ACTA MEDICA TRANSILVANICA March;26(1):36-40
DOI: 10.2478/amtsb-2021-0011
Online ISSN 2285-7079

MODERN ASPECTS IN THE DIAGNOSIS AND SURGICAL TREATMENT OF BREAST CANCER IN EARLY STAGES

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Keywords: *surgery, breast cancer, early stages, modern surgical treatment*

Abstract: *Breast cancer is the most common cancer in women and a major public health problem, affecting 2.1 million women each year globally and causing the highest number of cancer-related deaths among women. In 2018, an estimated 627,000 women died from breast cancer (about 15% of all cancer deaths among women). To improve survival, early detection is essential. There are two strategies for early detection of breast cancer: early diagnosis and screening.(1) In Romania, the latest statistics show a higher incidence of breast cancer compared to the European average of 7929 new cases / year with a mortality of 3101 deaths / year.(2)*

INTRODUCTION

Surgical resection was the first effective treatment for breast cancer and remains the most important treatment for curative purposes. Over time, significant improvements have been made to surgical techniques which, together with the use of adjuvant radiotherapy and advanced chemotherapeutic agents, have allowed the orientation towards more modern surgical techniques. Surgical management of breast cancer has undergone significant changes, starting from extensive procedures with increased morbidity, to the modern concept, thus obtaining the best possible cosmetic result, in tandem with the appropriate oncological resection. A growing understanding of breast cancer biology has led to significant advances in molecular diagnosis and targeted therapies. All these improvements have contributed to the development of more modern, more targeted therapeutic interventions that have also led to a decrease in morbidity and mortality. The current standard of care for breast cancer patients consists of a multidisciplinary approach that involves a coordinated effort between the surgeon, oncologist and radiologist to achieve the best possible outcome for each patient.(3)

Surgical management of breast cancer has undergone continuous changes over the past three decades. For patients with early-stage breast cancer, conservative breast surgery followed by radiation therapy has been definitively validated as a safe alternative to radical mastectomy, with similar survival rates and better cosmetic results. Due to improvements in the diagnostic process, as well as the expansion of screening programmes and efforts in patient education, breast tumours are detected more frequently at an early stage, facilitating the increasing use of breast preservation techniques.(4)

Gradual reduction of tumour size can be achieved by using neoadjuvant chemotherapy and/or endocrine therapy, allowing most patients to perform breast preservation surgery. In this context, the decision to continue conservative surgical treatment is guided by the clinical and radiological response to neoadjuvant therapy. Local recurrence rates after conservative surgical treatment are significantly reduced through the use of adjuvant radiotherapy and, therefore, should be considered as a standard of care, unless distant metastases are detected.(5)

Conservative therapy is considered an important step in the treatment of early breast cancer, representing a modern method of primary treatment for women with stage I and II breast cancer, being preferred due to the survival rate equivalent to those with total mastectomy and axillary dissection, while preserving the breast.

Conservative therapy involves extensive local excision of the tumour formation, along with 1-2 cm of healthy peritumoral tissue, in order to locally control the disease and evaluate the ipsilateral axillary lymph nodes by axillary lymphadenectomy or sentinel node biopsy. The selection criteria for patients who can benefit from conservative therapy are based on the correct evaluation of the clinical, imaging and pathological elements. Age is not a selection criterion. The clinical examination allows the assessment of the tumour size and the tumour-breast ratio, as well as the existence of several tumours. The mammographic examination provides us with information on the diameter of the tumour, the presence or the absence of multicenter lesions and microcalcifications. Histopathological examination is particularly important in establishing conservative behaviour, especially in the case of invasive intraductal carcinoma, positive margins or lobular carcinoma. Verification of intraoperative resection margins reduces the risk of postoperative recurrence.(6)

AIM

This paper is a comprehensive analysis of modern methods currently used in the detection and surgical treatment of early-stage breast cancer, increasing quality of life and decreasing the incidence among patients diagnosed with this disease.

The aim of this paper is to evaluate and describe the main modern methods of diagnosis and surgical treatment of breast cancer currently used in the Surgery I Clinic of the Sibiu

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Article received on 23.06.2020 and accepted for publication on 26.02.2021

County Emergency Clinical Hospital. One of the major objectives of this study is to evaluate the efficacy, safety and applicability of conservative surgical treatment by using different surgical techniques in patients with early-stage breast cancer.

MATERIALS AND METHODS

This study is a descriptive one regarding the patients hospitalized in the Surgery I ward of Sibiu County Emergency Clinical Hospital, diagnosed with breast cancer. The study includes a batch of 83 cases diagnosed with breast cancer over a period of 3 years, from 01.01.2016 to 31.12.2018. We included in the study all patients for the last 3 years, hospitalized in a chronic regimen. Patients with benign tumours were excluded. Statistical data processing was performed using Microsoft Office Excel 2016.

The data collection and integration was performed from the sources that were extracted from the database of the Sibiu County Emergency Clinical Hospital. Based on the collected data, the analysis and comparison of the cases that were represented with the help of tables and figures was prepared. These results were correlated with current data on breast cancer from the literature. Patients were analyzed according to the following parameters: age and environment of origin; topography of the primary tumour; presence of comorbidities (diabetes, hypertension, ischemic heart disease); TNM staging; patients who have received neoadjuvant therapy or with direct surgical indication; type of biopsy; surgical technique used and postoperative complications.

RESULTS AND DISCUSSIONS

Regarding the distribution of the cases by age groups, a predominance of the number of cases was observed in the age group 61-70 years representing a percentage of 33% for 27 cases, followed by the age group 51-60 years with 19 patients (23 %) and the age group 71-80 years with 16 cases (19%). The age distribution of the patients is illustrated in table no. 1.

Table no. 1. Distribution of patients according to age

Age group	Number of cases	Percentage (%)
31-40	2	2%
41-50	15	18%
51-60	19	23%
61-70	27	33%
71-80	16	19%
>80	4	5%
Total	83	100%

Out of a total of 83 cases, 19 patients belonged to the rural environment, i.e. a percentage of 23%, and the remaining 64 patients belonged to the urban environment, that is a percentage of 77%. This criterion emphasizes the fact that breast neoplasm is a pathology especially in women in urban areas, in rural areas being considerably less common. The environment of origin of patients is presented in table no. 2.

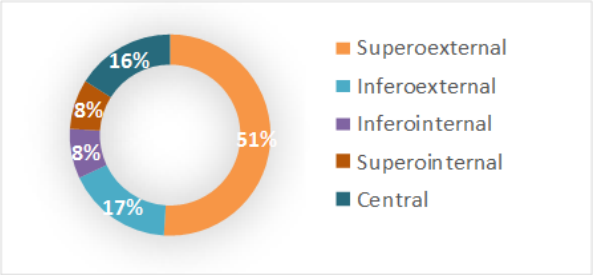
Table no. 2. Distribution of patients according to the environment of origin

Origin environment	Number of cases	Percentage (%)
Rural	19	23%
Urban	64	77%
Total	83	100%

The patients in the study group were assigned according to the location of the primary tumour in the quadrants of the breast. Out of the total of 83 patients included in the study group, 56 presented a tumour formation at the level of the external quadrants representing 68% of the total. Also, a predominance of tumour localization was observed in the superoexternal quadrant with 42 cases (51%) followed by the inferoexternal quadrant with 14 cases and a percentage of 17%. The least frequent locations were at the level of the internal superointernal and inferointernal quadrants with 7 cases for each. Instead, 13 cases were reported that showed a tumour formation in the central quadrant (16%).

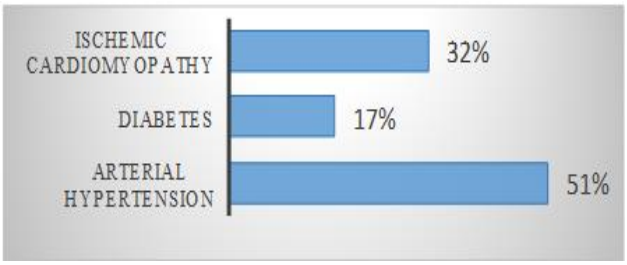
Several studies have attempted to establish the prognostic significance of breast cancer depending on the location of the primary tumour. Following a study conducted in the USA on a group of 980 patients who had tumours in different quadrants of the breasts, it was found that tumours located in the external quadrants, which are also the most common, are usually associated with a favourable prognosis unlike those located in the internal quadrants which are associated with a mortality twice as high due to the difficulty of detecting positive lymph nodes in the internal mammary lymph nodes. Tumours located in the central quadrant are associated with an unfavourable prognosis and increased mortality.(7) The distribution of patients according to the location of the primary tumour is illustrated in figure no. 1.

Figure no. 1. Distribution of patients according to the location of the primary tumour



Regarding the presence of comorbidities in patients diagnosed with breast cancer, 42 cases out of the total group had hypertension (51%), followed by 27 patients with ischemic heart disease and 14 cases with diabetes. Following the analysis of the data, there is an increased prevalence of hypertension and ischemic heart disease in patients diagnosed with breast cancer. Between January and December 2012, Indian researchers conducted a study that included 156 patients diagnosed with breast cancer. The most common comorbidities associated with breast cancer were high blood pressure, diabetes, chronic obstructive pulmonary disease and rheumatic disease. All four pathologies were reported in more than 75% of the cases included in the study. The data correlate with the values obtained in the personal study.(8) The distribution of cases according to the presence of comorbidities is presented in figure no. 2.

Figure no. 2. Distribution of cases according to the presence of comorbidities



For the analysis of the distribution of cases according to the stage of the disease, we used the clinical staging c-TNM, which is established following the clinical and imaging examination. Of the 83 patients included in the study group, 2 patients were in stage 0 of the disease (Tis, No, Mo),

representing 2% of all cases. Stage I comprises 20 cases (24%), while stage II comprises 28 cases, accounting for 34% of the total group. 25 patients were diagnosed with stage III breast cancer (30%), and 8 patients with stage IV breast cancer, i.e. 10% of cases. These data confirm that the number of cases detected in stage I is still small compared to stages II and III, when the therapeutic conduct already becomes more complex and the prognosis more unfavourable. The distribution of cases according to c-TNM staging is illustrated in table no. 3.

Table no. 3. Distribution of cases according to c-TNM staging

c-TNM staging	Number of cases	Percentage (%)
Stage 0	2	2%
Stage I	20	24%
Stage II	28	34%
Stage III	25	30%
Stage IV	8	10%
Total	83	100%

Regarding the first-line therapeutic indication, following the analysis of the collected data, 63% of the patients included in the study group received neoadjuvant treatment. The rest of the patients (37%) had a first-line surgical indication. These data emphasize the importance of using neoadjuvant chemotherapy in the selected cases in order to reduce tumour size to allow limited resection. Although many studies have not shown significant differences between the same systemic treatment administered pre- and postoperatively, in terms of overall survival of breast cancer patients, neoadjuvant therapy still has a number of advantages. By reducing the size of the tumour, mastectomy can be avoided, and the patients can opt for conservative surgical treatment. Moreover, it can reduce the volume of excision in patients with an indication for conservative treatment by improving the cosmetic result. It also improves locoregional control of the disease and reduces the risk of long-term spread.(9) Since its introduction, neoadjuvant chemotherapy has led to an increase in the rate of conservative treatment and a reduction in morbidity.(10) The distribution of cases according to the therapeutic strategy is presented in table no. 4.

Table no. 4. Distribution of cases according to the therapeutic strategy

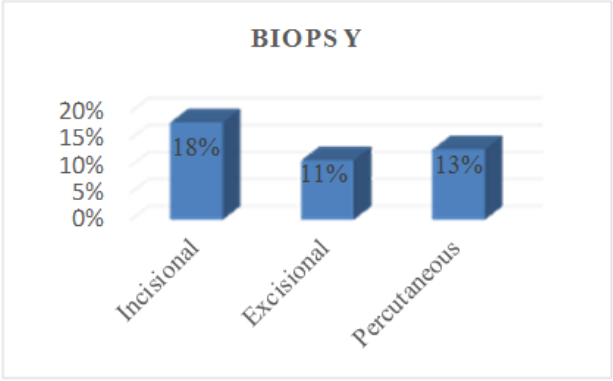
Primary treatment	Number of cases	Percentage (%)
Neoadjudvant	52	63%
Surgical	31	37%
Total	83	100%

Biopsy of tumour formations in the mammary gland is essential in the diagnosis of breast cancer. Although it is a more or less invasive method (depending on the type of biopsy), it allows the diagnosis of certainty. In addition, it provides information on the type of cancer and the degree of tumour differentiation. The biopsy completes the information obtained from the clinical and imaging examination so that the patient can benefit from a correct and targeted treatment depending on the result of the histopathological examination. Following the analysis of statistical data obtained from the database of the Sibiu County Emergency Clinical Hospital, we found that in the Surgery I department, three types of biopsy were used to diagnose breast cancer, namely incisional, excisional and percutaneous surgical biopsy (with needle). Of the 35 cases hospitalized for a breast biopsy, the majority had an incisional biopsy (15 cases). Percutaneous biopsy was performed in 11 patients and excision biopsy in 9 patients. Although in most cases the surgical biopsy was performed, the percutaneous biopsy (with fine needle/cutting needle) is gaining more and more ground due to the fact that it is less invasive and better supported by the patient. Unlike surgical biopsies, the risk of bleeding through the use of needle biopsy is much reduced.(11) The graphical representation of cases according to the type of biopsy is illustrated in figure no. 3.

In 2009, the U.S. Agency for Research and Quality in Health (AHRQ) conducted a comparative study that evaluated the effectiveness of percutaneous needle biopsy compared to surgical biopsy. The performance and frequency of postoperative complications for the two types of biopsy were also studied. The results showed that surgical biopsy remains the gold standard in terms of breast cancer diagnosis, with a sensitivity and specificity of over 98%. The rate of postoperative complications is between 2 and 10%, the most common being hematoma and local infection. Regarding the needle biopsy performed under palpation control, the studies show a sensitivity of 91% and a specificity of 98%.

It was also found that adding imaging methods (ultrasound, MRI) to guide the biopsy, led to an increase in the sensitivity of the method up to 99%. The rate of postoperative complications for percutaneous biopsy was 1%, the most common being local bleeding and infection at the puncture site. The authors of the study concluded that percutaneous biopsies have a high accuracy in detecting breast cancer and postoperative complications are minimal, but it is up to the clinician to choose the optimal diagnostic method for each patient.(12)

Figure no. 3. Graphical representation of cases according to the type of biopsy



Breast cancer surgery has been and will remain the most important treatment modality for curative purpose. Over time, significant improvements have been made to surgical techniques which, together with the use of neoadjuvant chemotherapy and adjuvant radiotherapy, have allowed the orientation towards more modern and less invasive surgical techniques, while improving the final cosmetic appearance.(3)

Following the analysis of statistical data obtained from the database of the Sibiu County Emergency Clinical Hospital, we found that out of the total of 48 patients who benefited from surgical treatment of breast cancer, most of them underwent Madden modified radical mastectomy with axillary lymph node dissection, i.e. 28 cases representing a percentage of 34%. In 9 of the patients, sectorectomy with axillary lymph node dissection was performed.

The "cleaning" mastectomy was performed in 8 cases and only one patient benefited from Patey's operation. There were also registered 2 patients hospitalized on the Surgery I ward with a history of breast surgery, in which a complementary axillary lymphadenectomy was performed. The most commonly used type of surgery was the Madden modified radical mastectomy. This aspect confirms the superiority of Madden surgery over other types of surgery such as radical mastectomy or Patey's operation, surgeries that are more mutilating and with

an oncological outcome similar to Madden mastectomy.

However, conservative breast surgery is the treatment of choice for stage I and II breast cancer and includes surgical excision of the tumour/sector/quadrant followed by axillary lymphadenectomy and adjunctive breast radiotherapy. The distribution of patients according to the type of surgery is presented in table no. 5.

Following a comparative study between conservative surgery and Madden surgery, the superiority of conservative surgery in early-stage breast cancer patients was demonstrated. In the case of conservative treatment, the duration of the operation was shorter, the intraoperative hemorrhage was minimal and the hospitalization days were few compared to the group that benefited from the Madden operation. In addition, the cosmetic result was in favour of conservative surgery.(13) However, a recent study by the European Organization for Research and Treatment of Cancer found no significant differences in the overall 20-year survival rate between patients receiving conservative surgical treatment followed by adjuvant radiotherapy and those receiving modified radical mastectomy for stage I and II. Overall survival at 20 years was 44% in those with conservative surgery and 39% in those with Madden mastectomy.

An important aspect to mention is that in the same study it was found that the locoregional recurrence of breast cancer at 10 years was higher in the group that received conservative surgery (20%) than those with Madden mastectomy (12%). However, modified radical mastectomy remains a topical method in early breast cancer, in situations where conservative treatment cannot be performed.(14)

Table no. 5. Distribution of patients according to surgery

Type of surgery	Number of cases	Percentage (%)
Madden mastectomy	28	34%
Sectorectomy	9	11%
Cleaning mastectomy	8	10%
Patey mastectomy	1	1%
Complementary axillary lymphadenectomy	2	2%
Total	48	58%

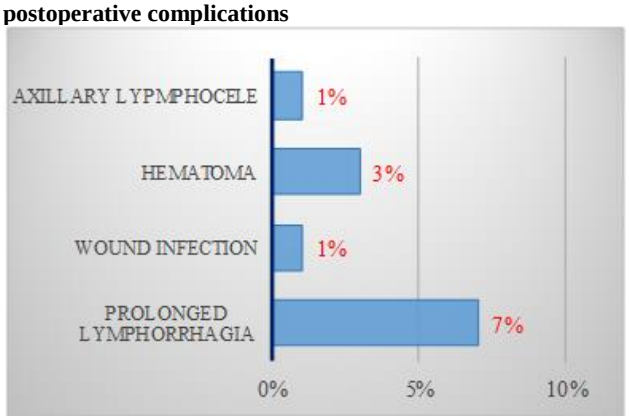
Breast cancer surgery is generally considered a surgery with a low risk of morbidity. However, a number of postoperative complications can occur with more or less serious consequences.

For example, local wound infection, skin necrosis, seromas, hematomas or postoperative haemorrhage can lead to both increased morbidity and costs through prolonged hospitalization and delay in the application of adjuvant treatments. After analyzing the statistical data, we found that out of the total of 83 patients included in the study group, only 10 cases had immediate postoperative complications, representing 12% of all cases. Graphical representation of cases according to postoperative complications is illustrated in figure no. 4.

Although the literature indicates serum as the most common postoperative complication of breast surgery, no patient in the study group presented this complication. This can be explained by the use of drainage tubes at the end of surgery. However, the most common complication was prolonged lymphorrhagia, which occurred in 6 patients and accounted for 7% of cases.

A study conducted at the University of Naples, on a group of 449 patients, found that 18.2% of them developed one or more immediate postoperative complications. Among the most common are seruma, wound infection, hematoma, postoperative bleeding, cardiovascular complications, anemia and pulmonary thromboembolism. On Surgery I ward, during the three years included in the study, only 2 cases with postoperative hematoma and two other patients with infected wound and axillary lymphocele were reported. An important aspect identified in the study of the University of Naples, was the increase in the incidence of postoperative complications with age and the number of associated pathologies. We can conclude that old age and comorbidities influence the appearance of complications in patients treated surgically for breast cancer.(15)

Figure no. 4. Graphical representation of cases according to postoperative complications



Another article recently published in the International Journal of Surgery Science, aimed at a comparative study of postoperative complications after modified radical mastectomy and conservative surgery in early breast cancer. This study included two groups of patients of 15 people each. The first batch benefited from Madden surgery and the second from conservative surgery. Of the 15 cases that benefited from Madden mastectomy, 2 developed seromas and one patient had marginal skin necrosis. From the group that benefited from conservative surgery, only one patient developed seroma. Therefore, conservative surgery has been shown to be superior to modified radical mastectomy in terms of the incidence of immediate postoperative complications.(16)

CONCLUSIONS

Breast cancer is a major public health problem and a major cause of morbidity and mortality globally. It is the most common neoplasm among women and the second leading cause of cancer, after lung cancer.

The current study suggests an increased incidence of breast cancer, especially in patients aged 50 to 70 years who also have numerous comorbidities. Among the most common associated pathologies are high blood pressure, ischemic heart disease and diabetes.

Most cases of breast cancer were identified in 2018, their number being continuously rising in those 3 years studied, and regarding the origin environment, the majority of cases were registered in the urban environment. The increased incidence of patients in urban areas can be explained by their better addressability and accessibility to specialized medical services.

The development and application of screening programmes is essential for the diagnosis and treatment of breast cancer. The detection of breast neoplasia at an early stage, allows the orientation of the therapeutic conduct to modern surgical methods such as conservative surgery that allows a good control of the disease and aesthetic outcomes superior to classical radical surgery.

Tumour biopsy allows the establishment of the certainty diagnosis, the degree of tumour differentiation and the type of breast cancer. Most cases benefited from incisional

biopsy, followed by percutaneous and excisional biopsy. Biopsy is mentioned in the literature as the gold standard for the diagnosis of breast cancer.

The use of neoadjuvant chemotherapy in the treatment of breast cancer, allows both the reduction of tumour size in view of limited resection and locoregional control of the disease, being applied to most cases in the study group. The application of preoperative oncological treatment can allow the conversion of selected cases to conservative surgery.

The most used surgical technique was Madden modified radical mastectomy, being the technique of choice in locally advanced breast cancer, with a high success rate and low risk of recurrence.

Conservative surgery is the treatment of choice in early breast cancer, being considered a safe alternative to radical mastectomy, with similar survival rates and good aesthetic outcomes. The selection of patients for this type of intervention is based on the evaluation of clinical, imaging, anatomopathological elements but also on the surgeon's experience.

Postoperative complications were recorded in a small number of cases, the most common being prolonged lymphorrhagia. Much rarer were local wound infection, hematoma and axillary lymphocele.

Madden mastectomy is more commonly associated with immediate postoperative complications as opposed to conservative surgery where their incidence is low.

REFERENCES

1. http://www.who.int/cancer/prevention/diagnosis-screening/breast-cancer/en/. Accessed on 15.12.2019.
2. Blidaru A, Bordea CI, Plesca M, Radu M. Compendiu de specialități medico-chirurgicale/ Stoica V, Scripcariu V. Editura Medicală, ISBN 978-973-39-0804-3, București. 2016;2:273,
3. Rostas JW, Dyess DL. Current Operative Management of Breast Cancer: An Age of Smaller Resections and Bigger Cures. Published online 2011 Dec 18. doi: 10.1155/2012/516417. [PubMed].
4. Franceschini G, Sanchez AM, Leone AD, Magno S, Moschella F, Accetta C, Natale M, Giorgio DD, Scaldaferri A, D'Archi S, Scardina L, Masetti R. Update on the Surgical Management of Breast Cancer. Ann Ital Chir. Mar-Apr 2015;86(2):89-99. [PubMed]
5. White J, Achuthan R, Turton P, Lansdown M. Breast Conservation Surgery: State of the Art. Volume 2011, Article ID 107981. [International journal of breast cancer]
6. Popescu I, Petelcu G, Ionescu M, Lesaru M, Anghel R, Minea N, Oprea L, Median D, Tratat de Chirurgie, Vol. 8, Partea 1: Chirurgie generală, ISBN-978-973-27-1679-3, Editura Academiei Române; 2008. p. 792-793.
7. Rummel S, Hueman MT, Costantino N, Shriver CD, Ellsworth RE. Tumour location within the breast: Does tumour site have prognostic ability? Published online 2015 Jul 13. doi: 10.3332/ecancer.2015.552. [PubMed]
8. Sharma N, Narayan S, Sharma R, Kapoor A, Kumar N, Nirban R. Association of comorbidities with breast cancer: An observational study. Date of Web Publication 5-Jul-2016. DOI: 10.4103/1119-0388.185449.
9. Franceschini G, Leone AD, Natale M, Sanchez MA, Masett R. Conservative Surgery After Neoadjuvant Chemotherapy in Patients With Operable Breast Cancer. Ann Ital Chir. 2018;89:290. [PubMed]
10. Masood S. Neoadjuvant chemotherapy in breast cancers. Published online 2015 Sep 1. doi: 10.1177/1745505716677139. [PubMed
11. http://chirurgiagenerala.ro/02.003_Biopsia.htm. Accessed on 28.12.2018.
12. Dahabreh IJ, Wieland LS, Adam GP, et al. Core Needle and Open Surgical Biopsy for Diagnosis of Breast Lesions: An Update to the 2009 Report. Comparative Effectiveness Reviews, No. 139. [PubMed].
13. Chen Z, Xu Y, Shu J, Xu N. Breast-conserving surgery versus modified radical mastectomy in treatment of early stage breast cancer: A retrospective study of 107 cases. Date of Web Publication 31-Aug-2015. DOI: 10.4103/0973-1482.163835.
14. Kuwajerwala NK, Washburn BJ, Widders KL, Badwe RA. Modified Radical Mastectomy. [Medscape].
15. Rocco N, Rispoli C, Pagano G, Rengo G, Compagna R, Danzi M, Accurso A, Amato B. Breast cancer surgery in elderly patients: postoperative complications and survival. Published online 2013 Oct 8. doi: 10.1186/1471-2482-13-S2-S25. [PubMed].
16. Vishwakarma M, Sahani IS. Comparative study of complications of modified radical mastectomy and breast conservation therapy in early invasive breast cancer. International Journal of Surgery Science. 2019; 3(1): 01-03. DOI: 10.33545/surgery.2019.v3.i1a.01.