

# Influence of pandemic COVID 19 on breast cancer treatment: one center experience

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## Abstract

**Background:** Global worldwide COVID19 has become a pandemic disease-causing severe chest infection affecting people of different ages, mostly elderly with immunocompromised disease leading to unexpected death.

Well known that breast cancer is the most common cancer disease. As a result of early breast screening awareness, which enables immediate therapy once diagnosed, but due to the COVID19 outbreak limitations, and restrictions should be considered. So far, international protocols and guidelines and vaccination have been submitted to be followed during management phases, to decrease the risk of infection and mortality per (WHO).

**Aim:** Strategies of COVID19 risk assessment levels during managing breast cancer: using hospital facility and precautions, giving ways to formulate safe Multidisciplinary team (MDT) discussions; to overcome the spread of COVID19 among breast cancer patients.

**Methodology:** Case series, descriptive retrospective, study of 9 female patients aged ( 45- 69 ) years old from February 2020 till may 2021.

**Results:** We found no transmission of the virus disease in any of our patients during the preoperative, intraoperative, and postoperative periods. In a world overshadowed by the COVID19 pandemic, where many lay stranded awaiting their treatments, we highlight the safety of performing elective surgeries in patients during the pandemic.

**Conclusion:** The best method of reducing the risk of this infection among health care workers and breast cancer patients are to follow infection control prevention teams with setting up precautionary measures in their facilities to advocate higher standard care of treatment

**Abbreviations:** COVID 19: Corona Virus 2; MDT: Multidisciplinary Team; PCR: Nasopharyngeal Swab; PPE: Personal Protective Equipment; WLE: Wide Local Excision; SLNB: Sentinel Lymph Node Biopsy; F: Female; AF: Atrial Fibrillation; CAD: Coronary Artery Disease; EF: Ejection Friction; CXR: Chemotherapy; RX: Radiation Therapy; neoCXR: Neoadjuvant Chemotherapy; CDC: Chinese Center For Disease Control And Prevention; FNAC: Fine Needle Aspiration Cytology; CT: Computerized Tomography; LN: Lymph Node; MRI: Magnetic Resonance Imaging; WHO: World Health Organization; ER: Estrogen Receptor; PR: Progesterone Receptor; Her2/neu: Human Epidermal Growth Factor Receptor 2; UOQ: Upper Outer Quadrant; LOQ: Left Outer Quadrant; IUQ: Inner Upper Quadrant; : ve - Negative; Us: Ultrasound Breast

## Introduction

At the end of 2019, WHO declared a pandemic; caused by a novel COVID19 virus, identified by the Chinese center for disease control and prevention (CDC), proven by multiple throat swabs in January 2020 respiratory syndrome. The outbreak had originated from China and had an easy predilection for community spread [1,2].

The disease had a severe presentation in patients who were elderly, with co-morbidities like diabetes mellitus, and immunosuppressed individuals, mostly; oncology patients [3,4]. With this mindset, it has become imperative to categorize and prioritize patients with breast pathology, needing surgical treatments according to hospital facility and utilization.

During the outbreak of global pandemic disease, categorizing patients with breast cancer disease; was done to identify vulnerable high-risk groups concerning breast-related conditions. Several protocols have been suggested to ease surgical patients' treatment while avoiding unnecessary exposure to the pandemic virus.

Although prioritization urges the challenge of clinicians and medicine to help patients, where American College of Breast Surgeons and the American College of Surgeons have recently published phases that change the long-standing patterns of care [5].

Since breast pathology and surgery does not carry any healthcare worker risk of transmission of the COVID19 virus, there was no need to avoid treating such patients. Instead, a planned approach needed to be put in place to identify plan and execute the necessary treatment for such patients, especially breast carcinoma.

## Methods and materials

A retrospective descriptive case series study was conducted based on breast surgery clinic patients flow at our centre, from February 2020

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till May 2021. We would like to present how breast cancer surgeries were categorized with proper COVID19 protocols and standard cancer care.

**Ethical consideration**

This study was approved from hospital research center as well as, signed consent from patients were obtained.

**Results**

The study was conducted on 9 patients; the ages were between 45 and 69 years; all were females, who have been presented to our breast surgical clinic during the period of COVID19 pandemic, with unilateral breast mass as About 66% of them have hypertension, Diabetes mellitus, and dyslipidemia. Only 1(11.1%) has face basal cell carcinoma. Only 2(22.2%) used to take oral contraceptive pills. All of them have early menarche, and no one of them has late pregnancy. All the cases have low COVID 19 risk assessment and negative PCR swab. 6(66%) of the cases had WLE & SLNB surgery,1(11.1%) had simple mastectomy and SLNB. 6 months to one year were the duration of the follow up for 5(55.5%) cases, while 1 (11.1%) of them done last month, 1 (11.1%) still waiting for neo adjuvant chemotherapy,1(11.1%) case refused the surgery due to EF 15%, 1(11.1) case preferred to do the procedure in oncology center ,1(11.1%) preferred to travel aboard. All 6 cases were in the pT1-2 N0 M0 stage. See (Table 1).

Risk stratification of COVID19 assessment prior to work up and surgery was shown in (Figure 1).

**Case 1**

**History:** 69 years old female known case of DM and hyperlipidemia referred to the breast clinic with the incidental finding from Health Center after breast screening with mammography revealed; a malignant

cluster of microcalcification in the left breast complaining of mild left breast pain and no other associated symptoms.

On examination, found to have supra-areolar left breast mass 2 x 2 cm, irregular, lobulated, not fixed, no pitting edema, no tethering with no axillary lymph node (LN); other breast and axilla were unremarkable.

**Imaging:** mammogram and ultrasound breast (Us) requested were found with left upper quadrant suspicious mass at 11 o'clock 2 x1.5 cm irregular, tiny calcification; no axillary LN found (Figure 2).

**Core biopsy:** showed Invasive Ductal Carcinoma Grade III, immunohistochemistry stains with ER: -ve, PR: -ve, Her2/neu: negative, Ki-67:20% proliferation index, FNAC of axillary LN showed negative for malignancy.

**Staging workup:** patient forwarded to CT chest, abdomen, and pelvis which revealed: Left breast features of malignancy, thyroid nodules, where U/S done and found small nodules for FNAC and came with colloid goiter,

Pulmonary soft tissue nodule12-month interval CT follow up is recommended.

Hepatic cysts for a 2nd look by ultrasound abdomen, which shows the same finding.

**Plan:** The virtual tumor board discussion was performed and planned for left WLE & SLNB followed by chemotherapy and radiation.

**Surgery:** Left WLE & SLNB ,5 lymph nodes sent for frozen section and came with negative for metastasis

Final histopathology: Left breast: Grade 3 invasive ductal carcinoma, NOS, measuring 2.6cm in maximum dimension, excision complete, SLNB: negative (0/5) Pathological staging TNM: pT2 N0 M0

**Table 1.** Demographic data of breast cancer patients.

Cases	1	2	3	4	5	6	7	8	9
Age	69	45	62	56	53	69			
Gender	F	F	F	F	F	F	F	F	F
Co-morbidity (HTN)	Yes	Yes	No	No	Yes	Yes	No	No	No
(DM)	Yes	Yes	No	No	Yes	Yes	No	No	No
Dyslipidemia	Yes	Yes	No	No	Yes	Yes	No	No	No
face basal cell ca	No	No	No	No	Yes	No	No	No	No
AF,CAD,EF 15%	No	No	No	No	No	Yes	NO	No	No
Risk factors									
1.menupausal status	Post	Post	Post	Post	Post	Post	Post	Post	Post
2.FH of cancer	Uterine ca	-ve	-ve	-ve	-ve	Breast ca	No	No	No
3.OCP	Yes	No	No	No	yes	No	No	No	No
4.late pregnancy	No	No	No	No	No	No	No	No	No
5.early menarche	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6.alcohol and smoking	No	No	No	No	No	No	No	No	No
COVID 19 risk	Low	Low	low	low	low	low	low	low	low
PCR swab	-ve	-ve	-ve	-ve	-ve	-ve	-ve	Pending surgery	Travel abroad
Hospital stay days)	1	1	1	1	After chemo	Not done	1	-	Travel abroad
Surgery	WLE &SLNB	WLE &SLNB	WLE &SLNB	WLE &SLNB	Lost followup	refused	WLE&SLNB	NACT	Travel abroad
Follow up (days/weeks/months/year)	2/2/3/1	2/2/1-6	2/2/3/1	2/2/3/1	Lost follow up	3m-1 y	2	-	-
Stage of cancer	pT2 N0 M0	pT2N0M0	pT1N0M0	pT1N0M0	T2N0M0	T2N0M0	T1N0M0	-	-
Adjuvant therapy	CTX +RT	CTX+RT	RT+ hormonal (femara)	CTX+RT	neoCTX+RT	Hormonl (Femara)	CTX RX hormonal	-	-
recurrence	No	Yes	NO	NO	Lost follow up	NO	NO	-	-
COVID 19 vaccine	Yes	NO	Yes	Yes	Lost follow up	Yes	Yes	Yes	-
COVID 19 symptoms	NO	NO	NO	NO	Lost follow up	NO	NO	NO	-

### Pre- Op and Pre-Admission Risk Assessment

- The following risk assessment is to be done by primary team at least 3 days prior to admission for any booked admission (Surgical and Non-surgical)
- Contact COVID19 team directly with patient details for further evaluation and screening: if deemed necessary or any of the below risks are ticked.
- The same list should be used as well for other un planned admissions.
- Risk factors as (Age > 65, chronic co-morbidities, Pregnancy, or immune-compromised state) should be taken into account to lower threshold of risk assessment of symptoms, but are not solely indications for testing pre-operatively.
- Please document assessment in patient electronic chart.

Risk point		Comments
Fever	<input type="radio"/>	
Cough	<input type="radio"/>	
Shortness of Breath	<input type="radio"/>	
Any Other URT symptoms (sore throat, runny nose, Anosmia)	<input type="radio"/>	
Other symptoms of concern ( GI symptms : Diarrhea, new onset headache , Myalgia)	<input type="radio"/>	
Travel in the past 28 days, or h/o contact With a returning traveler	<input type="radio"/>	
Contact with a confirmed or suspected COVID19 case in the past 28 days	<input type="radio"/>	
Recent visit or admission to any other healthcare facility	<input type="radio"/>	
Working in any healthcare facility (That includes COVID19 facilities)	<input type="radio"/>	
Living in an overcrowded accommodation	<input type="radio"/>	

Figure 1. COVID19 risk assessment.

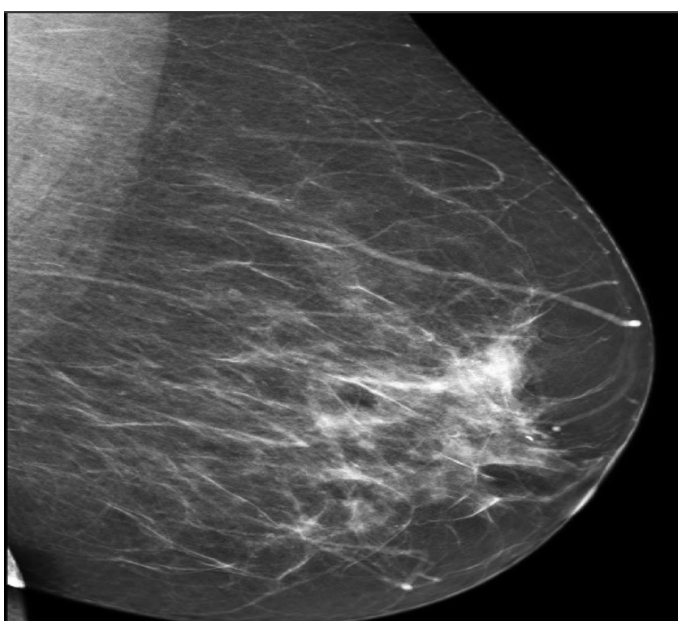


Figure 2. Micro calcification of left breast indicate invasive ductal carcinoma of breast.

**Follow up:** Over 1 year per virtual tumor board discussion she finished her adjuvant chemotherapy and radiation resulted with no recurrence proved by imaging at oncology center, she had mild dizziness after therapy, although she had COVID19 vaccine after approval of oncology center with no symptoms of corona virus.

#### Case 2

**History:** 45 years old female known case of DM, hyperlipidemia, HTN, presented to breast clinic from Health Center with asymptomatic mass, was discovered one week back in the left breast; she comes with ultrasound breast form outside shows mass at left outer quadrant 1 cm most likely fibroadenoma.

On examination, found to have 1 x 1 cm mass at the left axillary tail, no skin changed, normal nipple, no axillary LN felt, right breast and axillary LN normal.

**Imaging:** mammogram image found small oval dense lesion about 2x1.8cm, is seen at the UOQ left breast, likely benign cyst or fibroadenoma, free axillary LN.

Us breast found irregular heterogeneous soft tissue mass lesion about 2.3 x 1.8 cm is seen in the left axillary tail, with surrounding tissue edema.

**Core biopsy:** showed left invasive ductal carcinoma grade 3, immunohistochemistry stains were: ER- 3/8 (Allred score), PR - 3/8 (Allred score), her2neu: negative, ki67:40% proliferation index.

FNAC of left axillary LN showed negative for malignancy,

Staging workup patient forwarded to CT chest, abdomen, and pelvis which revealed negative for metastasis. Due to discrepancy between pathology, and imaging we requested MRI breast for confirmation, where it came with heterogeneously enhanced lesion about 2.5 x 2.2 cm is seen in the left axillary tail with surrounding architectural distortion, and tissue edema, with axillary abnormal LN.

**Plan:** Virtual tumor board discussion was performed, and planned for left WLE & SLNB followed by chemotherapy and radiation.

**Surgery:** she underwent left WLE and SLNB, 3 LN sent for frozen section and came with positive for metastasis so converted to formal axillary LN dissection

**Final histopathology:** Left breast, -Grade 3, invasive atypical medullary carcinoma (Nos) measuring 2.2cm in maximum dimension. Excision complete.

Axillary lymph node: No lymph node metastasis (0/8)

Pathological staging TNM: pT2N0M0

**Follow up:** After one month of her surgery, she had sign of cellulitis on operated site improved with oral antibiotics, per tumor board plan she had to complete her adjuvant chemotherapy and radiation.

later, after 6 months of operation she presented with enlargement of left breast, edema, peau d'orange appearance and retracted nipple. Urgently US and MRI breast done shows retro areolar recurrence mass about 6 cm with suspicious axillary lymph node. Again, core biopsy and staging work up requested, shows recurrence of the disease but no metastasis (Figure 3 and Figure 4).

She had followed with her oncologist and started on new regimen chemotherapy and immunosuppressant for 2 months resulted in good response. She did not receive any COVID 19 vaccine until now but no symptoms corona virus.



Figure 3: CT scan indicate recurrence of left breast cancer.



Figure 4: Recurrence of breast cancer after 6 months.

### Case 3

**History:** 62 years old female, referred to breast clinic from Health Center has not been screened for long time came with new outside image of mammogram shows opacity having suspicious features UOQ 1.5 cm by 1.8 cm, and Us showed 1.7cm by 0.9 cm at 2 o'clock suspicious irregular left side mass, axillary lymph node 1.3 cm, bilateral breast cyst.

On examination no lump felt at left side, no axillary LN, no skin changes, right breast and axilla were normal.

**Imaging:** mammogram image found dense opacity at LOQ lobulated with irregular border 1.1 cm x 1.8 cm. Us breast found 1.7 x 1 x 0.9 cm suspicious irregular nodule at 2 o'clock LOQ, left axillary LN 1.4 cm, bilateral fibrocystic changes.

**Core biopsy:** showed left grade 2 invasive ductal carcinoma, immunohistochemistry stains were: ER- 8/8 (allred score), PR - 7/8 (allred score), her2neu: negative, ki67 = 10-12% proliferation index, FNAC of left axillary LN shows negative for malignancy

**Staging workup:** patient forwarded to CT chest, abdomen, and pelvis which revealed negative for metastasis.

**plan:** Virtual tumor board discussion planned for left WLE & SLNB followed by radiation and hormonal therapy.

**Surgery:** Left WLE and SLNB, 2 lymph nodes sent for frozen section and came with negative for metastasis

**Final histopathology:** Invasive ductal carcinoma, Grade 1; All margins are free. no (sentinel) LN metastasis (0/2)

Pathological staging TNM: pT1 N0 M0

**Follow up:** over 1 year per tumor board she finished her radiation and now on hormonal therapy resulted with no recurrence proved by imaging, in addition she had COVID 19 vaccine after approval of oncology center with no corona virus symptoms.

#### Case 4

**History:** 56years old female, referred to breast clinic with left side painful breast mass for 1-month with no risk factors.

**On examination:** left mass at 10 o'clock IUQ 1 by 2 cm, no tethering, no nipple changes, no inflammation, LN not identified, right breast, and axilla was unremarkable.

**Imaging:** mammogram image found a speculated density in the left breast, bilateral axillary LN looks benign, Us breast shows irregular heterogenous vertically oriented suspicious mass about 1.7 x 1.5 cm is seen in the left breast at 10 o'clock position corresponding to the speculated mass seen in mammogram.

**Core biopsy:** showed left invasive ductal carcinoma grade 3, immunohistochemistry stains were: ER- 0/8 (allred score), PR - 0/8 (allred score), her2neu: negative, ki67 = 80% proliferation index, FNAC of left axillary LN shows negative for malignancy.

**Staging workup:** patient forwarded to CT chest, abdomen, and pelvis which revealed negative for metastasis.

**plan:** Virtual tumor board discussion planned for left WLE & SLNB followed with chemotherapy and radiation.

**Surgery:** Left WLE and SLNB, 2 lymph nodes sent for frozen section and came with negative for metastasis

**Final histopathology:** Left breast: Invasive ductal carcinoma, NOS, 1.6 cm in maximum dimension. Excision complete. left axillary LN: -No lymph node (sentinel) metastasis (0/2)

Pathological staging TNM: pT1cN0M0

**Follow up:** over 10 months per tumor board she finished her adjuvant chemotherapy and radiation with no recurrence. In addition, she had COVID19 vaccine after approval of oncology center with no corona virus symptoms.

#### Case 5

**History:** 53 years old female known case of DM, Hyperlipidemia, Basal cell carcinoma of face, presented to breast clinic with a complain of left breast mass in the last 2 weeks, no other complains, no risk factors.

**On examination:** left breast mass at outer quadrant at 10 o'clock 2 by 3 cm, hard, no tethering, no edema, no muscle attachment, no axillary LN, right breast, and axilla were normal.

**Imaging:** mammogram image found dense mass with surrounding speculations is seen in the left breast UOQ with surrounding architectural distortion. Us breast, a partially defined irregular mass about 3.1 x 2 cm is seen in the left breast UOQ, with increased vascularity and surrounding architectural distortion, with normal Left axillary LN.

**Core biopsy:** showed left invasive ductal carcinoma grade 3, immunohistochemistry stains were: ER- 0/8 (allred score), PR - 0/8 (allred score), her2neu = negative (0+), ki67 = 75% proliferation index, FNAC of left axillary LN shows negative for malignancy

**Staging workup:** patient forwarded to CT chest, abdomen, and pelvis which revealed negative for metastasis.

**plan:** Virtual tumorboard discussion planned for neochemotherapy; prior to clipping marker at site of tumor, then waiting for WLE and SLNB followed by radiation.

**Follow up:** patient preferred to do surgery and complete her treatment in oncology center.

#### Case 6

**History:** 69 years old female know case of DM, Hyperlipidemia, CAD, AF, EF 15% presented to breast clinic complain of Left breast pain for 10 days, no nipple discharge, no other symptoms

On examination found to have left breast lump at 2 o'clock with skin tethering attached to skin, no axillary LN, other breast was unremarkable.

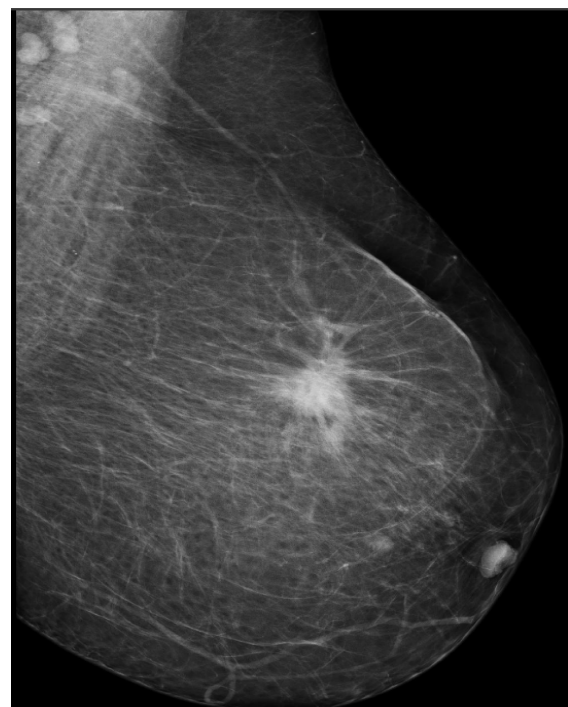
**Imaging:** mammogram image found ill-defined irregular speculated mass lesion with overlying skin dimpling is seen in the left breast UOQ consistent with malignancy, left nipple retraction is noted, left axillary LN noted, Us breast found irregular ill-defined hypochoic speculated mass is seen in the left breast 1-2 o'clock position measuring about 3.1 x 2.5 x 1.9 cm with posterior shadowing (Figure 5).

**Core biopsy:** showed left invasive lobular carcinoma grade 2, immunohistochemistry stains were: ER- 8/8 (allred score), PR - 7/8 (allred score), her2neu: negative, ki67 :10-15% proliferation index, FNAC of left axillary LN shows negative for malignancy.

**Staging workup:** patient forwarded to CT chest, abdomen, and pelvis which revealed negative for metastasis.

**Plan:** Virtual tumor board discussion planned for left WLE & SLNB, but patient due to her EF 15% she refused to go for surgery, so she preferred to have hormonal therapy which have been agreed by the tumor board council.

**Follow up:** Patient was seen at breast clinic once after hormonal therapy (femara 2.5 mg) once daily every 3 months for one year to see the effect of therapy where is shows good progress. In addition, she had COVID 19 vaccine after approval of oncology center with no corona virus symptoms felt.



## Case 7

**History:** 57-year-old female medically free had breast mass for 9 months, no previous screening, had family history of lung cancer and leukemia (first degree line relative), no other risk factors.

**On examination:** right breast mass less than 1 cm, 4 cm away from the nipple, mobile, not attached to skin, no tethering, no nipple retraction, no axillary lymph node, other breast, and axilla normal.

**Imaging:** Mammogram shows right sided UOQ asymmetric density is seen, a linear asymmetric density is seen in the left breast at 12 o'clock. Bilateral possibly benign calcifications, more evident on the right UOQ. Skin and both nipples are unremarkable. Bilateral axillary lymph nodes.

Us breast an irregular mass about 5 x 6 x 6 mm is seen in the right breast UOQ with bright halo of compressed tissues. right axillary nodes show altered echogenicity, compressed hilum and relatively thickened cortex.

**Core biopsy:** Right breast biopsy showing invasive mucinous carcinoma, grade 2.

No DCIS, LVI or micro calcification seen. The tumor shows the following immunoprofile: ER - 8/8 (Allred score), PR - 0/8 (Allred score), Her2/neu - Negative (0+), E-cadherin - Strong positive, Ki67 - 5% proliferation index. FNAC of right axillary lymph node are negative for metastasis.

**Staging workup:** patient forwarded to CT chest, abdomen, and pelvis shows Right upper lobe posterior segment pulmonary parenchymal soft tissue nodule, 2.7 mm for follow up.

No evidence of gross soft tissue or bony suspicious lesions. Bone scan shows focal increase uptake in relation to the left sided junction of the third rib with transverse process due to underlying degeneration.

**plan:** Virtual tumor board discussion planned for right WLE & SLNB followed by chemotherapy and radiation and hormonal therapy.

**Surgery:** right WLE & SLNB, 4 lymph nodes sent for frozen section and 2 lymph nodes came with metastatic cancer, so formal axillary lymph node dissection performed

Pathological staging NM: pT1 N1M0

**Follow up:** she just finished her surgery and waiting for tumor board council plan, although she had COVID19 vaccine prior to awareness of breast cancer but no corona virus symptoms.

## Case 8

**History:** 59 old female known case of diabetes mellitus, positive family history of breast cancer (first degree relative), dyslipidemia, asthma, came with screening from health center since 2018 by mammogram with asymmetry of breast mass done but patient not notified until she had mass at RUQ while self-examination.

**On examination:** right breast mass 3 x 4 cm, 2 cm away from the nipple, mobile, not attached to skin, no tethering, no nipple retraction, no axillary lymph node, other breast and axilla normal.

**Imaging:** Mammogram an asymmetric density is seen in the right breast UOQ.

No suspicious micro calcifications noted as per visualized through dense breast tissue. Right axillary dense nodes with thickened cortex.

Us breast shows an irregular micro lobulated heterogeneous mass about 2.1 x 1.8 x 1.5 cm is seen in the right breast at 9-10 o'clock position with prominent vascularity. Enlarged right axillary lymph node with effaced hilum and thickened cortex is seen.

**Core biopsy:** Right breast biopsy showing a grade 2 invasive ductal carcinoma (NOS).

No DCIS, LVI or micro calcification seen. The tumor shows the following immunoprofile: ER - 8/8 (Allred score), PR - 8/8 (Allred score), Her2/neu - Positive (3+), E-cadherin - Strong positive, Ki67 - 80% proliferation index. FNAC of right axillary LN are positive for metastatic cancer.

**Staging workup:** patient forwarded to CT chest, abdomen, and pelvis shows right lower lobe posterior pulmonary soft tissue nodule measuring 3.5 mm for follow-up. Bone scan shows no bony metastasis.

**plan:** Virtual tumor board discussion planned for clipping of tumor prior to neo adjuvant chemotherapy under radiological guidance then to follow again for further treatment, she already had COVID19 vaccine prior to breast cancer awareness with no corona virus symptoms.

## Case 9

**History:** Presented to gynae clinic for screening and complained of right breast mass for few months so mammogram done at that time.

**On examination:** Right breast mass at 6 o'clock, skin tethering, 4 x3cm, not attached to muscle, mobile, no nipple retraction. No AXLN felt.

**Imaging:** Mammogram dense breast, right inner deep part architectural distortion, bilateral scattered micro calcification needs MRI, benign axillary lymph node US breast showed dense breast and bilateral fibrocystic changes, right irregular heterogenous mass 3.3x 1.6 cm at 5 o'clock.

**Core biopsy:** Right Grade 2 invasive ductal carcinoma, no DCIS, No micro calcification, no lymph vascular invasion, supplementary Report: ER - 7/8 (Allred score), PR - 0/8 (Allred score), Her2/neu = score(3+) positive, Ki67 = 30% proliferation index, E - cadherin strong positive.

**Staging workup:** CT chest, abdomen and pelvis and bone scan shows no metastasis, MRI breast confirmed right solitary breast cancer pathology, bilateral multiple fibrocystic changes as Us findings.

**plan:** Virtual tumor board discussion planned for surgery and followed by adjuvant therapy, but patient want to travel abroad.

## Discussion

These were the first cases of breast cancer disease during pandemic in our hospital, at that time the administration of the infectious control team tried to minimize and limit the workload towards the spread of the pandemic in our country. However, the guidelines and policies that have been established, the breast cancer cases needed active treatment and eventually all patients with low immunity, feasibility, vulnerability, and safety had successful surgeries, and negative symptoms of COVID19 among their treatment.

Under control of our policy and hospital sources, we categorized the priority of the patients that needed urgent treatment as shown in (Figure 6), during that period we have traced breast cancer cases electronically, and through phone consultation to complete their triple assessment 'history - examination, imaging (mammogram and ultrasound breast) & core biopsy'.

From thereon, if the patient is a case of “benign disease” they will be followed with phone consultation after 3 months and further treatment if needed, on the other hand if the patient is diagnosed with “malignancy” will be brought to clinic for exact history ,examination and staging workup, (CT chest, abdomen and pelvis and bone scan) with all precautions methods , then a virtual tumor board will be conducted to facilitate the treatment of patient.

Two days prior to the admission, COVID19 risk assessment will be conducted by The Infectious Control Team at the COVID19 clinic (Figure 7), if the score of the risk assessment results as “low”, and the nasopharyngeal swab showed “target not detected”, then the patient will be admitted at the ward with full precaution, and personal protective equipment (PPE) was performed from time of admission till discharged.

At the time of surgical procedure all health workers including surgeons, assistants, anaesthetists, circulating nurses, and scrubbed nurses were wearing (PPE) preoperative from holding bay till recovery stage resulted in a successful free COVID19 infectious surgeries to those immunocompromised patients and predictive high-risk factors.

Later, the postoperative patient starts follow-up stage at breast surgical clinic after few days; for evaluation of wound scar, removal of drain and continue intervals of 2 weeks to monthly and one year by “phone consultation” to trace any complaint or complication or symptoms of COVID19.

Finally, the postoperative histopathology report per hospital policy will be discussed by the tumor board to decide the adjuvant therapy (chemotherapy, radiotherapy, hormonal therapy) to approach the high standard cancer care.

In all 9 study cases they were diagnosed to have early breast cancer as mentioned but according to American association of breast cancer they were categorized as phase I, which is integrated to be challenging stage in time of COVID19, that can wait for 3 months but under all preventive measures they have successful treatment and care [6].

American College of Breast Surgeons and the American College of Surgeons established phases to treat breast cancer which includes Phase 1 includes patients who can wait for 3 months as its not will affect their survival rate. It includes early breast cancer (Stage 1 or 2 ER-positive breast cancer), those who are finishing neoadjuvant chemotherapy course, and some with triple negative breast cancers. also, who are receiving neoadjuvant anti-estrogen medicine to provide treatment for the cancer. Phase II is patients with threaten survival need few days to do the surgery. These situations include someone with a breast abscess or experiencing serious complications from previous surgery, including breast reconstruction. Phase III means patients who could die within a few hours without surgery (this is a most unlikely scenario).

Recommendation to perform surgery according to American College of Surgeons includes the following: those who are on

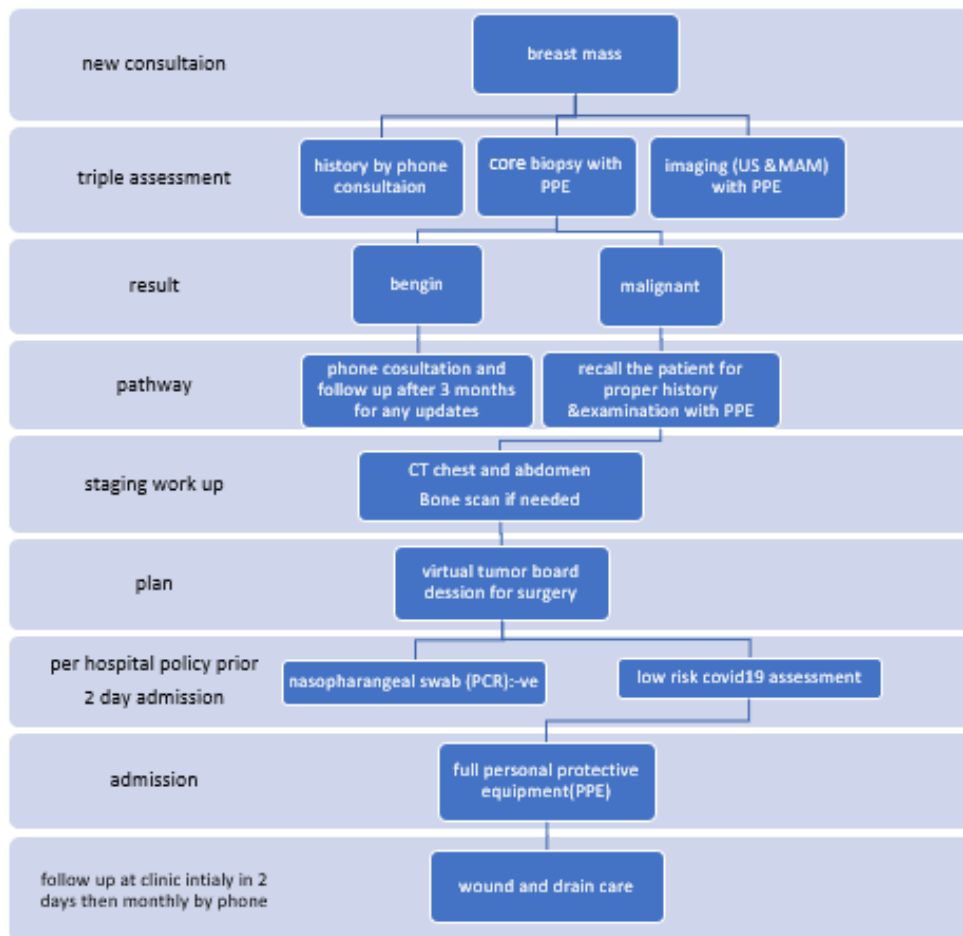


Figure 6: Sequale of breast mass assessment in breast clinic.

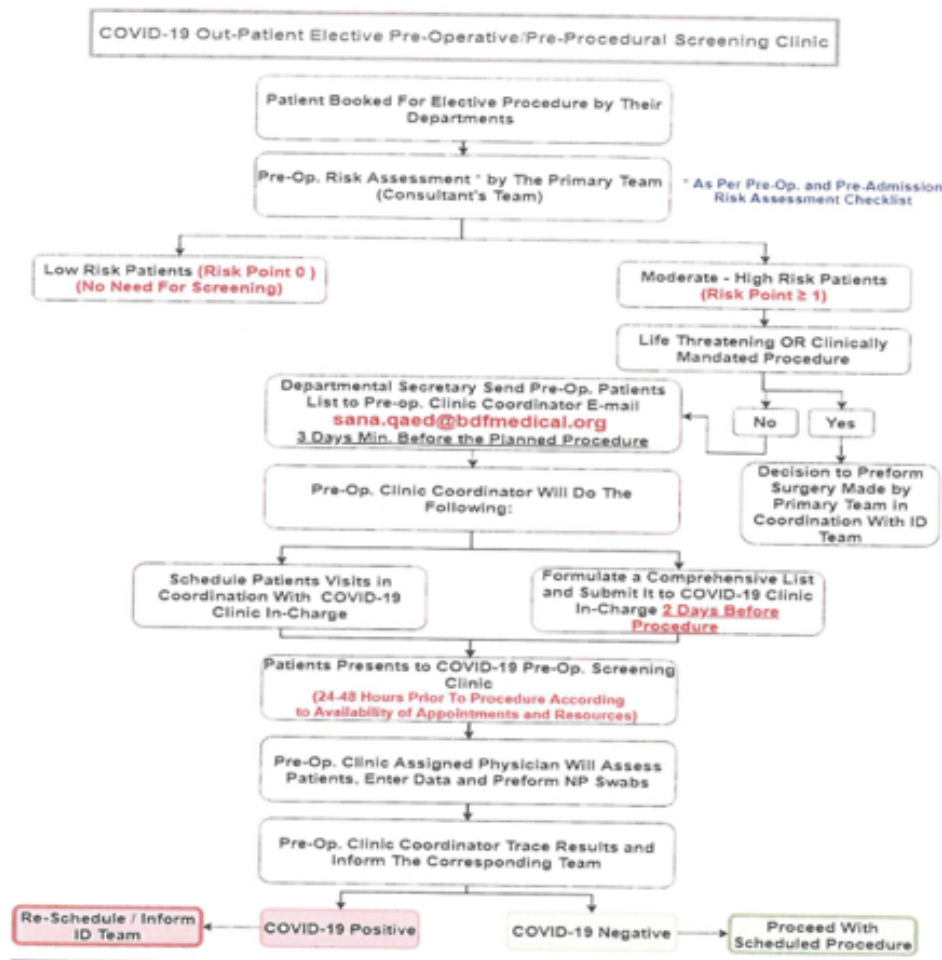


Figure 7: Algorithm of patient at COVID19 clinic.

chemotherapy therapy, people diagnosed with hormone-receptor-positive, HER2-negative cancer with certain characteristics(luminal classification), anyone diagnosed with triple-negative or HER2-positive disease due to aggressive disease , people who had a breast lump and there is discrepancy between radiology and pathology, although all of these indications applied to our patients.

In comparison with international studies, the lesson learned is that cancer cases need more detailed information, and manners to change in protocols; to adapt in elective, and emergency cases. This needs cooperation and integration between international society.

The SARS-CoV-2 outbreak is the first viral pandemic disease challenges oncology team members during lockdown worldwide. Challenging and modification of guidelines made the clinician think regarding the ways of treatment and protocols to change. Multiple societies had modified their protocols to bring the best outcome for oncological patients as ESMO, ASCO, NCCN [7–11].

The challenge in categorizing the appropriate patients for breast cancer surgery lies between providing the best outcomes and reconstruction (where breast conservation is guided by the extent of involvement). Also risking, young or vulnerable groups to general

anesthesia, hospital environment, or similar circumstances where they may be innocent victims of exposure and disease. It becomes imperative to decide if breast cancer surgery needs to be performed with imminent urgency, or can be delayed for additional therapy, or safety of patient alone to avoid the pandemic exposure.

COVID-19 vaccination programme being rolled out across the world, different wide variety types have been introduced to give higher immune response. As breast cancer is the most commonly malignant neoplasm, it is important to encourage vaccination to reduce COVID-19-associated mortality specially among oncologic patients and higher risk of severe illness [12-14].

### Conclusion

COVID-19 pandemic has shaken the healthcare system and affected non-covid individuals in not receiving their deserved treatment in priority. We applied planned protocols in accordance with the hospital's directive and conducted safe breast cancer surgery; in patients awaiting such treatment, although vaccination was encouraged. Thereby resulted in providing an uneventful outcome, vulnerable and safe measures in their path toward standard breast cancer care.



## Statement of Ethics

This study was supported and granted by National COVID19 Research Team (CRT-COVID2020-078) at Bahrain Defense Force Hospital -Royal Medical Service, all patients have been informed also written consent signed.

## Author Contributions

Dr. Noora Al Moosa contributed to the idea and data collection, and implantation of writing and editing of the manuscript.

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