

Postoperative Period

- Acute hypocalcemia may develop after thyroidectomy/parathyroidectomy.
- During liver transplantation, especially during anhepatic stage.

Anticipated Problems/Concerns

- Risk of hypocalcemia with massive transfusion of citrated blood products (>1.5 mL/kg/min) may be more severe with hepatic dysfunction due to impaired citrate metabolism.

- Alkalosis increases Ca^{2+} binding to proteins, thereby decreasing ionized calcium.
- Very low levels of ionized calcium may impair coagulation.

Cancer, Bladder

Ashish C. Sinha

Risk

- Primary risk factor is smoking; smokers are more than twice as likely to get bladder cancer compared with nonsmokers.
- Incidence: males 37 per 100,000; females 9 per 100,000.
- No associated increased risk with alcohol or caffeine consumption.
- Median age of diagnosis: 73 y.
- Greater for Caucasian than for African Americans.
- Quitting smoking decreases risk over time (baseline in 5–8 y).
- Incidence on a decline since 1999.

Perioperative Risks

- Risks vary based on surgical procedure and coexisting disease
- Chemotherapy: Pulm fibrosis and renal and cardiac dysfunction
- Fatty infiltration of liver in those with poor nutritional status
- Protein-calorie malnutrition resulting from cancer, metabolism, anorexia, anemia, hypoalbuminemia and dehydration

Overview

- Transitional cell cancer generally a systemic disease at time of Dx; 60% of patients will die of metastatic complications.

- Pts are typically elderly with long Hx of smoking, thereby promoting concurrent diseases: COPD, lung CA, atherosclerosis, angina, CAD, CHF, and Htn.
- Chemotherapy/radiation therapy may be used preop, thus complicating periop period.

Survival and Stage

- Relative survival (%) of 5 y:
 - In situ (only in the layer of cells in which it began): 96.6%
 - Localized (confined to primary site): 73.3%
 - Regional (spread to regional lymph nodes): 36.1%
 - Distant (cancer has metastasized): 5.6%

Worry About

- Significant blood loss (type and cross blood products and large-bore IV access).
- Hyperextension of lumbar spine/pelvis and compression of iliac veins results in reduced venous return of blood volume.
- Adequate padding of peripheral nerves (upper and lower extremities).
- Maintenance of neutral neck position in flexed body position.

- Monitoring of UO difficult after ligation/division of ureters.
- Overall postop morbidity between 30–64%.

Etiology

- Exposure to aromatic amines (arylamines): β -naphthylamine in cigarette smoke causes bladder cancer in mice.
- Work-related exposure: β -naphthylamine and benzene in the manufacture of rubber products, arylamines in synthetic textile and hair dyes, and paint pigments.
- Drivers of diesel trucks are affected.
- “Slow acetylators” (homozygous and autosomal recessive) may be at higher risk; *N*-acetyltransferase may detoxify aromatic amines.

Usual Treatment

- Chemotherapy
- Doxorubicin/bleomycin/cyclophosphamide/cisplatin/methotrexate; 5-fluorouracil/vinblastine/teniposide
- Radiation therapy
- Transurethral fulguration
- Radical cystectomy

Assessment Points

System	Effect	Assessment by Hx	PE	Test
CV	Doxorubicin (Adriamycin) toxicity: Cardiomyopathy	>550 mg/m ² , prior or concurrent mediastinal radiation therapy	Signs of CHF	Endomyocardial biopsy, serial ECHO, radionuclide angiography, DLCO ECG
	5-Fluorouracil: Myocardial ischemia (rare)	Angina		ECG
	Cyclophosphamide: Pericarditis with effusion	CHF	Signs of CHF	ECHO
RESP	Smoking-related injury	Cough, sputum, infections	Wheezes, rhonchi, barrel chest	CXR PFT CXR
	Bleomycin or cyclophosphamide toxicity: Pulm fibrosis	>500 mg (bleomycin), cough, dyspnea	Rales, fever	CXR
	Methotrexate: Inflammation		Pulm edema, effusions, infiltrates	CXR
RENAL	Cisplatin: ATN Methotrexate: Renal failure	Occurs 3–5 d after course		BUN, Cr, proteinuria, hyperuricemia Hematuria, proteinuria
HEPATIC	Methotrexate: Fibrosis			SGPT
CNS	Methotrexate: Encephalopathy	Confusion, somnolence, ataxia, tremors, and focal signs		

Key References: Patel HR, Cerantola Y, Valerio M, et al: Enhanced recovery after surgery: are we ready and can we afford not to implement these pathways for patients undergoing radical cystectomy? *Eur Urol* 65(2):263–266, 2014; Friedrich-Freksa M, Schulz E, Nitzke T, et al: Performing radical cystectomy and urinary diversion in regional anesthesia: potential risk reduction in the treatment of bladder cancer, *Urol Int* 91(1):103–108, 2013; Cerantola Y, Valerio M, Persson B, et al: Guidelines for perioperative care after radical cystectomy for bladder cancer: Enhanced Recovery After Surgery (ERAS®) society recommendations, *Clin Nutr* 32(6):879–887, 2013.

Preoperative Implications**Preoperative Preparation**

- Consider rehydration after bowel preparation.
- Use two large-bore IVs or one peripheral IV plus a central line.

Monitoring

- Consider arterial catheterization.
- Renal perfusion difficult to judge after division of ureters. Consider CVP or PAC or TEE.

- Standardize anesthesia technique: no bowel prep, no preop fasting, epidurals (T9–T11), PONV, and DVT prophylaxis.
- Consider combined general-epidural anesthesia to treat postop incisional pain and to reduce blood loss and fluid requirements for cystectomy, as well as less risk of postop ileus.

Induction

- Watch for hypotension due to volume depletion from prep and/or decreased systolic function from cardiotoxic chemotherapeutic agents.

Maintenance

- Avoid high concentrations of O₂ in pulm fibrosis.
- Goal-directed fluid therapy (based on euvolemia and pulsus paradoxus).
- Avoid N₂O (bowel surgery).
- Maximize efforts to prevent hypothermia.

Postoperative Considerations

- Consider overnight ventilation if procedure is long, and prepare for significant blood loss/fluid resuscitation. An epidural catheter can optimize pulmonary toilet and recovery.
- Fluids shifts occur during first 48 h.
- Early oral nutrition, ambulation, and drain removal.

- EBT of TURBT about 200 mL; cystectomy between 500–1000 mL.
- Pain score of 7–9 (cystectomy) expected.

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Cancer, Breast

Vincent S. Cowell

Risk

- 100 times more common in women than men.
- Besides skin cancer, most common cancer in USA for women; 1 in 8 women develop breast cancer; a man's lifetime risk is about 1 in 1000.
- Most significant risk factors for breast cancer are gender and growing older. About 2 out of 3 women with invasive breast cancer are 50 y or older when the cancer is found.
- Racial predilection: non-Hispanic whites > African Americans > Asians, Hispanics, and Native Americans.
- African Americans are more likely to die of breast cancer because their cancers tend to be more aggressive and of a more advanced stage that is diagnosed at a younger age.
- Of breast cancers, 5–10% are directly due to inherited mutations of the *BRCA1* and *BRCA2* gene, which tend to occur more often in younger women.
- Increased with family Hx among close blood relatives; personal Hx increases the risk of developing a new cancer in the same or other breast.
- >85% are diagnosed in women with no family Hx (genetic mutations secondary to aging and life in general rather than inherited).
- Associated with increased risk: Obesity, aging, high alcohol consumption, estrogen exposure, and long-term heavy smoking.

Perioperative Risks

- Mortality: very rare
- Lymphedema of arm following axillary node dissection

- Ipsilateral brachial plexus injury from extensive abduction of the arm, or iatrogenic
- Injury to long thoracic and/or thoracodorsal n. during surgical dissection of axilla
- Rare incidence of unrecognized pneumothorax
- Breast surgery is associated with postop N/V, with incidence as high as 60%
- Neuropathic pain, postmastectomy pain syndrome (up to 20–30% may develop symptoms)

Worry About

- Systemic or regional effect of metastasis to lungs, brain, or bones.
- High incidence of postop N/V
- NMB and identification of major nerves.
- Access to an upper extremity may be restricted or limited
- Potential adverse effects of chemotherapeutic drugs and chest radiation therapy

Overview

- Two types of invasive breast cancer, which account for 95%: invasive ductal carcinoma at around 80% and invasive lobar carcinoma at around 10%.
- Abnormal growth of adenomatous tissue that results in systemic symptoms and metastasizes to the liver, bones, lungs, and brain.
- Early detection of breast cancer offers a greater range of treatment options, increasing survival time.
- Mammography: reduces the risk of dying from breast cancer by 15–20%
- Physical exam and mammography are complementary
- Needle biopsies provide histologic diagnosis.

- Presurgical needle localization may be necessary for nonpalpable lesions.
- Most breast biopsies yield benign diagnosis.

Etiology

- Exact cause of most breast cancers is still unknown.
- Inherited and acquired genetic mutations increase the risk of developing breast cancer.

Usual Treatment

- Noninvasive breast cancer: Lumpectomy or partial mastectomy rarely with sentinel node Bx and/or axillary node dissection with radiation and/or hormonal therapy (e.g., tamoxifen and toremifene)
- Invasive breast cancer: Lumpectomy, partial mastectomy with sentinel lymph node Bx, possible ALND or radiation, possible chemotherapy, and possible hormonal therapy
- Radical mastectomy: Rarely performed
- Of women who undergo mastectomy, 20–40% elect to have breast reconstruction, with either an implant, a tissue flap, or a combination of the two.

Prognosis

- In USA, about 40,730 women will die from breast cancer in the year 2015, making it the second-most lethal cancer in women (lung cancer is the leading cancer killer in women).
- Relative 5-y survival rate for women diagnosed with cancer is 89%. The 10-y survival rate is about 83%; after 15 years, it is 78%. Unfortunately, women in lower social and economic groups still have significantly lower survival rates than women in higher groups.

Assessment Points

System	Effect	Assessment by Hx	PE	Test
CHEST	Lung lesions	Nipple discharge Chest pain or discomfort	Breast asymmetry Nipple discharge, erythema, crusting, or erosion Nipple retraction Skin dimpling	Physical exam Mammography Fine-needle aspiration biopsy CXR
GI	Liver metastasis	Fatigue, abdominal pain	Enlarged or nodular liver	Liver US or CT scan
HEME	Bone metastasis	Lethargy, SOB	Anemia, pancytopenia	CBC
CNS	Brain metastasis	Change in mental status, seizures	Neurologic exam	Head CT
MS	Bone metastasis Pathologic fractures	Severe pain Immobilization Arm swelling	Deformities Pain on palpation Axillary adenopathy	Bone scan X-rays Physical exam

Key References: Andrae MH, Andrae DA: Regional anaesthesia to prevent chronic pain after surgery: a Cochrane systematic review and meta-analysis, *Br J Anaesth* 111(5):711–720, 2013; Wu J, Buggy D, Fleischmann E, et al: Thoracic paravertebral regional anesthesia improves analgesia after breast cancer surgery: a randomized controlled multicentre clinical trial, *Can J Anaesth* 62(3):241–251, 2015.