



CO-EXISTING DISEASE

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Ischemic Heart Disease

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- ▶ The exercise ECG is most likely to indicate myocardial ischemia when there is at least 1 mm of horizontal or down-sloping ST-segment depression during or within 4 minutes after exercise.

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- ▶ **Noninvasive imaging tests for the detection of ischemic heart disease are used when exercise electrocardiography is not possible or interpretation of ST-segment changes would be difficult.**

Table 68–4 Laboratory test recommendations for outpatients scheduled to undergo ambulatory surgery procedures under general anesthesia

Age Range	Men	Women
<40	None	Pregnancy test*
40-49	Electrocardiogram	Hematocrit level, pregnancy test*
50-64	Electrocardiogram	Hemoglobin or hematocrit level, electrocardiogram
65-74	Hemoglobin or hematocrit level, electrocardiogram, serum urea nitrogen, glucose	Hemoglobin or hematocrit level, electrocardiogram, serum urea nitrogen, glucose
>75	Hemoglobin or hematocrit level, electrocardiogram, serum urea nitrogen, chest radiograph†	Hemoglobin or hematocrit level, electrocardiogram, serum urea nitrogen, chest radiograph†

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- ▶ β -Blockers are the principal drug treatment for patients with angina pectoris.

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- ▶ Patients with acute coronary syndrome can be categorized based on a 12-lead ECG.

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- ▶ ST elevation MI occurs when coronary blood flow decreases abruptly.

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- ▶ The primary aim in the management of ST elevation MI is reestablishment of blood flow in the obstructed coronary artery as soon as possible.

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- ▶ Administration of β -blockers is associated with a significant decrease in early (in-hospital) and long-term mortality and myocardial reinfarction.

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- ▶ **Non-ST elevation MI and UA result from a reduction in myocardial oxygen supply.**



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- ▶ The simplest, most cost-effective method for detecting perioperative myocardial ischemia is electrocardiography.

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- ▶ The degree of ST-segment depression parallels the severity of myocardial ischemia.

Risk Factors for Development of Ischemic Heart Disease



Male gender
Increasing age
Hypercholesterolemia
Hypertension
Cigarette smoking
Diabetes mellitus
Obesity
Sedentary lifestyle
Genetic factors/family history

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- ▶ **Atherosclerosis is the most common cause of impaired coronary blood flow resulting in angina pectoris.**

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- ▶ Angina pectoris is typically described as retrosternal chest discomfort, pain, pressure, or heaviness. The chest discomfort often radiates to the neck, left shoulder, left arm, or jaw and occasionally to the back or down both arms. Angina may also be perceived as epigastric discomfort resembling indigestion.

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- ▶ Exercise electrocardiography is useful for detecting signs of myocardial ischemia and establishing their relationship to chest pain.

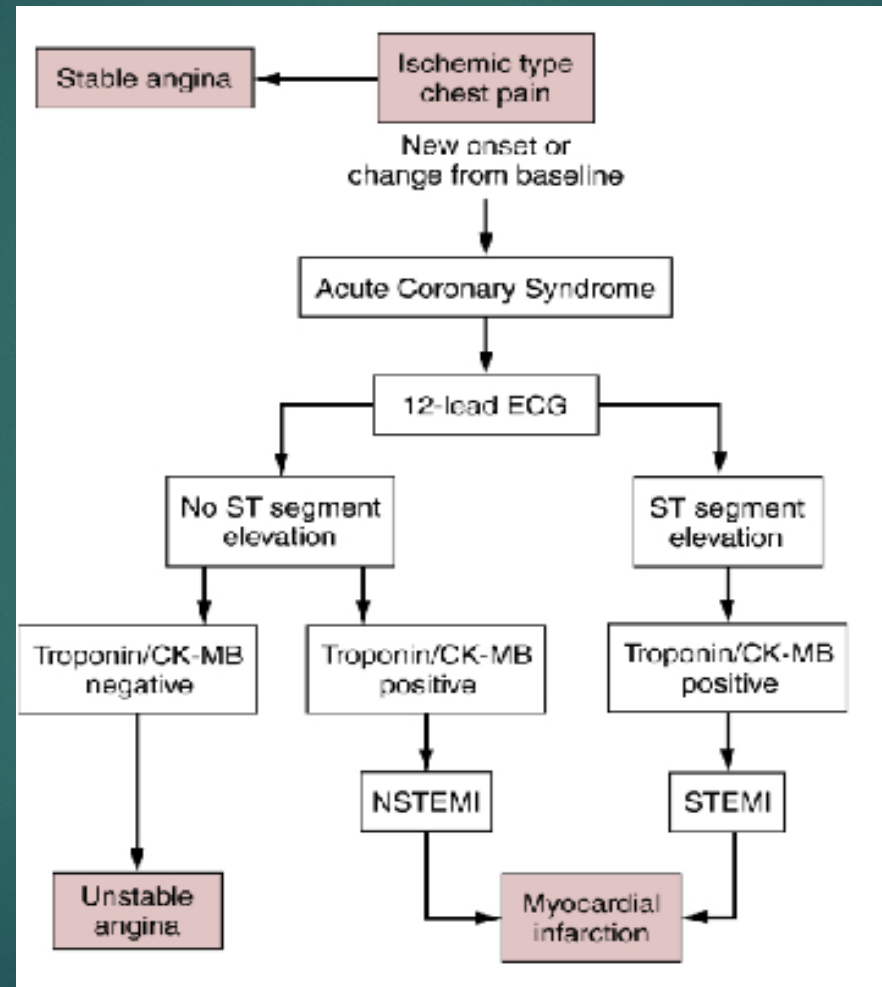
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- ▶ **Contraindications to exercise stress testing include severe aortic stenosis, severe hypertension, acute myocarditis, uncontrolled heart failure, and infective endocarditis.**



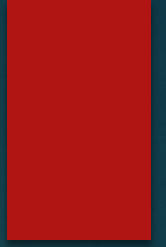
▶ **Noninvasive Imaging Tests:**

- ▶ -Echocardiography
- ▶ -Nuclear Stress Imaging
- ▶ -Electron Beam Computed Tomography

- ▶ Coronary Angiography



ASTHMA



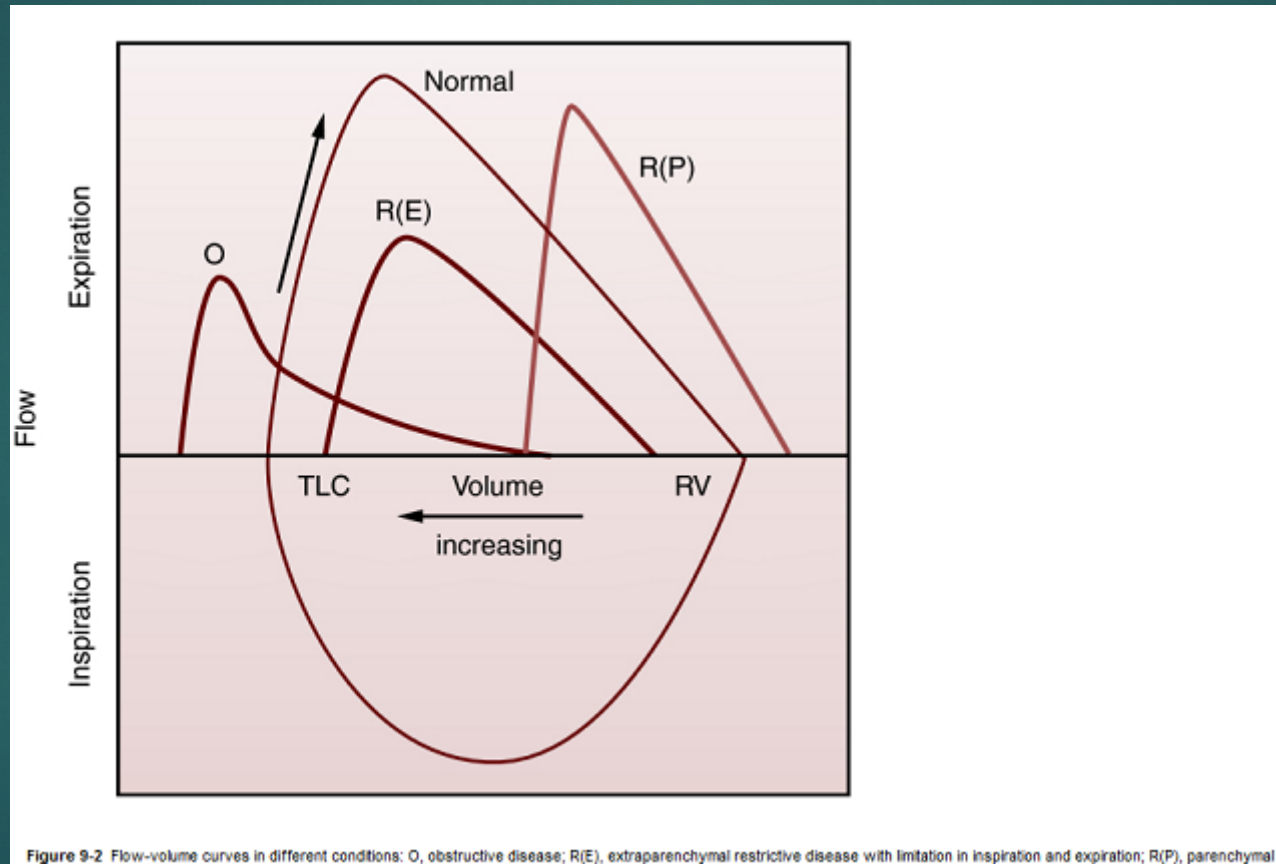
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- ▶ Asthma is a disease characterized by chronic airway inflammation, reversible expiratory airflow obstruction in response to various stimuli, and bronchial hyperreactivity.

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- ▶ Asthma is an episodic disease with acute exacerbations interspersed with symptom-free periods. Most attacks are short-lived, lasting minutes to hours, and clinically the patient seems to recover completely after an attack. However, there can be a phase in which the patient experiences some degree of airway obstruction daily. This phase can be mild, with or without superimposed severe episodes, or much more serious, with significant obstruction persisting for days or weeks. Status asthmaticus is defined as life-threatening bronchospasm that persists despite treatment.

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- ▶ Clinical manifestations of asthma include wheezing, productive or nonproductive cough, dyspnea, chest discomfort or tightness that may lead to “air hunger,” and eosinophilia.

DIAGNOSIS

- ▶ Forced expiratory volume in 1 second (FEV_1) and maximum mid-expiratory flow rate are direct measures of the severity of expiratory airflow obstruction



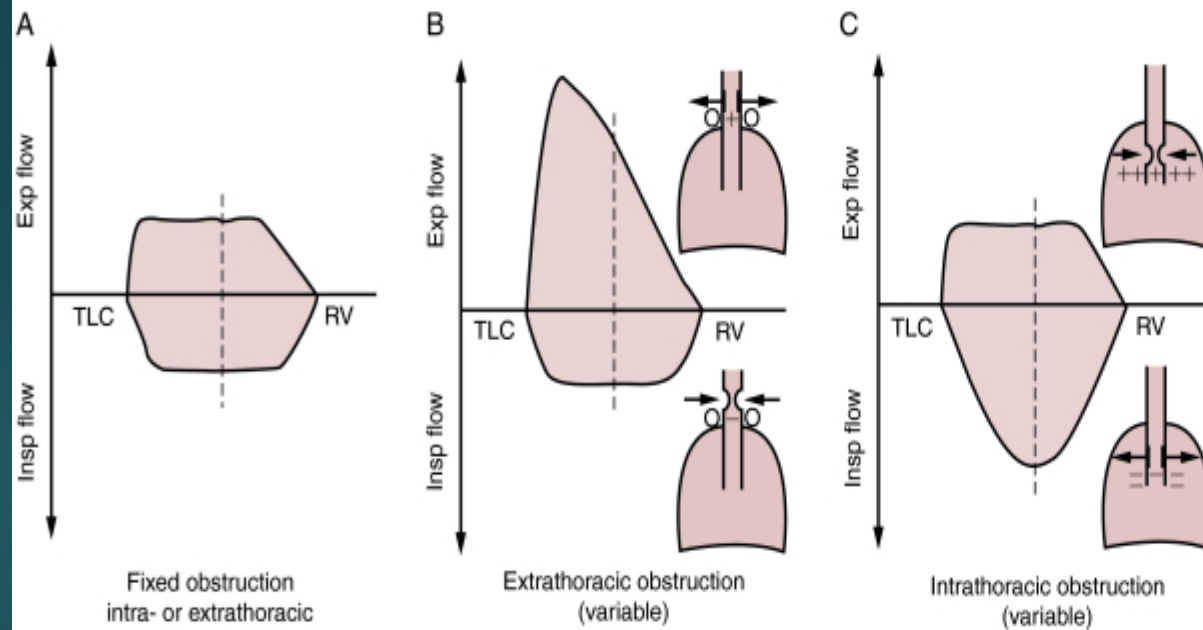


Figure 9-3 Flow-volume curves in fixed and variable obstruction. **A**, Fixed obstruction, intra- or extrathoracic. **B**, Extrathoracic obstruction (variable). **C**, Intrathoracic obstruction (variable). Exp, expiratory; Insp, inspiratory; RV, residual volume; TLC, total lung capacity. (Adapted from Benumof J [ed]: *Anesthesia for Thoracic Surgery*, 2nd ed. Philadelphia, WB Saunders, 1995.)

TABLE 9–3 -- Pharmacologic Agents Used in the Treatment of Asthma

Class	Drug	Actions	Adverse Effects
Anti-inflammatory drugs	Corticosteroids: beclomethasone, triamcinolone, flunisolide, fluticasone, budesonide	Decrease airway inflammation, reduce airway hyperresponsiveness	Dysphonia, myopathy of laryngeal muscles, oropharyngeal candidiasis
	Cromolyn	Inhibit mediator release from mast cells, membrane stabilization	
	Leukotriene modifiers: zafirlukast (Accolate), pranlukast (Ultair), montelukast (Singulair), zileuton (Zyflo)	Reduce synthesis of leukotrienes by inhibiting 5-lipoxygenase enzyme	Increased hepatic enzyme levels
Bronchodilators	β -adrenergic agonists: albuterol, metaproterenol, salmeterol	Stimulate β_2 -receptors of tracheobronchial tree	Tachycardia, tremors, dysrhythmias, hypokalemia
	Anticholinergics: ipratropium, atropine, glycopyrrolate	Decrease vagal tone by blocking muscarinic receptors in airway smooth muscle	
Methylxanthines	Theophylline	Increase cAMP by inhibiting phosphodiesterase, block adenosine receptors, release endogenous catecholamines	Disrupted sleep cycle, nervousness, nausea, vomiting, anorexia, headache, dysrhythmias

cAMP, cyclic adenosine monophosphate.



► Management of Anesthesia

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- ▶ Preoperative evaluation of patients with asthma requires an assessment of disease severity and the effectiveness of current pharmacologic management and the potential need for additional therapy prior to surgery. The goal of preoperative evaluation is to formulate an anesthetic plan that prevents or blunts expiratory airflow obstruction.

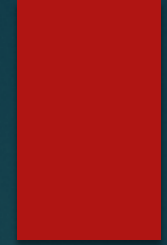


TABLE 9–4 -- Characteristics of Asthma to Be Evaluated Preoperatively

Age at onset
Triggering events
Hospitalization for asthma
Frequency of emergency department visits
Need for intubation and mechanical ventilation
Allergies
Cough
Sputum characteristics
Current medications
Anesthetic history

TABLE 9-5 -- Differential Diagnosis of Intraoperative Bronchospasm and Wheezing

Mechanical obstruction of endotracheal tube

 Kinking

 Secretions

 Overinflation of the tracheal tube cuff

Inadequate depth of anesthesia

 Active expiratory efforts

 Decreased functional residual capacity

Endobronchial intubation

Pulmonary aspiration

Pulmonary edema

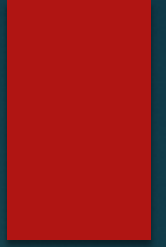
Pulmonary embolus

Pneumothorax

Acute asthmatic attack

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- ▶ If bronchospasm persists despite β_2 -agonist therapy and deep general anesthesia, corticosteroid administration may be necessary. It must be recognized that several hours may pass before the therapeutic effect of corticosteroids becomes apparent.
 - ▶ Emergency surgery in the asthmatic patient introduces a conflict between protection of the airway in someone at risk of aspiration and the risk of triggering bronchospasm. In addition, there may be insufficient time to optimize bronchodilator therapy prior to surgery. Regional anesthesia may be preferable if the site of surgery is suitable.

PULMONARY EMBOLISM



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- ▶ Surgery predisposes patients to pulmonary embolism even as late as 1 month postoperatively and despite significant advances in the prophylaxis and diagnosis of deep vein thrombosis, the mortality and recurrence rate of pulmonary embolism remain high.

TABLE 9–16 -- Differential Diagnosis of Pulmonary Embolism

Myocardial infarction
Pericarditis
Congestive heart failure
Chronic obstructive pulmonary disease
Pneumonia
Pneumothorax
Pleuritis
Thoracic herpes zoster
Anxiety/hyperventilation syndrome
Thoracic aorta dissection
Rib fractures

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- ▶ Pulmonary arteriography is the gold standard for the diagnosis of pulmonary embolism. It is used when pulmonary embolism must be diagnosed or excluded and other preliminary testing has been inconclusive.



TABLE 9–17 -- Signs and Symptoms of Pulmonary Embolism

Sign/Symptom	Incidence (%)
Acute dyspnea	75
Tachypnea (>20 breaths per minute)	70
Pleuritic chest pain	65
Rales	50
Nonproductive cough	40
Tachycardia (>100 bpm)	30
Accentuation of pulmonic component of second heart sound	25
Hemoptysis	15
Fever (38° – 39° C)	10
Homans' sign	5



Management of Anesthesia

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- ▶ **Management of anesthesia for the surgical treatment of life-threatening pulmonary embolism is designed to support vital organ function and to minimize anesthetic-induced myocardial depression. Patients typically arrive in the operating room intubated and mechanically ventilated, often with a high FIO₂. Monitoring of intra-arterial pressure and cardiac filling pressures is necessary.**

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- ▶ The phosphodiesterase inhibitors amrinone and milrinone increase myocardial contractility and are excellent pulmonary artery vasodilators

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- ▶ Nitrous oxide is not a likely selection, considering the need to administer high concentrations of oxygen and the potential for this drug to increase pulmonary vascular resistance.

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- ▶ . A nondepolarizing neuromuscular-blocking drug that does not release histamine is best in this situation.





THANK YOU