Chinese Society of Breast Surgery (CSBrS) Practice Guideline 2022

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Background: The Chinese Society of Breast Surgery (CSBrS) Practice Guideline 2021 was published nearly one year ago. The new guideline was revised based on comprehensive feedback of the previous publication. The aim is to provide a better reference suitable for Chinese breast surgeons.

Methods: Referred to GRADE (Grading of Recommendations Assessment, Development and Evaluation) system, evidences accepted by the Guideline were classified into four categories: I, II, III and IV, which reflected the reliability of the evidences quantitatively. The guideline also comprehensively considered the accessibility of the guideline in clinical practice in China and gave recommendations with different strengths.

Results: The guideline emphasized the basic idea that a curative surgical approach falls under the category of radical tumor surgery. Six chapters, including "Diagnosis and treatment of patients with invasive breast cancer", "Sentinel lymph node biopsy in patients with early-stage breast cancer", "Breast-conserving surgery in patients with early-stage breast cancer", "Modified radical mastectomy of breast cancer", "Central venous access for the systemic treatment of breast cancer", and "Breast cancer in pregnancy and postpartum breast cancer" were revised.

Conclusions: Compared with the 2021 edition, the new guideline has been revised in six chapters based on the latest research evidence and clinical needs.

Keywords: Breast surgery; clinical guideline; GRADE system

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Introduction

The Chinese Society of Breast Surgery (CSBrS) Practice Guideline 2021 was published nearly one year ago. The Writing Committee has completed the compilation of the 2022 guideline based on comprehensive feedback of the previous publication. The 2022 guideline continues to refer to the GRADE (Grading of Recommendations, Assessment, Development and Evaluation) system for the level of evidence, emphasizing the basic idea that a curative surgical approach falls under the category of radical tumor surgery. The guideline focuses on the basic definition of tumor radical surgery in four chapters: "Diagnosis and treatment of patients with invasive breast cancer", "Sentinel lymph node biopsy in patients with early-stage breast cancer", "Breast-conserving surgery in patients with early-stage breast cancer", "Modified radical mastectomy of breast cancer". Meanwhile, according to the latest high-level evidence, some contents of two chapters, "Central venous access for the systemic treatment of breast cancer" and "Breast cancer in pregnancy and postpartum breast cancer", were revised. The Writing Committee will continue to make improvements in light of the latest research evidence and sincerely looks forward to receiving criticism and corrections from peers. The aim of the guideline is to provide a practical reference for Chinese breast surgeons in clinical practice. We present the following article in accordance with the RIGHT reporting checklist (available

at https://tbcr.amegroups.com/article/view/10.21037/tbcr-22-50/rc).

Methods

Level of evidence standard

The level of evidence grading system was developed by referring to the GRADE system combined with findings in clinical studies in China. The levels are classified as Category I, II, III, and IV to quantify the evaluation of the reliability of the evidence by experts on the compiling committees (1). To make these guidelines accessible in clinical practice in China, the expert panel preferentially selected Category I and II evidence, as indicated in the guideline evaluation system.

Highlight box

Key recommendations

- Radical resection of tumor is a major type of surgery for cure, including total mastectomy, breast-conserving surgery, and sentinel lymph node biopsy (SLNB).
- Peripherally inserted central catheter (PICC) are recommended as a method of establishing central venous access, however, implantable intravenous port is still preferred.
- SLNB for breast cancer refers to the surgical excision of SLNs marked by a tracer and their pathological examination to clarify the status of axillary lymph nodes.
- The definition of pregnancy-associated breast cancer has been removed, and breast cancer in pregnancy (BCP) and postpartum breast cancer (PBC) has been defined separately.

What was recommended and what is new?

- Compared with the guideline 2021, the new edition adds the concept of radical resection of tumor, and emphasizes that standard radical mastectomy (Halsted), modified radical mastectomy (Patey, Auchincloss), total mastectomy, ALND, breast-conserving surgery, and SLNB all belong to the category of radical operation.
- Compared with the guideline 2021, the new edition adds PICC as a method of establishing central venous access.
- The concept of SLNB has been added to the new guideline, which emphasizes that SLNB has replaced ALND as the primary strategy for axillary surgery in patients with SLN-negative breast cancer.
- The definition of pregnancy-associated breast cancer referred in the guideline 2021 has been removed, and BCP and PBC has been defined separately.

What is the implication, and what should change now?

- The grading system for breast cancer surgery in China should be reclassified. PICC can be an alternative to establish central venous access for patients who are not suitable for implanting intravenous ports.

Recommendation strength standard

The recommendation strength of these guidelines combines the GRADE system and the characteristics of clinical practice in China, with four influencing factors, namely the level of evidence, health economics, product equivalence, and accessibility. According to the weight for each characteristic, the recommendations were scored individually by the experts who wrote the guidelines, using a grading system. The recommendation strength was as follows: A (strong recommendation), B (weak recommendation), and C (not recommended) (1).

Target audience

Clinicians specializing in breast diseases in China.

Overview of the guideline update

The updates to the 2022 Chinese Society of Breast Surgery Practice Guideline in comparison with the 2021 edition are detailed below.

Invasive breast cancer (2)

Modified recommendations

Surgical treatment of breast cancer has been revised as a 2-part procedure: radical operation of breast cancer and postmastectomy breast reconstruction.

Added recommendations

Radical resection of tumor as a major type of surgery for cure (3) has been proposed. It is further emphasized that total mastectomy, breast-conserving surgery (BCS), and sentinel lymph node biopsy (SLNB) have been widely accepted by clinicians as radical operations for tumor.

Modified recommendations

Among all radical operations, Halsted radical mastectomy and Patey modified radical mastectomy are recommended according to level I evidence and class B recommendations. Auchincloss modified radical mastectomy (modified radical mastectomy), BCS + SLNB, BCS + axillary lymph node dissection (ALND), total mastectomy + SLNB, skin-sparing mastectomy + SLNB, skin-sparing mastectomy + ALND, nipple-sparing mastectomy + SLNB, and nipple-sparing mastectomy + ALND are recommended as combined breast axillary surgery according to level I

evidence and class A recommendations. BCS and total mastectomy are recommended as breast surgery according to level I evidence and class A recommendations. Skin-sparing mastectomy and nipple-sparing mastectomy are recommended as breast surgery according to level II evidence and class A recommendations. Finally, SLNB and ALND are recommended as axillary surgery according to level I evidence and class A recommendations (4-10).

Modified discussions

It has been emphasized that high-level evidence has confirmed Auchincloss modified radical mastectomy, total mastectomy, BCS, and SLNB as meeting the standard of radical operation for breast cancer.

Central venous access for the systemic treatment of breast cancer (11)

Updated guideline headline: The guideline headline has been modified to "Clinical Practice Guidelines on Central Venous Access for Systemic Breast Cancer Treatment".

Added recommendations

- For a peripherally inserted central catheter (PICC) access, the basilic vein is recommended according to level I evidence and class A recommendations, and the median cubital vein, cephalic vein, brachial vein, external jugular vein (saphenous vein, temporal vein, and retroauricular vein for newborns), and femoral vein are recommended according to level II evidence and class B recommendations.
- The internal jugular vein, subclavian vein, and femoral vein are recommended for central venous catheter (CVC) access according to level I evidence and class A recommendations (12,13).
- The lower one-third of the superior vena cava and the junction of the superior vena cava and right atrium are recommended as suitable locations for the tip of the PICC catheter according to level I evidence and class A recommendations (14,15).
- The part between the lower one-third of the inferior superior vena cava and upper one-third of the superior right atrium is recommended as a suitable location for the tip of the CVC according to level II evidence and class A recommendations (16).
- Regarding PICC access maintenance, according to level I evidence and class A Recommendations, the maintenance of PICC should be performed by individuals and/or teams with educational backgrounds in infusion therapy, the dressings should be changed 24 hours after catheter insertion, the dressings should be changed immediately when they become soiled with blood or loosened, the heparin cap should be replaced according to the situation, the sterile transparent dressings and heparin cap should be maintained or changed once every 7 days, the sterile gauze excipients should be changed at least every 2 days, and diluted heparin saline (1–10 U/mL) or preservative-free saline should be used for sealing the tube with a pulsatile positive-pressure maneuver. According to level II evidence and class A recommendations, a 10-mL syringe or disposable special washing device should be used for flushing and tube sealing, and the access should be maintained at least once every week during treatment intervals (17-21).
- Regarding CVC maintenance, level I evidence and class A recommendations support changing the film dressing within 24 hours after venipuncture; carrying out daily disinfection care; changing the dressing immediately when it is contaminated, wet, or loosened; accessing the catheter every day; and using the catheter for no longer than 14 days. According to level II evidence and class A recommendations, the catheter should be flushed with a 10-mL syringe using a pulsatile maneuver and sealed with 3–5 mL of heparin saline with positive pressure, but with high pressure injection being strictly prohibited (12,19,22-24).

Added discussion

It has been emphasized that implantable intravenous ports have been preferentially recommended by the breast cancer chemotherapy expert group to establish central venous access.

SLNB for early-stage breast cancer (25)

Added introduction

It has been emphasized that SLNB is a type of radical operation for early-stage breast cancer.

Added recommendations

- The definition of SLNB has been added. SLNB for breast cancer refers to the surgical excision of sentinel lymph nodes (SLNs) marked by a tracer and their pathological examination to clarify the status of axillary lymph nodes (LNs). At present, SLNB has replaced ALND as the primary strategy for axillary surgery in

patients with SLN-negative breast cancer.

- Clinically node-positive (cN+) breast cancer before and after neoadjuvant therapy (NAT) is recommended as an SLNB contraindication according to level I evidence and class A recommendations (26,27).
- For the timing of SLNB, patients who do not receive NAT can undergo SLNB directly, patients treated with NAT should undergo SLNB before NAT, and patients with cN0 treated with NAT can also undergo SLNB after NAT according to level I evidence and class A recommendations. cN1 patients can undergo SLNB after NAT according to level I evidence and class B recommendations (26,27).
- For the follow-up treatment of patients with different SLN statuses: ALND should be performed in early-stage patients with 1–2 positive SLNs who receive SLNB directly, according to level I evidence and class A recommendations.
- Regarding the follow-up treatment of different SLN statuses, level I evidence and class A recommendations suggest that SLN-negative patients who receive SLNB before NAT should not undergo ALND after NAT, while SLN-positive patients should receive ALND after NAT (26,27).

BCS for early-stage breast cancer (28)

Added to introduction

It has been emphasized that tumor radical operation should aim to cure tumors and that BCS as a radical operation for breast cancer has been widely recognized (3).

Added recommendations

According to level I evidence and class A recommendations, the basic definition of BCS is as "one of the treatment methods for the radical operation of breast cancer" (29,30).

Modified radical mastectomy (31)

Added introduction

The concept of radical operation emphasizes that standard radical mastectomy (Halsted), modified radical mastectomy (Patey, Auchincloss), total mastectomy, ALND, BCS, and SLNB all belong to the category of radical operation (32).

Added recommendations

Patey modified radical mastectomy is recommended according to level I evidence and class B recommendations, and Auchincloss modified radical mastectomy is recommended according to level I evidence and class A recommendations (5,6).

Added discussion

The expert group emphasizes that Auchincloss modified radical mastectomy is one of the most widely used radical mastectomies for early-stage breast cancer with axillary LN metastasis in China at this stage. High-level evidence has proven that Auchincloss modified radical mastectomy can obtain the same goal of tumor healing, and patients have a better quality of life compared with patients who receive the Halsted operation and Patey operation.

Breast cancer in pregnancy (BCP) and postpartum breast cancer (PBC) (33)

Updated guideline headline: Clinical Practice Guidelines for Breast Cancer in Pregnancy and Postpartum Breast Cancer.

The definition of pregnancy-associated breast cancer has been removed, and BCP and PBC has been defined separately.

Added recommendations

Individualized fetal heart monitoring and thrombosis prevention during the perioperative management of BCP are recommended according to level I evidence and class A recommendations (34-37).

Added discussion

- Multidisciplinary collaboration and patient informed consent should be integrated into the entire treatment process of BCP.
- The perioperative management of BCP has been added, which includes the selection of the surgical position, implementation of individualized fetal heart monitoring, prevention of thrombosis, and use of contraction inhibitors.
- Fertility preservation in patients with BCP is gaining increasing attention.

Recommendations

Risk assessment for identifying women at high risk of breast cancer

- Population under consideration: asymptomatic women

≥35 years who have no current or previous diagnosis of breast cancer or ductal carcinoma *in situ* (DCIS); women with a history of atypical hyperplasia or lobular carcinoma *in situ* (level of evidence: I; recommendation strength: A) (38).

- Assessment tools: breast cancer risk assessment tool (Gail model) (level of evidence: I; recommendation strength: B); online tool of breast cancer risk assessment for Chinese women (level of evidence: II; recommendation strength: A) (38).
- Indications of genetic testing for *BRCA1/2* genetic mutations: women with a likelihood of inherited predisposition to breast cancer based on personal or family history should be offered genetic counseling in order to guide decision-making of genetic testing for *BRCA1/2* genetic mutations; priority of genetic testing should be offered to the cancer patient(s) among the family members (index case) (level of evidence: I; recommendation strength: A) (38).

Preoperative evaluation of breast cancer (39)

- General evaluation: evaluation of vital signs; laboratory evaluation; clinical examination; blood pressure monitoring and related preoperative management; glucose monitoring and related preoperative management; specific clinical conditions in patients with breast cancer (level of evidence: I; recommendation strength: A) (39).
- Anesthesia-related evaluation: evaluation of preoperative medications; preoperative evaluation of the airway; comprehensive evaluation of anesthetic safety (level of evidence: I; recommendation strength: A) (39).

In addition, patients should undergo preoperative tumor-related evaluation, including evaluation of primary tumor, regional LNs, and distant metastases.

Diagnosis and treatment of hyperplasia of the mammary glands

- Definition: noninflammatory and nontumorous lesions of the mammary glands (level of evidence: II; recommendation strength: A) (40).
- Clinical manifestation: cyclical/noncyclical breast pain; nodular breast or diffuse distribution of thickened glands; nipple discharge in a few patients (level of evidence: II; recommendation strength: A) (40).
- Diagnostic method: patient history; systematic breast exam; ultrasonography; breast radiography; breast magnetic resonance imaging (MRI); histopathological examinations (level of evidence: I; recommendation strength: A) (40).
- Treatment principle: regular monitoring; nonmedical treatments, such as psychological counseling and counseling on changes in diet and lifestyle (level of evidence: I; recommendation strength: A); symptomatic treatments (level of evidence: II; recommendation strength: A) (40).

Diagnosis and treatment of patients with nonpuerperal mastitis

- Diagnostic method: ultrasonography (level of evidence: I; recommendation strength: A); detection of pathogenic microorganisms (level of evidence: II; recommendation strength: A); pathological diagnosis (level of evidence: I; recommendation strength: A) (41).
- Therapeutic schedule:
  - Pharmacotherapy: granulomatous lobular mastitis, corticosteroids (level of evidence: III; recommendation strength: B); periductal mastitis, anti-infective treatment during acute inflammation (level of evidence: II; recommendation strength: A); antimycobacterial drugs for periductal mastitis with fistula formation or ulceration (level of evidence: III; recommendation strength: B) (41).
  - Surgery: abscess, incision and drainage (level of evidence: I; recommendation strength: A); needle aspiration with ultrasound guidance may be considered for unilocular abscesses (<3 cm) (level of evidence: II; recommendation strength: A). Sinus and fistula: fistulectomy (level of evidence: III; recommendation strength: B) (41).

Diagnosis and treatment of patients with breast fibroadenoma

- Diagnostic method: clinical palpation (level of evidence: II; recommendation strength: A). Ultrasonography; pathological diagnosis (level of evidence: I; recommendation strength: A) (42).
- Surgical treatment:
  - Indication: rapid growth; large size (>3 cm) (level of evidence: II; recommendation strength: A). Breast Imaging-Reporting and Data System (BI-RADS) category increase; core needle biopsy

(CNB) suggested with atypical hyperplasia or suspected phyllodes tumor (level of evidence: I; recommendation strength: A) (42).
- Surgical option: open excision (level of evidence: I; recommendation strength: A); ultrasound-guided vacuum-assisted breast biopsy (VABB) (level of evidence: II; recommendation strength: A) (42).

❖ Nonsurgical treatment:
- Indication: BI-RADS category 3 (level of evidence: I; recommendation strength: A); sonographically typical fibroadenomas in a young patient (level of evidence: II; recommendation strength: A) (42).
- Follow-up interval: 6 months (level of evidence: I; recommendation strength: A) (42).
- Follow-up method: clinical palpation combined with ultrasonography; annual mammography starting at age 40 years (level of evidence: I; recommendation strength: A) (42).

Diagnosis and treatment of patients with intraductal papilloma

❖ Diagnostic method: clinical manifestations, bloody or serous nipple discharge and/or breast mass (level of evidence: I; recommendation strength: A); ultrasonography (level of evidence: II; recommendation strength: A); mammography (level of evidence: II; recommendation strength: A); ductoscopy (level of evidence: I; recommendation strength: A); cytological examination of nipple discharge (level of evidence: II; recommendation strength: A); CNB (level of evidence: I; recommendation strength: A) (43).

❖ Surgical treatment:
- Surgical indications: clinically and/or pathologically diagnosed intraductal papilloma without surgical contraindications (level of evidence: I; recommendation strength: A) (43).
- Surgical options: open excision or VABB (level of evidence: I; recommendation strength: A) (43).

Multigene assays in patients with early-stage breast cancer

❖ Assay: 70-gene (MammaPrint®) next-generation sequencing (NGS) (level of evidence: I; recommendation strength: A); 21-gene (Oncotype Dx®) reverse transcription polymerase chain reaction (RT-PCR) (level of evidence: I; recommendation strength: B) (44).

❖ Indications:
- 70-gene: T1–T2, 0–3 positive nodes, hormone receptor $(HR)^+$, human epidermal growth factor receptor 2 $(HER2)^-$ (level of evidence: I; recommendation strength: A) (44).
- 21-gene: T1–T2, pN0, HR^+, $HER2^-$ (level of evidence: I; recommendation strength: B) (44).

❖ Treatment implications:
- 70-gene (Mammaprint®):
  - Clinical low risk/genomic high risk: the additional benefit of adjuvant chemotherapy may be small. The assay cannot be used as a reference for the addition of chemotherapy in decision-making.
  - Clinical high risk/genomic low risk: consider omission of chemotherapy (level of evidence: I; recommendation strength: A) (44).
- 21-gene (Oncotype Dx®):
  - Recurrence score (RS) ≤25: for patients with T1b/c-T2 and RS between 0–25, omission of chemotherapy should be considered. In women ≤50 years with RS 16–25, addition of chemotherapy should be considered.
  - RS 26–30: in patients with T1–T2, the omission of chemotherapy has not been studied prospectively. Clinicians should consider additional clinical and pathological factors with regard to chemotherapy in decision-making.
  - RS ≥31: for patients with T1b–T2, the addition of chemotherapy is recommended (level of evidence: I; recommendation strength: B) (44).

BRCA1/2 gene testing for patients with breast cancer

❖ Indication:
- Breast cancer diagnosed ≤45 years old (level of evidence: I; recommendation strength: A).
- Breast cancer diagnosed between 46 and 50 years old with 1 or more of the following: an additional breast cancer primary at any age; ≥1 close blood relative with breast cancer at any age; an unknown or limited family history (level of evidence: I; recommendation strength: A).
- Diagnosed ≤60 years old with triple-negative breast cancer (level of evidence: I; recommendation strength: A).
- Breast cancer diagnosed at any age with 1 or more of the following: ≥1 close blood relative with breast cancer diagnosed ≤50 years old; ≥1 close blood

relative with ovarian carcinoma/metastatic prostate cancer/pancreatic cancer/male breast cancer; ≥2 additional diagnoses of breast cancer at any age in patient and/or in close blood relatives; personal history of ovarian carcinoma/pancreatic cancer (level of evidence: II; recommendation strength: A).
- Male breast cancer (level of evidence: I; recommendation strength: A).
- Patients with $HER2^-$ recurrent metastatic breast cancer (level of evidence: I; recommendation strength: A).
- *BRCA1/2* pathogenic/likely pathogenic variant detected in tumor tissues (level of evidence: I; recommendation strength: A).
- Individual from a family with a known *BRCA1/2* pathogenic/likely pathogenic variant (level of evidence: I; recommendation strength: A).
- Ovarian carcinoma (level of evidence: I; recommendation strength: A).
- High-grade prostate cancer with 1 or more of the following: ≥1 close blood relatives with ovarian carcinoma/pancreatic cancer/metastatic prostate cancer/breast cancer <50 years old; ≥2 close blood relatives with breast/prostate cancer (any grade) at any age. (level of evidence: I; recommendation strength: A) (45).

❖ Risk control for *BRCA1/2* mutation carriers:
- Breast awareness starting at 18 years old; physical exam every 6 to 12 months starting at age 25 (level of evidence: I; recommendation strength: A).
- Annual breast MRI screening with contrast starting at age 30 (level of evidence: I; recommendation strength: A).
- Annual breast MRI screening with contrast starting at age 25 if ≥1 close relative diagnosed with breast cancer before age 30 (level of evidence: II; recommendation strength: B).
- Annual breast clinical exam for male carriers starting at age 35 (level of evidence: II; recommendation strength: A).
- Prostate clinical exam for male *BRCA2* carriers starting at age 40 (level of evidence: I; recommendation strength: A).
- Prophylactic mastectomy combined with immediate breast reconstruction (level of evidence: II; recommendation strength: B).
- Genetic counseling for gynecological tumors (level of evidence: I; recommendation strength: A).
- Genetic counseling for pancreatic and skin tumors (level of evidence: II; recommendation strength: A) (45).

❖ Surgical options for breast cancer patients with *BRCA1/2* mutation:
- BCS with adjuvant radiotherapy (RT) to the whole breast; mastectomy; mastectomy combined with immediate breast reconstruction (level of evidence: I; recommendation strength: A).
- Contralateral prophylactic mastectomy with or without immediate breast reconstruction (level of evidence: II; recommendation strength: B) (45).

Diagnosis and treatment of patients with DCIS

❖ Diagnostic method: breast ultrasonography; breast radiography; breast enhanced MRI (level of evidence: I; recommendation strength: A) (46).

❖ Diagnostic modality: postoperative histopathological diagnosis (level of evidence: I; recommendation strength: A) (46).

❖ Surgical treatment: BCS; mastectomy; mastectomy + breast reconstruction (level of evidence: I; recommendation strength: A) (46).

❖ Other treatments: adjuvant RT after BCS; administration of endocrinotropic agents for HR^+ breast cancer (level of evidence: I; recommendation strength: A) (46).

Diagnosis and treatment of patients with invasive breast cancer

❖ Breast cancer screening:
- Women with average risk: begin at 40 years; annual screening with mammography; annual ultrasonography (level of evidence: I; recommendation strength: A) (47).
- Women with increased risk: begin before 40 years; annual screening with mammography; annual ultrasonography; annual breast MRI (level of evidence: I; recommendation strength: A) (47).

❖ Breast cancer diagnosis:
- Imaging diagnosis: diagnostic mammography; ultrasound; MRI (level of evidence: I; recommendation strength: A) (47).
- Pathology diagnosis:
  - Image-guided lesion biopsy: CNB; VABB; wire-guided biopsy.

- Image-guided LN biopsy: fine needle biopsy; CNB (level of evidence: I; recommendation strength: A) (47).

❖ Radical operation of breast cancer:
- Combined breast axillary surgery: Halsted radical mastectomy; Patey modified radical mastectomy (level of evidence: I; recommendation strength: B); Auchincloss modified radical mastectomy; BCS + SLNB; BCS + ALND; total mastectomy + SLNB (level of evidence: I; recommendation strength: A); skin-sparing mastectomy + SLNB; skin-sparing mastectomy + ALND; nipple-sparing mastectomy + SLNB; nipple-sparing mastectomy + ALND (level of evidence: II; recommendation strength: A).
- Breast surgery: BCS; total mastectomy (level of evidence: I; recommendation strength: A); skin-sparing mastectomy; nipple-sparing mastectomy (level of evidence: II; recommendation strength: A).
- Axillary surgery: SLNB; ALND (level of evidence: I; recommendation strength: A) (47).

❖ Postmastectomy breast reconstruction:
- BCS combined with oncoplastic techniques (level of evidence: II; recommendation strength: A) (47).
- Breast reconstruction following mastectomy:
  - Timing of reconstruction: immediate reconstruction; delayed reconstruction; delayed-immediate reconstruction (level of evidence: II; recommendation strength: A).
  - Type of reconstruction: implant reconstruction; autologous tissue reconstruction; autologous tissue combined with implant reconstruction (level of evidence: II; recommendation strength: A) (47).

❖ Breast cancer radiation therapy:
- Whole breast radiation therapy after lumpectomy (level of evidence: I; recommendation strength: A).
- Radiation to chest wall and regional LNs after mastectomy and ≥ N1 (level of evidence: I; recommendation strength: A).
- Radiation to chest wall after mastectomy and ≥ T3 (level of evidence: II; recommendation strength: A) (47).

❖ Breast cancer systemic therapy:
- Adjuvant systemic therapy: adjuvant endocrine therapy for HR^+ patients; adjuvant HER2-targeted therapy for $HER2^+$ patients; adjuvant chemotherapy for high-risk recurrence patient (level of evidence: I; recommendation strength: A).
- Neoadjuvant systemic therapy:
  - Indications: inoperable breast cancer (T4 or ≥ N2); patients with large primary tumor desiring breast conservation; evaluation of drug sensitivity *in vivo* (level of evidence: I; recommendation strength: A).
  - Strategy for NAT: clarify clinical stage, pathological diagnosis, histological grade, and molecular characteristics before treatment; demarcate the tumor bed before treatment; routinely assess tumor response during treatment; conduct pathological evaluation for primary tumor and LN after treatment (level of evidence: I; recommendation strength: A) (47).

❖ Breast cancer follow-up:
- Interval for follow-up: 1–4 times per year within 5 years after surgery; annually after 5 years of surgery (level of evidence: II; recommendation strength: A).
- Content of follow-up:
  - Loco-regional recurrence: ultrasound of both breast and regional LNs (level of evidence: II; recommendation strength: A); mammography (level of evidence: I; recommendation strength: A).
  - Distant metastasis: screening of distant metastases is not recommended for asymptomatic patients (level of evidence: I; recommendation strength: A); tumor markers; chest computed tomography (CT); CT/ultrasound/MRI of abdomen; bone scan; fluorodeoxyglucose-positron emission tomography (FDG PET)/CT (level of evidence: III; recommendation strength: C).
  - Complication of surgery: lymphedema (level of evidence: II; recommendation strength: A).
  - Complication of medication: endometrial evaluation during treatment of tamoxifen; assessment of bone mineral density during treatment of aromatase inhibitor (level of evidence: I; recommendation strength: A).
  - Encouraging a healthy lifestyle (level of evidence: I; recommendation strength: A) (47).

❖ Treatment of recurrent or metastatic breast cancer:
- Biopsy and complete immunohistochemical assessment of the recurrence/metastatic site (level of evidence: II; recommendation strength: A).
- Surgical resection ± radiation therapy if possible for local/regional recurrence (level of evidence: II;

recommendation strength: A).
- Systemic therapy according to molecular subtyping of metastatic site (level of evidence: I; recommendation strength: A) (47).

Ultrasound-guided breast lesions and LNs biopsy

- Indication:
  - Breast lesion: BI-RADS category ≥4 (level of evidence: I; recommendation strength: A); BI-RADS category 3 with a family history of breast cancer or other high-risk factors (level of evidence: II; recommendation strength: A); possible for NAT; benign lesion for further pathological classification (level of evidence: I; recommendation strength: A).
  - Regional LN: suggested by imaging with abnormal histomorphology and (or) structure, and suspected of being metastatic (level of evidence: I; recommendation strength: A) (48).
- Method for biopsy:
  - Breast lesion: fine-needle aspiration biopsy (FNAB) (level of evidence: III; recommendation strength: B); CNB; VABB (level of evidence: I; recommendation strength: A).
  - Regional LN: FNAB; CNB (level of evidence: I; recommendation strength: A) (48)
- Clinical issues on breast lesion biopsy:
  - Needle size for breast lesion CNB: 14 or 16 G (level of evidence: II; recommendation strength: A); 18 G (level of evidence: III; recommendation strength: B); ≥4 specimens for breast lesion CNB to improve the diagnostic rate (with 14 G needle) (level of evidence: II; recommendation strength: A).
  - CNB or VABB specimens may have pathological underestimation of the following breast lesions:
    - High-risk lesions: papilloma; atypical ductal hyperplasia (ADH) (level of evidence: I; recommendation strength: A); phyllodes tumor; radial sclerosing lesion (level of evidence: II; recommendation strength: A).
    - Carcinoma *in situ* (level of evidence: I; recommendation strength: A) (48).

Ultrasound-guided VABB

- Indication: diagnostic indication: BI-RADS category ≥4; treatment indication: BI-RADS category 3 lesions with surgical indications (level of evidence: I; recommendation strength: A) (49).
- Contraindication: bleeding tendency, blood coagulation disorder, and related disorders; patients with serious systemic diseases who cannot tolerate surgery (level of evidence: I; recommendation strength: A) (49).
- Clinical problem:
  - Incision is necessary for hemostasis or debridement if a patient is suspected of having active bleeding or has a huge hematoma causing severe pain (level of evidence: I; recommendation strength: A).
  - When the lesion is confirmed to be completely removed and histopathologically confirmed to be ADH, open surgery excision should be performed (level of evidence: II; recommendation strength: A).
  - When the lesion is histopathologically confirmed to be benign phyllodes tumor, surveillance is justified (level of evidence: I; recommendation strength: A).
  - When the lesion is histopathologically confirmed to be borderline or malignant phyllodes tumor, open surgery excision should be performed (level of evidence: II; recommendation strength: A).
  - When the lesion is histopathologically confirmed to be classical lobular neoplasia, flat epithelial atypia, radial scars, or papillary lesions, surveillance is justified (level of evidence: II; recommendation strength: A) (49).

Central venous access for the systemic treatment of breast cancer

- Indication: patients with breast cancer requiring chemotherapy drugs, highly osmotic or viscous fluids such as intravenous nutrition, or blood or long-term infusions (level of evidence: I; recommendation strength: A) (50).
- Channel selection:
  - Implantable intravenous infusion ports: subclavian vein, internal jugular vein, basilic vein (level of evidence: I; recommendation strength: A); femoral vein (level of evidence: II; recommendation strength: A).
  - PICC: basilic vein (level of evidence: I; recommendation strength: A); median cubital vein, cephalic vein, brachial vein, external jugular vein, femoral vein (level of evidence: II; recommendation strength: B).
  - CVC: internal jugular vein, subclavian vein, femoral vein (level of evidence: I; recommendation strength:

A) (50).

- Catheter tip position:
  - Implantable intravenous infusion ports: lower 1/3 of the superior vena cava; junction of the superior vena cava and right atrium (level of evidence: I; recommendation strength: A).
  - PICC: lower 1/3 of the superior vena cava; junction of the superior vena cava and right atrium (level of evidence: I; recommendation strength: A).
  - CVC: between the lower 1/3 of the inferior superior vena cava and 1/3 of the superior right atrium (level of evidence: II; recommendation strength: A) (50).
- Catheter tip positioning method: intraoperative X-ray or post-operative chest radiograph; intraoperative electrocardiogram (ECG) localization (level of evidence: I; recommendation strength: A) (50).
- Prevention and management of common complications:
  - Pneumothorax, hemothorax, air embolism, misdirected artery, etc.: ultrasound localization or intraoperative use of ultrasound-guided venipuncture (level of evidence: I; recommendation strength: A).
  - Catheter-associated bloodstream infections: strict asepsis; empirical use of antibiotics until drug sensitivity test results are available and selection of drugs based on drug sensitivity after clarification of the infecting agent; removal of intravenous ports when treatment is ineffective (level of evidence: II; recommendation strength: A).
  - Catheter-associated thrombosis: avoid repeated punctures; position the catheter tip correctly. Once catheter-associated thrombosis occurs, anticoagulation is preferred (level of evidence: II; recommendation strength: A) (50).

Visualized percutaneous breast tissue clips

- Indications:
  - Indication for primary breast lesion: non-palpable suspicious breast lesion, for surgical biopsy (level of evidence: II; recommendation strength: A); non-palpable breast cancer, for BCS; breast cancer for NAT and BCS (level of evidence: I; recommendation strength: A).
  - Indication for the axillary LN: pathologically confirmed metastatic axillary LN (pN1) for NAT (level of evidence: I; recommendation strength: A) (51).
- Contraindication: concomitant intolerable severe systemic disease, psychiatric disorders, or other reasons not to cooperate; concomitant severe bleeding or coagulation disorders; the presence of breast local infection or adjacent to the breast prosthesis (level of evidence: I; recommendation strength: A) (51).
- Clinical issue for positioning tissue clip:
  - Number of clips placed: one placed in the center of the primary breast lesion (level of evidence: II; recommendation strength: A); one placed in the center of metastatic axillary LN (level of evidence: I; recommendation strength: A).
  - Imaging-guided approach for clip placement: ultrasound-guided placement; X-ray-guided placement (level of evidence: I; recommendation strength: A).
  - Preoperative clip localization method: guide wire; dye; isotopic tracer (level of evidence: I; recommendation strength: A).
  - Intraoperative clip confirmation: intraoperative radiography (level of evidence: I; recommendation strength: A).
  - Timing of clip placement in patients undergoing NAT: before NAT following pathological confirmation of primary breast cancer lesion and metastatic axillary LN (level of evidence: I; recommendation strength: A) (51).

SLNB in patients with early-stage breast cancer

- Indication: early-stage invasive breast cancer, axillary LN negative in the clinical examination; DCIS, invasive carcinoma that cannot be excluded clinically; initial cN0 patients and still cN0 after NAT; patients with initial cN1 and converted to cN0 after NAT (level of evidence: I; recommendation strength: A) (52).
- Contraindication: inflammatory breast cancer; invasive breast cancer with axillary LN metastasis confirmed by needle biopsy without NAT; initial cN+ patients and still remaining cN+ after NAT; allergy to the tracer (level of evidence: I; recommendation strength: A) (52).
- Mapping method: combination of radioisotope and blue dye; radioisotope (level of evidence: I; recommendation strength: B); blue dye; fluorescence imaging (level of evidence: I; recommendation strength: A) (52).
- Timing of SLNB:
  - Patients who do not receive NAT can undergo

SLNB directly (level of evidence: I; recommendation strength: A).
- Before NAT (level of evidence: I; recommendation strength: A).
- After NAT: initial cN0 patients (level of evidence: I; recommendation strength: A); initial cN1 patients (level of evidence: I; recommendation strength: B) (52).

❖ Tracer selection:
- Blue dye: methylene blue; carbon nanoparticles (level of evidence: I; recommendation strength: A); patent blue; isosulfan blue (level of evidence: I; recommendation strength: B).
- Radioisotope: ^{99}mTc-labeled sulfur colloid (level of evidence: I; recommendation strength: B).
- Fluorescence imaging: indocyanine green (level of evidence: I; recommendation strength: A) (52).

❖ Injection site: intradermal or subcutaneous around the affected areola (level of evidence: I; recommendation strength: A) (52).

❖ SLNB and NAT:
- Initial cN0 patient: SLNB before NAT; SLNB after NAT (level of evidence: I; recommendation strength: A).
- Patients with initial cN1 and converted to cN0 after NAT: SLNB after NAT; direct ALND (level of evidence: I; recommendation strength: A).
- Patients with initial > cN1 and converted to cN0 after NAT: no SLNB, ALND directly (level of evidence: I; recommendation strength: A).
- Patients with initial cN+ and remaining cN+ after NAT: no SLNB, ALND directly (level of evidence: I; recommendation strength: A) (52).

❖ Pathological diagnosis:
- Intraoperative evaluation: rapid frozen section pathological examination (level of evidence: I; recommendation strength: A).
- Postoperative evaluation: paraffin section and immunohistochemical examination (level of evidence: I; recommendation strength: A) (52).

❖ Follow-up surgery for different SLN statuses:
- SLNB for early-stage breast cancer with initial surgery:
  - SLN-negative: no subsequent ALND (level of evidence: I; recommendation strength: A).
  - 1–2 positive SLNs: T1–2, BCS, whole breast RT planned, ALND can be exempted (level of evidence: I; recommendation strength: A); total mastectomy, axillary RT planned, ALND can be exempted (level of evidence: II; recommendation strength: B); ALND (level of evidence: I; recommendation strength: A).
  - ≥3 positive SLNs: ALND (level of evidence: I; recommendation strength: A).
- SLNB before neoadjuvant therapy:
  - SLN negative: no subsequent ALND (level of evidence: I; recommendation strength: A).
  - SLN positive: ALND (level of evidence: I; recommendation strength: A).
- SLNB after neoadjuvant therapy:
  - SLN negative: no subsequent ALND (level of evidence: I; recommendation strength: A).
  - SLN positive: ALND (level of evidence: I; recommendation strength: A) (52).

BCS in patients with early-stage breast cancer

❖ Definition: BCS is one of the treatment methods for the radical operation of breast cancer (level of evidence: I; recommendation strength: A) (53).

❖ Indication (all of the indications should be met): patient wishes to preserve her breast; clinical stage I, II, or ≤ cT2; able to achieve acceptable cosmetic outcomes after BCS (level of evidence: I; recommendation strength: A) (53).

❖ Contraindication (any one of the indications is sufficient): cannot receive RT after BCS; unable to achieve negative surgical margins; extensive microcalcification; inflammatory breast cancer; patient refusal to undergo BCS (level of evidence: I; recommendation strength: A) (53).

❖ Surgical issue:
- Incorporation of oncoplastic techniques is able to improve the cosmetic outcomes after BCS (level of evidence: II; recommendation strength: A).
- It is recommended that inert metal clips (e.g., titanium clips) be placed in the surgical bed after BCS as a localization marker for radiation boosting (level of evidence: I; recommendation strength: A) (53).

❖ Pathological evaluation: margin assessment after BCS is mandatory; intraoperative frozen section analysis for margin; postoperative formalin-fixed, paraffin-embedded tissue analysis is recommended for margin assessment (level of evidence: I; recommendation strength: A) (53).

❖ Method for margin assessment: lumpectomy margin

assessment (perpendicular inked method) (level of evidence: I; recommendation strength: A); lumpectomy margin assessment (tangential shaved method); cavity wall (tumor bed) sampling (level of evidence: II; recommendation strength: A) (53).

- RT: whole-breast irradiation is recommended after BCS (level of evidence: II; recommendation strength: A) (53).

Modified radical mastectomy of breast cancer

- Surgical method: Patey modified radical mastectomy (level of evidence: I; recommendation strength: B); Auchincloss modified radical mastectomy (level of evidence: I; recommendation strength: A) (54).
- Indication: early breast cancer not suitable for breast-sparing surgery; axillary LN positive; clinical evaluation suitable for R0 resection (level of evidence: I; recommendation strength: A) (54).
- Incision design: horizontal Stewart incision preferred (level of evidence: I; recommendation strength: A) (54).
- Free skin flap layer: the free skin flap should be isolated in the superficial fascia of breast tissue (level of evidence: I; recommendation strength: A) (54).
- Free skin flap range: generally, the upper boundary is 1 to 2 cm below the clavicle, the lower boundary is at the level of the costal arch, the medial boundary is at the parasternal line, and the lateral boundary is at leading edge of the latissimus dorsi (level of evidence: I; recommendation strength: A) (54).
- ALND level: axillary LN cleaning for level II only (if there is an obvious level II or III of LN metastasis, level III cleaning is needed) (level of evidence: I; recommendation strength: A) (54).

Postmastectomy breast reconstruction

- Indication: patients with breast cancer who have undergone mastectomy and need breast reconstruction (level of evidence: II; recommendation strength: A) (55).
- Contraindication: absolute contraindication, inflammatory breast cancer; relative contraindication, smoking and obesity (level of evidence: II; recommendation strength: A) (55).
- Timing of breast reconstruction surgery: immediate breast reconstruction; delayed breast reconstruction; delayed-immediate breast reconstruction (level of evidence: II; recommendation strength: A) (55).
- Type of reconstruction:
  - Autologous breast reconstruction: transverse rectus abdominis myocutaneous (TRAM) flap breast reconstruction; deep inferior epigastric perforator (DIEP) flap breast reconstruction; latissimus dorsi flap (LDF) breast reconstruction (level of evidence: II; recommendation strength: A).
  - Prosthetic breast reconstruction: immediate implant-based breast reconstruction (one-stage method); combined tissue expander and prosthetic breast reconstruction (two-stage method) (level of evidence: II; recommendation strength: A).
  - Combined autologous and prosthetic breast reconstruction: combined LDF and prosthetic breast reconstruction (level of evidence: II; recommendation strength: A) (55).
- Commonly used covering material in breast reconstruction: acellular dermal matrix (ADM); titanium-coated polypropylene mesh (TCPM) (level of evidence: II; recommendation strength: A) (55).

Endoscopic breast surgery in patients with early-stage breast cancer (56)

In the guidelines, endoscopic breast surgery include: endoscopic nipple-sparing mastectomy, immediate breast implant reconstruction for breast cancer, and endoscopic axillary or internal mammary LN dissection/SLNB for breast cancer.

- Indication:
  - Imaging data indicating that the tumor has not invaded the nipple, areola, or subcutaneous tissue, and a distance from the margin of the tumor to the margin of the areola of ≥2 cm (level of evidence: II; recommendation strength: A).
  - Clinical and imaging examinations of early-stage breast cancer revealing axillary LNs ≤ cN1 (level of evidence: I; recommendation strength: A).
  - Internal mammary LN dissection/biopsy is necessary (level of evidence: II; recommendation strength: A) (56).
- Contraindication: severe mastoptosis; breast volume >500 mL; inflammatory breast cancer (level of evidence: II; recommendation strength: A); history of axillary surgery (level of evidence: I; recommendation strength: A) (56).
- Method of establishing the operating space:
  - Establish the operating space by liposuction

and maintain the space with CO_2 inflation or suspension (level of evidence: II; recommendation strength: A).
- Establish the operating space using a non-liposuction method and maintain the space with CO_2 inflation or suspension (level of evidence: II; recommendation strength: A).
- Operation under the guidance of entire-course monitoring (level of evidence: II; recommendation strength: A).
- Prevent hypercapnia through continuous positive-pressure ventilation (level of evidence: II; recommendation strength: A) (56).

❖ Treatment of surgical complications:
- Convert to open surgery in cases of intraoperative hemorrhage of unknown cause (level of evidence: II; recommendation strength: A).
- Endoscopic exploration or open hemostatic surgery for postoperative active bleeding (level of evidence: II; recommendation strength: A) (56).

BCP and PBC

❖ BCP:
- Diagnostic method:
  - Screening method for BCP: breast ultrasound; CNB (level of evidence: I; recommendation strength: A).
  - Distant site examination for BCP: abdominal ultrasound; radionuclide scan is prohibited (level of evidence: I; recommendation strength: A) (57).
- Treatment principle:
  - Treatment timing: second and third trimester of pregnant (level of evidence: I; recommendation strength: A).
  - Surgical treatment: modified radical mastectomy (level of evidence: I; recommendation strength: A); BCS (level of evidence: II; recommendation strength: A) (57).
- Perioperative management of BCP: individualized fetal heart monitoring; thrombosis prevention (level of evidence: I; recommendation strength: A) (57).
- Other treatments: endocrine therapy with tamoxifen is prohibited during pregnancy; HER2-targeted therapy is prohibited during pregnancy; radiation therapy is prohibited during pregnancy (level of evidence: I; recommendation strength: A) (57).

❖ PBC:
- Besides breast feeding, the diagnosis and treatment of PBC can refer to the principle of diagnosis and treatment of nonpregnancy breast cancer.
- Contraindications of breast-feeding: not recommended during chemotherapy, endocrine therapy, and HER2-targeted therapy (level of evidence: I; recommendation strength: A) (57).

Discussion

The Writing Committee of the CSBrS has updated the Chinese Society of Breast Surgery Practice Guideline 2022 based on the latest research evidence and clinical needs. They also comprehensively considered the accessibility of the guideline in clinical practice in China and gave recommendations with different strengths. Six chapters, including "Diagnosis and treatment of patients with invasive breast cancer", "Sentinel lymph node biopsy in patients with early-stage breast cancer", "Breast-conserving surgery in patients with early-stage breast cancer", "Modified radical mastectomy of breast cancer", "Central venous access for the systemic treatment of breast cancer", and "Breast cancer in pregnancy and postpartum breast cancer" were revised. The authors sincerely hope to get criticism and correction from others, and improve the Guideline referring to the latest research results.

Conclusions

Compared with the 2021 edition, the new guideline has been revised in six chapters based on the latest research evidence and clinical needs. The aim is to provide a better reference suitable for Chinese breast surgeons.

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