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Original Research Article

A prospective study of wound complications in cancer breast surgery following neoadjuvant chemotherapy

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ABSTRACT

Background: Neoadjuvant chemotherapy is most of the time suitable for subset of the patients of breast cancer in Indian population. Neoadjuvant chemotherapy may be used to down stage a tumor that is inoperable in its current state, so that curative resection becomes feasible. But also, it can decrease size of operable primary tumour so that breast conserving surgery become possible which has better functional outcome and improves the quality of life. Therefore, there is a need to improve understanding of potential for post-operative complications in recipients of Neoadjuvant chemotherapy. Given that neutropenia is most common side effect of chemotherapeutics, this has raised concerns regarding the increased risk of post-operative complications. The objective of present study is to examine the risk of post-operative wound complications in patients receiving neoadjuvant chemotherapy for breast cancer.
Methods: This study was conducted on 60 patients of breast carcinoma admitted for treatment to Nehru Hospital, BRDMC Gorakhpur for treatment during the period of July 2016-December 2017.
Results: Seroma formation was most common complication observed in 20% (12/60) patients followed by superficial surgical site infection in 6.67% (4/60) patients, Deep surgical site infection in 2 patients (3.33%). Wound dehiscence in 2 (3.33%) patients. These data suggested that no obvious increase in complications in patients gone for neoadjuvant chemotherapy.
Conclusions: Authors concluded that the rate of wound complications for breast cancer patients receiving Neoadjuvant chemotherapy is low. Seroma formation is the most frequent complication. Other complications can be avoided if proper preventive measures are taken. Smoking, hypertension, DM and obesity were associated with an increased risk of wound complications for patients undergoing BCS or MRM.

Keywords: Deep surgical site infection, Flap necrosis, Neoadjuvant chemotherapy, Seroma, Superficial surgical site infection, Wound dehiscence

INTRODUCTION

Indications for neo adjuvant chemotherapy in the treatment of breast cancer are expanding.[1] Neo adjuvant chemotherapy provides the advantages of monitoring the in-situ breast tumor for treatment response and the potential for breast conserving surgery (BCS) in patients with locally advanced breast cancer who otherwise may not have been candidates.[2] Given that both overall and disease-free survival are equivalent after neo adjuvant and adjuvant chemotherapy, neo adjuvant chemotherapy can be considered as a treatment option for any patient who is expected to require systemic treatment.[3-5]

Therefore, there is a need to improve understanding of the potential for post-operative complications in recipients of neo adjuvant chemotherapy. A recent study assessing post-operative morbidity following breast

cancer surgery demonstrated that the most frequent complication was wound infection.[6] Given that neutropenia is a common side effect of breast cancer chemotherapeutics, this has raised concern that patients treated with neoadjuvant chemotherapy may be at increased risk for post-operative complications.[7] This has been examined in several single institution series that have focused primarily on mastectomy with or without immediate reconstruction; in these studies, no increase in post-operative complications in patients treated with neoadjuvant chemotherapy was identified.[8-11]

The objective of this study is to examine the risk of post-operative wound complications in patients receiving neoadjuvant chemotherapy for breast cancer. By using this prospectively collected dataset, authors would be able to examine the relationship between receipt of neoadjuvant chemotherapy and post-operative wound complications, stratified by type of surgical procedure, under variety of settings.

Several treatment options are available for the treatment of breast carcinoma depending on the stage of the disease. Complete removal of the tumor is a definitive therapy, but it is not possible every time, so several treatment options have been described. Neo adjuvant chemotherapy therapy is a treatment which is most of the time suitable for subset of the patients in Indian population. A woman may receive Neoadjuvant chemotherapy for breast cancer to down stage a tumor that is inoperable in its current state, so that curative resection becomes feasible

Another advantage of giving Neoadjuvant chemotherapy in a operable breast cancer is that primary tumor decreased size and the breast conserving surgery become possible which has better functional outcome and improves the quality of life in patients.

Aside from the potential clinical benefits that are achieved by down staging, Neoadjuvant therapy allows direct and early observation of the response to treatment, which in theory could lead to modifications of the treatment plan in the event of poor response. Neoadjuvant chemotherapy can be considered as treatment option for any patient who is expected to require systemic treatment. Therefore, there is a need to improve understanding of potential for post-operative complications in recipients of Neoadjuvant chemotherapy. Given that neutropenia is most common side effect of chemotherapeutics, this has raised concerns regarding the increased risk of post-operative complications.

Aims and objectives

- To study wound related complications likely to occur after different breast surgeries for breast cancer following neoadjuvant chemotherapy.
- To study the impact of other variables on wound related complications after Neoadjuvant chemotherapy mentioned like Age of patients, Smoking, Diabetic mellitus, Hypertension and BMI.

METHODS

Source of data

The Patient attending the department of surgery and also patient referred from other departments of combined Nehru Hospital BRD Medical College Gorakhpur form the subjects for present study.

This study will be conducted on patients presenting with lump in the breast and fine Biopsy confirming breast carcinoma and getting admitted to Nehru Hospital BRD Medical College Gorakhpur for treatment during the period of July 2016-December 2017.

Inclusion criteria

- Female/Male patient with breast lump diagnosed to be breast carcinoma by biopsy.
- Stage of disease which requires mastectomy or breast conservative surgery and systemic therapy.
- Patient willing to take treatment.

Exclusion criteria

- Recurrent breast carcinoma.
- Patient who has taken previous chemotherapy/ radiotherapy, outside this institution.
- Patient with residual disease.
- Patient with previous incomplete breast surgery.

Method of collection of data

A written informed consent will be taken from all patient included in the study. A detailed history taking, through clinical examination will be done for these patients. The data collected will be entered into a specially designed case record form.

Duration of study

The study will be conducted from July 2016 to December 2017.

RESULTS

There is different mode of surgeries available for breast carcinoma, but main are breast conservation surgery (BCS) and modified radical mastectomy (MRM). After neoadjuvant chemotherapy down staging of tumor occur. Out of 60 patient breast conserving surgery (BCS) done in 4(6.66%) patient and modified radical breast surgery (MRM) done in 56 (93.33%) patients.

Table 1: Distribution of the patient according to the type of breast surgery.

Type	No.	%
Breast Conserving Surgery	4	6.66
Modified Radical Mastectomy	56	93.33

Breast cancer occur mainly in middle age group,24 patients out of 60, More than one third of total were between 41-50 years (40%), followed by 51-60 (23.3%), 31-40 (20%), 21-30 (10%) and 61-70 (6.7%).

Table 2: Distribution of patients according to age.

Age in years	No. (n=60)	%
21-30	6	10.0
31-40	12	20.0
41-50	24	40.0
51-60	14	23.3
61-70	4	6.7

Out of 60 patients, percentage of overweight and underweight were 16.67% and 30% respectively, while 32 patients nearly 53% were of normal weight.

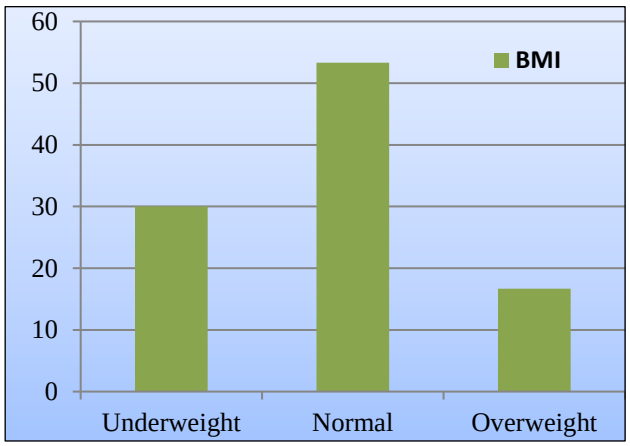

Figure 1: Distribution of patients according to BMI.

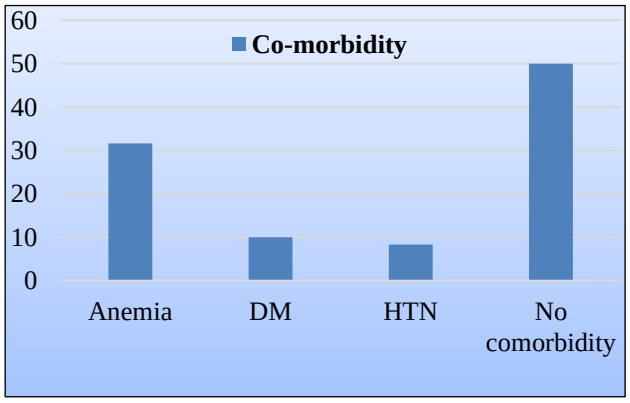

Figure 2: Distribution of patients according to comorbidity.

Most common comorbidity was anemia, present in 19 patients (31.67%) followed by DM in 6 patients (10%) and hypertension 4 patients (8.3%) while 30 patients (50%) have no comorbidity.

Breast cancer presents at various stages according to tumor size, T4b was most common tumor characteristic in 22 patients (36.7%) and T3 was second most common tumor characteristic in 13 patients (21.67%) in present study, while 8 patients in T2,11 in T4a and 6 in T4c characteristic.

Table 3: Distribution of patients according to tumor characteristics.

Tumor characteristics	No. (n=60)	%
T2	8	13.3
T3	13	21.67
T4a	11	18.33
T4b	22	36.7
T4c	6	10.0

Wound related complications like superficial surgical site infection, deep surgical site infection, seroma formation and wound dehiscence can occur after surgery, superficial surgical site infection was present in 4 (6.67%) patients.

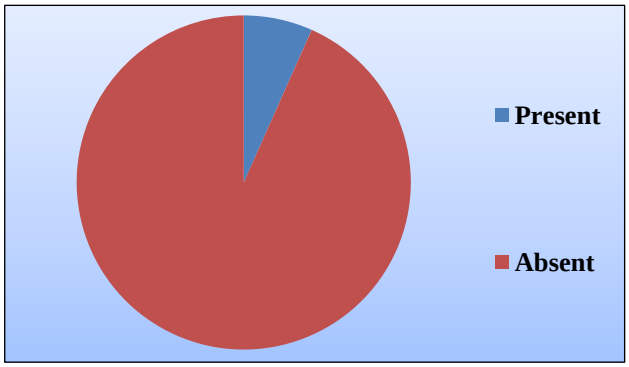

Figure 3: Distribution of patients according to superficial surgical site infection.

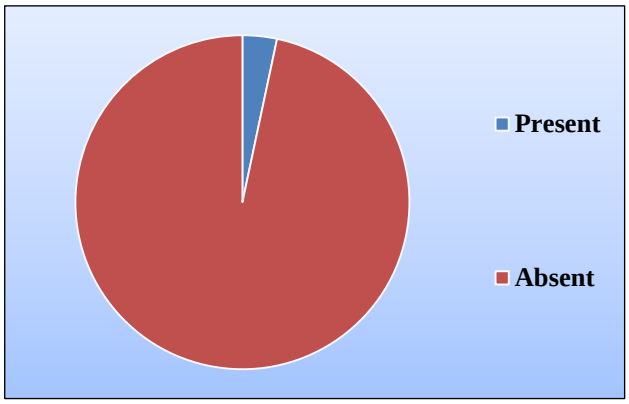

Figure 4: Distribution of patients according to deep surgical site infection.

Out of 60 operated patients, deep surgical site infection was present in 2 (3.33%) patients (Figure 4).

Out of 60 operated patients wound dehiscence was present in 2 (3.33%) patients (Table 4).

Table 4: Distribution of patients according to wound dehiscence.

Wound dehiscence	No. (n=60)	%
Present	2	3.3
Absent	58	96.7

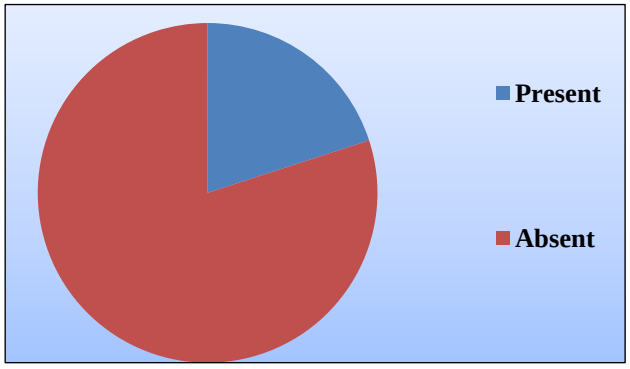

Figure 5: Distribution of patients according to seroma formation.

Most common complication of breast surgery was Seroma formation, that was present in 12 (20%) patients.

Table 5: Distribution of patients according to flap necrosis.

Flap necrosis	No. (n=60)	%
Present	0	0.0
Absent	60	100.0

None of the operated patient developed flap necrosis in post op period.

DISCUSSION

In present study of 60 patients, 4 patients (6.67%) had gone for Breast Conserving Surgery (BCS) while in Decker's et al 11% and in Milan's study 37.86% had gone for Breast Conserving Surgery. While in present study out of 60 patients, 93.3% undergone Modified Radical Mastectomy. In Decker's study and Milan's study that was 70 % and 22% respectively

Table 6: Type of surgery.

Types of surgery	Current	Decker's et al[12]	Milan [13]
BCS	6.66%	11%	37.86%
MRM	93.3%	70%	22%

In present study more than one third patients were between 41-50 years (40%) followed by 51-60% (23.3), 31-40 (20%), 21-30 (10%), and 61-70 (6.7%). In present study maximum 40% patients were from 41-50 years, while in study of Milan's study 40.17% were from 40-49 years.

Table 7: Distribution of patient according to age in different study.

Distribution of patient according to age	Current	Milan's et al[13]
Age in years	41-50 years (40%)	40-49 years (40%)

In present study distribution of patients according to their body mass index here percentage of overweight and underweight respectively 16.67% and 30% while in Decker's et al study 68% and 2% respectively.[12]

Table 8: Distribution of patients according body mass index (BMI).

BMI	Current study	Decker's et al[12]
Overweight	16.67%	68.2%
Underweight	30%	2.0%

In present study percentage of patients with co-morbidities like anemia, diabetes mellitus, and % respectively while in Deckers et al, study the percentage was 73.4%, 5.5% and 30% respectively.[12]

Table 9: Distribution patients' according to co-morbidity.

Co morbidity	Current study	Decker's et al[12]
Anemia	31.67%	73.4%
DM	10%	5.5%
Hypertension	8.3%	30%

In present study distribution of patients according to Tumor Characteristic here T4b was most common tumor characteristics stage that was 36.7% while in Milan's study T4b is 26% and T3 stage in my study 16.7% and Milan's study is 24%.

Table 10: Distribution of patients according to Tumor Characteristic.

	Current study	Milan's study[13]
T 4b	36.7%	26%
T 3	16.7%	24%

Superficial surgical site infection in present study were 6.6% while in Decker's et al, Milan's and Vilar - Compete et al, 1.8%, 3% and 20.5% respectively.[12-14]

In present study deep surgical site infection were 3.33% while in Milan's and Vilar-Compte et al, was 2% and

6.8% respectively.[13,14] Wound dehiscence, in Current Study was 3.3%, while in Decker's et al, Milan's and Vilar-Compte et al, are 0.65%, 4% and 11.2% respectively.[12-14]

Table 11: Patient's distribution according to superficial surgical site infection.

	Current study	Decker's et al	Milan's	Vilar-Compte et al
SSI	6.66%	1.8%	3%	20.5%

Table 12: Patient's distribution according to Deep surgical site infection (DSSI).

	Current Study	Milan's	Vilar-Compte et al
DSSI	3.33%	2%	6.8%

Seroma formation in present study seroma formation was present in 20% patients while in Milan's study is 4.43%.[13]

Table 13: Distribution of patients according to Wound Dehiscence.

	Current Study	Decker's et al	Milan's	Vilar-Compte et al
Wound Dehiscence	3.3%	0.65%	4%	11.2%

Table 14: Distribution of patient according to seroma formation.

	Current study	Milan
Seroma formation	20%	4.43%

Table 15: Distribution of patients according to flap necrosis.

	Current	Milan	Decker's et al
Flap necrosis	nil	14%	15%

No patients have flap necrosis in present study while in Milan's and Decker's et al, are 14% and 15% respectively.[13,12]

CONCLUSION

Authors concluded that the rate of wound complications for breast cancer patients receiving neoadjuvant chemotherapy is low.

Seroma formation is the most frequent and common complication after modified radical mastectomy with axillary clearance. Many factors lead to seroma formation and other early wound complications like wound infection, wound dehiscence and flap necrosis in breast surgery which can be avoided or decreased if proper preventive measures are taken.

A number of previously identified factors, including smoking, hypertension, and obesity were associated with an increased risk of wound complications for patients undergoing either breast conserving surgery or mastectomy.

Neoadjuvant chemotherapy was not associated with an increased risk of wound complications, though the type of chemotherapeutic agent used for NACT was not part of present study.

The association between neoadjuvant chemotherapy and post-operative wound complications was much less than that observed for other clinical factors (especially obesity), it represents one of many factors that must be considered by surgeons when making recommendations for breast surgery in patients who have received neoadjuvant chemotherapy.

Obesity, older age, smoking, and diabetes mellitus were recognized as risk factors for early postoperative complications after neoadjuvant Chemotherapy.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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