who underwent this treatment sequence, with an IBR via the LDF technique, with another group of 78 patients who had a secondary breast reconstruction (SBR). No significant difference was found between the 2 groups in terms of the rate of immediate (61% [n = 16] in the IBR group vs. 56% [n = 44] in the SBR group; $P = .645$) and secondary (30% [n = 8] in the IBR group vs. 21% [n = 17] in the SBR group; $P = .362$) complications, or in the rate of local recurrence (7.7% [n = 2] in the IBR group vs. 6.4% [n = 5] in the SBR group; $P = .823$), with a median follow-up of 4.7 years and 4.5 years for the IBR and SBR groups, respectively.

Furthermore, in this study, all patients underwent identical IBR with an autologous or heterologous LDF. Some teams, such as that of Monrigal et al,[5] compared the various types of LDF reconstruction, however—with and without a prosthesis, prosthesis-only, or transverse rectus abdominis musculocutaneous (TRAM)—and showed that TRAM flap reconstructions after an "inverse" sequence led to a higher risk of necrosis (risk ratio [RR], 6.4 [range, 2.9-14.2]; $P = .000004$) and surgical revision (RR, 2.5 [range 1.2-5.3]; $P = .015$) than the other types of reconstruction.

In terms of radiotherapy, all patients in this case series received a 50-Gy dose to the breast and the entire chest wall, the internal lymph nodes, and the supra- and subclavicular regions, but no radiotherapy was delivered to the axilla. This radiotherapy sequence was also used in the studies by Giacalone et al[3] and Monrigal et al,[5] unlike in the study by Paillocher et al,[4] who did not systematically deliver radiation to the internal and supra- and subclavicular lymph nodes. Only Zinzindohoué et al[2] delivered radiotherapy to the axilla, when suggested in the pretreatment multidisciplinary meeting. The lack of systematic axillary radiation raises the question of performing radiotherapy on an active illness and leaving lymph nodes, very often affected, in place. In fact, preoperative axillary radiation could complicate the reconstructive surgery, as well as the AD, which was quasisystematic in this study. However, this study revealed no axillary progression of the illness, over a median follow-up duration of 5 years.

Finally, in terms of the time between the different treatments, the median duration of the treatment sequence observed in this case series was 9.7 months (range,7.8-11.8 months). These data cannot be compared because it has not been evaluated in the other studies. It would have been interesting to compare the median duration of care, to ensure compliance with the recommended time between treatments of the therapeutic sequence. In their study, Paillocher et al[4] specified the importance of rapid surgery after the radiotherapy ends, to prevent complications. They revealed a significant increase in surgical complications if the surgery was performed more than 7 weeks after the end of radiotherapy. Conversely, we have no data on the total treatment duration between diagnosis and the final surgery. Additionally, we showed significantly longer times for the IL group than for the TIS group. Despite these significant differences, the delay in treatment was only a few weeks and no significant difference in terms of relapse-free survival was observed between the 2 groups. This case series thus showed the feasibility of this technique after an IL. No information on patients who received initial lumpectomies who underwent this sequence was found in the literature.

In the study by Giacalone et al,[3] the cosmetic assessment was deemed good or excellent by the patients (88.8% [n = 16] in the IBR group vs. 94.4% [n = 51] in the SBR group; $P = .723$) and the surgeons (77.7% [n = 14] in the IBR group vs. 87% [n = 47] in the SBR group; $P = .541$) in both groups. In our study, in two-thirds of the cases, the cosmetic result was satisfied (55.8%) or completely satisfied (20.9%) at 4 months after the surgery and there was no difference between the IL group and TIS group. Similarly, Paillocher et al[4] showed an overall patient satisfaction rate of 17/20 and 30% of patients had no criticism of the reconstruction and 70% of patients would have chosen the same type of treatment if there is had a recurrence.

Additionally, we observed that the rate of pCR in this study was 51.3%, using Chevalier[17] and Sataloff[18] classifications (T and N

Table 4 Time Between the Various Treatments and Median Follow-up

Time (mo)	Overall Population (n = 52)	TIS (n = 39)	IL (n = 13)	P
Diagnosis to first ttt	1.4 (0.0-2.8)	1.3 (0.3-2.8)	1.4 (0.0-2.1)	.36
Start of CT to start of RT	4.6 (2.1-6.4)	4.8 (2.1-6.4)	4.1 (3.1-5.1)	**.02**
Start of RT to Surg	3.4 (2.5-4.4)	3.4 (2.5-4.4)	3.4 (2.9-4.2)	.6
First ttt to Surg	8.4 (5.7-10.6)	8.0 (5.7-9.9)	9.3 (8.3-10.6)	**.001**
Diagnosis to final Surg	9.7 (7.8-11.8)	9.5 (7.8-11.2)	10.5 (9.0-11.8)	**.003**
Median follow-up (95% CI)	61.9 (52.7-65.4)	63.3 (53.1-67)	51.7 (41.8-67.2)	NC

Bold values indicate statistically significant ($P < .05$).
Data are presented as time in months (range), except where otherwise noted.
Abbreviations: CT = chemotherapy; IL = initial lumpectomy; NC = not calculated; RT = radiotherapy; Surg = surgery; TIS = traditional inverse sequence; ttt = treatment.

pCR). These figures are better than those in the literature from studies considering a treatment sequence that starts with neo-adjuvant chemotherapy (NACT) alone (12.5%-27.1%),[19] but lower than those in the study by Barrou et al[19] (53.4%), who studied the histological effect of the combination of neoadjuvant chemotherapy and radiotherapy, as in this study. In their study, Barrou et al[19] presented tumors with more aggressive histological characteristics, however, of 103 patients, 19 had a triple-negative tumor (19.4%), 25 had a HER2$^+$ tumor (24.3%), and 59 had an HR$^+$ tumor (57.3%); these tumors were primarily stage cT2 (67%; n = 69) and were N+ in 61.5% of cases (n = 56). These high numbers might be explained by the high rate of aggressive and highly proliferative tumors, as well as the neoadjuvant radiotherapy (NART), the effect of which is difficult to assess. The rate of pCR after neoadjuvant chemotherapy is a well established marker of good prognosis, depending on the histological subtype of the tumor,[20] although it is still under debate by some authors.[21,22]

The oncological feasibility of a skin-sparing mastectomy after neoadjuvant chemotherapy and adjuvant radiotherapy has already been assessed in several studies.[23-25] In our study, overall survival could not be statistically analyzed. Nevertheless, the results concerning local recurrence, distant recurrence, and mortality, in patients with an often aggressive initial disease, seem interesting. The study by Paillocher et al[4] also showed, in 111 patients who underwent this so-called "inverse" treatment sequence, a relapse-free survival rate at 5 years of 93.2% and an overall survival rate of 98.2%, after a median follow-up of 31.6 months. Similarly, Michy et al[1] revealed a relapse-free survival rate at 5 years of 75% after neoadjuvant chemotherapy in the previous paragraph (NACT) and NART in patients (n = 60) who presented with tumors that were not accessible to initial breast-conserving treatment, and patients (n = 41) who had a lumpectomy with poor margins, after a median follow-up of 65 months.

A lot of surgeons consider autologous reconstruction as the "gold" standard if adjuvant radiotherapy is necessary. Barry and Kell,[26] through a meta-analysis of 1105 patients showed that an autologous flap offered more favorable outcome in terms of morbidity than expander/implant reconstruction (odds ratio, 0.21; 95% CI, 0.1-0.4 [autologous vs. implant-based]). This autologous reconstruction could be by using LDF but equally by using free flap. Some studies showed real advantages in use of free flap like the deep inferior epigastric perforator (DIEP) flap. Hughes et al[27] evaluated free autologous breast reconstruction after NACT and NART in 40 patients; they did not find an increase of morbidity versus standard reconstruction (12.5% of major complication and 15% of minor complication). Chatterjee et al[28] studied the effect of postoperative radiotherapy breast volume after DIEP flap reconstruction on 68 patients. Twenty-two of them received postoperative radiotherapy and they did not find any statistically difference in volume between patients who had and those who did not have postreconstruction radiotherapy.

Moreover, even if this new therapeutic sequence is interesting, other conventional techniques present acceptable cosmetic results. Brennan et al[29] evaluated cosmetic results of mastectomy with immediate reconstruction compared with expander/implant after NACT and compared with postmastectomy radiation therapy in 47 patients who completed the different questionnaires. They found

high patient satisfaction, low complication rates (expander/implant loss rate of 6.4%, wound infection rate of 10.6%, and occurrence of seroma in 4.1%), and good cosmetic results (evaluation by surgeon for 34 patients: mean global aesthetic score of 2.29 evaluated with the Kroll scale from 1 to 4, with a maximum score of 4 for excellent cosmetic outcome).

Our study is thus one of the few studies to assess this treatment sequence in breast cancer, with a high median follow-up, and within patients who had an IL. However, our study had low statistical power and was retrospective with a heterogeneous patient cohort (IL vs. TIS).

Conclusion

Treatment with a so-called "inverse sequence" in cases of invasive breast cancer seems to be a feasible procedure in selected patients who want an IBR. Treatment should be multidisciplinary. Indeed, increasing numbers of patients could benefit from reconstruction with a prosthetic implant or expansion implant after neoadjuvant chemotherapy and before adjuvant radiotherapy.[30-32] Prospective, randomized studies with higher statistical power would allow more tailored answers on the oncological feasibility and assessment of patient satisfaction—particularly in terms of cosmetics—with this treatment procedure for breast cancer.

Clinical Practice Points

- The "inverse" sequence including mastectomy with IBR and LDF after chemotherapy and radiotherapy for invasive, non-metastasizing breast cancer is not common.
- The initial axillary lymph node status of the illness should be known in advance, to adjust the radiotherapy.
- Several studies have reported on the feasibility of this sequence.
- This "inverse" therapeutic strategy should be considered a potentially effective option for patients who want an IBR, and who are screened on the basis of morphology, age, and tumor characteristics after discussion in a multidisciplinary team meeting.

Disclosure

The authors have stated that they have no conflicts of interest.

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