Includes interactive ebook with complete content

Anesthesiologist's Manual of Surgical Procedures

- Induction
- Maintenance
- Emergence
- Blood and Fluid Requirements
- Control of Blood Loss
- Monitoring
- Positioning
- Surgical Complications

Richard A. Jaffe
Clifford A. Schmiesing
Brenda Golianu

Wolters Kluwer Health

5th Edition

with sentinel lymph node biopsy: results from a prospective international group trial. *Ann Surg Oncol* 2006; 13(4):491–500.

BREAST-CONSERVING SURGERY AND MASTECTOMY ± RECONSTRUCTION

SURGICAL CONSIDERATIONS

Description: The treatment of invasive breast cancer has evolved greatly in the last 35 years. **Modified radical mastectomy** refers to removal of the breast and the **axillary lymph nodes;** total mastectomy with **sentinel lymph node biopsy** refers to removal of the breast and the sentinel lymph node(s); and **lumpectomy (partial mastectomy)** and sentinel lymph node biopsy or axillary lymph node dissection refers to removal of the cancer in the breast with a tumor-free margin and the sentinel lymph node(s) or a more complete axillary lymph node dissection, as indicated. All offer equivalent survival for operable, earlier-stage breast cancer. Lymphatic mapping with **sentinel lymph node biopsy** is used in women with clinically negative lymph nodes. Modified radical mastectomy is performed through a single elliptical incision, whereas lumpectomy and sentinel lymph node, or axillary lymph node dissection, are normally done through separate incisions. Postop adjuvant radiation therapy is routinely recommended in breast-conserving surgery and is administered following the completion of adjuvant chemotherapy. For in situ breast cancer, lymphatic mapping and sentinel node biopsy are generally not done with the exception of large or high grade DCIS or in select cases undergoing mastectomy. Newer accelerated and partial radiation techniques are being integrated into breast care, including the insertion of brachytherapy balloons during surgery or administering a single dose of intraop radiation.

In an **axillary dissection**, Levels I and II lymph nodes are removed. These nodes lie behind and lateral to the edge of the pectoralis minor muscle. The Level III, or highest group of axillary lymph nodes, are medial to the pectoralis minor muscle and are not routinely removed unless clinically involved. As part of the axillary dissection, the surgeon preserves the thoracodorsal nerve (innervates the latissimus dorsi muscle) and the long thoracic nerve (innervates the serratus anterior muscle),

as well as the blood and nerve supply to the pectoral muscles. The intercostobrachial nerves (sensory to the upper arm) course through the axillary contents and its preservation usually can be accomplished, avoiding the occurrence of permanent dysesthesias. Reverse arm lymphatic mapping may be used selectively in patients undergoing lymphadenectomy in an effort to preserve arm lymphatics and prevent lymphedema. Breast-Conserving Surgery and Mastectomy ± ReconstructionTypically, 3–5 mL of isosulfan blue is injected intradermally and subcutaneously into the upper arm, which is then massaged for five minutes to enhance drainage.

A **total mastectomy** (also known as a **simple mastectomy**) removes only breast tissue. It is done mainly for treatment of extensive duct carcinoma in situ or for prophylaxis in high-risk patients. Total mastectomy may be combined with sentinel lymph node biopsy for treatment of early-stage breast cancer in clinically node-negative patients. **Skin-sparing** or **nipple-sparing mastectomies** are being increasingly performed to improve cosmesis of breast reconstruction. During the mastectomy, the surgeon typically preserves the entire skin envelope, commonly lengthening the duration of the operation. Ischemic skin flaps are a big concern, and techniques such as infrared camera imaging of perfusion using iv indocyanin green may be used. Indocyanin green should be avoided in patients with iodine allergies.

Immediate breast reconstruction is an option for most women undergoing mastectomy. Postop chest radiation may be a relative, but not absolute, contraindication to immediate reconstruction. Two approaches are commonly used: (a) **prosthetic reconstruction** with a temporary tissue expander or a saline-filled implant placed behind the pectoral muscles and (b) **autologous myocutaneous flaps** (see Breast Reconstruction, p. 1153). Truly excellent cosmetic results are possible with mastectomy techniques that preserve much of the breast skin (skin-sparing, areolar-sparing, or nipple-sparing mastectomies). The latter are usually performed through smaller incisions therefore requiring more operative time. Patients who carry BRCA1 or BRCA2 gene mutations are at risk for developing breast and ovarian cancer and may choose to undergo prophylactic bilateral mastectomies, which also lengthens operative duration.

Usual preop diagnosis: Invasive or in situ breast cancer, high-risk patients (e.g., genetic susceptibility to breast cancer; family history of breast cancer)

SUMMARY OF PROCEDURES

	Modified Radical Mastectomy	Total Mastectomy	Lumpectomy, Axillary Lymph Node Dissection
Position	Supine with ipsilateral arm abducted and may be prepped on field. Avoid brachial plexus stretch. Repositioning may be required (latissimus dorsi reconstruction).	=	=
Incision	Elliptical oblique or elliptical transverse to include nipple/areola and previous biopsy; periareolar, or "tennis-racquet."	=	Incision over breast mass or previous biopsy site. Separate transverse or oblique incision in axilla.
Unique considerations	Avoid iv and BP cuff on ipsilateral arm; many surgeons prefer no paralytics during axillary portion of surgery	=	=
Antibiotics	Cefazolin 1 g iv (optional)	=	=
Surgical time	1.5–3 h (+ 1–7 h, if immediate breast reconstruction performed); longer for bilateral surgery	1–2 h (+ 1–7 h, if immediate breast reconstruction performed)	1–3 h
Closing considerations	Gauze bandage over incision	=	=
EBL	150–500 mL, depending on whether scalpel or electrocautery is used.	=	25–100 mL
Postop care	PACU → 2 d hospitalization	PACU → 1–2 d hospitalization or occasionally → home	PACU → home
Mortality	Rare	=	=
Morbidity	Lymphedema: 5–30% (depending on extent of axillary dissection) Seroma: 25% Infection: 2–10% Flap necrosis: < 5% Hematoma: < 5% Injury to axillary neurovascular structures: Rare Pneumothorax: Rare (may occur with attempts to obtain hemostasis of intercostal perforating vessels)	= = = = = =	= = = < 10% =
Pain score	4–8	4–6	4–8

PATIENT POPULATION CHARACTERISTICS	
Age range	20–90 yr (generally > 40 yr)
Incidence	Over their lifetime, ~1/8 of American women develop breast cancer. In 2013, according to American Cancer Society it is estimated, there will be 232,340 new cases of invasive breast cancers in women and 2240 in men; there are also expected to be 64,640 new cases of carcinomas in situ.
Etiology	Unknown in most cases; about 5–10% of female breast cancers and 4–40% of male breast cancers may be related to a gene such as BRCA1 and BRCA2.

ANESTHETIC CONSIDERATIONS

PREOPERATIVE

Patients often have no other coexisting medical problems. Consider implications of advanced disease including metastatic spread to lung, brain, liver, and bone, and related debility.

Respiratory	Respiratory compromise can be present if patient has received XRT to the thorax as part of treatment. **Tests:** Consider CXR if pulmonary Sx or signs of disease present. Others as indicated by H&P.
Cardiovascular	Chemotherapeutic agents (e.g., doxorubicin at doses > 550 mg/m^2) may cause significant cardiomyopathies. **Tests:** ECG if > age 60 or if cardiac disease or Sx present. Review any relevant cardiac studies. Consider echo if cardiomyopathy or HF Sx's present.
Neurological	Breast cancer may metastasize to the CNS and can present with focal neurologic deficits, ↑ ICP, or altered mental status. **Tests:** As indicated from H&P
Hematologic	Look for anemia and thrombocytopenia following chemotherapy. **Tests:** CBC, with differential and Plt count
Laboratory	Other as indicated from H&P
Premedication	Consider midazolam 1–2 mg iv.

INTRAOPERATIVE

Anesthetic technique: GETA or GA with LMA. Regional anesthesia (paravertebral block [PVB]) in breast surgery is associated with less PONV, less postop pain, earlier discharge from the hospital, and less chronic incisional pain.

General anesthesia:

Induction	Standard induction (see p. B-2)
Maintenance	Standard maintenance (see p. B-3). The use of muscle relaxants during axillary dissection should be avoided to permit surgical identification of nerves by nerve stimulator or if electrocautery is used in the axilla.
Emergence	Pressure dressings may be applied with the patient anesthetized and "sitting up" at the end of the procedure. Discuss with surgeons whether they intend to apply this type of dressing, to enable appropriate timing of emergence. Consider PONV prophylaxis (see p. B-6).

Regional anesthesia: Unilateral multiple-level PVB provides satisfactory anesthesia for modified radical mastectomy and lumpectomy with axillary lymph node dissection. A block from T1-T6 is required. Suitable local anesthetics (4–5 mL/level) are 0.5% bupivacaine or 0.5% ropivacaine with 1:400,000 epinephrine. Sedation is useful during block placement and is continued intraop. (See Anesthetic Considerations for Breast Biopsy, p. 663.) PVB is contraindicated for the following reasons: (a) patient refusal, (b) local anesthetic allergy, (c) pathology or previous surgery → anatomic distortion of paravertebral space, and/or (d) infection at sites of injection.

Blood and fluid requirements	Minimal-to-moderate blood loss IV: 16–18 ga × 1 (avoid operative side) NS/LR @ 3–5 mL/kg/h	
Monitoring	Standard monitors (see p. B-1).	Others as indicated by patient status. BP cuff on arm opposite surgical site or on leg.
Positioning	✓ and pad pressure points ✓ eyes	
Complications	Pneumothorax	Deep surgical exploration may cause inadvertent pneumothorax; monitor patient for Sx (e.g., ↑ PIP, ↓ $PaCO_2$, asymmetric breath sounds, hemodynamic instability). Dx: CXR. Rx: Chest tube and ↑ FiO_2.
Complications 2° PVB	Inadequate block (10%) Pleural puncture Pneumothorax Horner's syndrome Inadvertent epidural spread of local anesthetic	

POSTOPERATIVE

Complications	Pneumothorax Psychological trauma PONV (see p. B-6)	If index of suspicion for pneumothorax is high, maintain oxygenation (100% FiO_2) and ventilation; inform surgeons of the likelihood of the Dx. If patient is hemodynamically stable and not hypoxemic, a portable CXR may aid in diagnosis.
Pain management	PCA (see p. C-3) PO analgesics (see p. C-3)	
Tests	Postop portable CXR, if pneumothorax is suspected.	

Suggested Readings

1. Alander JT, Kaartinen I, Laakso A, et al: A review of indocyanine green fluorescent imaging in surgery. *Int J Biomed Imaging* 2012; 940585.
2. Boneti C, Badgwell B, Robertson Y, et al: Axillary reverse mapping (ARM): initial results of phase II trial in preventing lymphedema after lymphadenectomy. *Minerva Ginecol* 2012; 64(5):421–30.
3. Boneti C, Yuen J, Santiago C, et al: Oncologic safety of nipple skin—sparing or total skin-sparing mastectomies with immediate reconstruction. *J Am Coll Surg* 2011; 212(4):686–93; discussion:693–5.
4. Greengrass RA, Duclas R: Paravertebral blocks. *Int Anesthesiol Clin* 2012; 50(1):56–73.
5. Kairaluoma P, Bachmann M, Rosenberg P, et al: Preincisional paravertebral block reduces the prevalence of chronic pain after breast surgery. *Anesth Analg* 2006; 103(3):703–8.
6. Peled AW, Foster RD, Stover AC, et al: Outcomes after total skin—sparing mastectomy and immediate reconstruction in 657 breasts. *Ann Surg Oncol* 2012; 19(11):3402–9.