

Perspectives

Recovery Strategies from the OR to Home

In This Issue

Bowel resection (colectomy) is generally performed to treat various disorders of the intestine, including cancer, obstruction, inflammatory bowel disease, ruptured diverticulum, ischemia or traumatic injury. Total colectomy entails the removal of the entire colon, rectum and anus. A restorative proctocolectomy or ileal pouch anal anastomosis with sparing of the rectal sphincter to preserve anal continence is an alternative surgical option. As Ms. Wright, a certified WOC nurse points out, health care providers must be sensitive to the anticipated alteration in the patient's body image and life routines. Educating supportive family members throughout the continuum of care will optimize the patient's coping mechanisms and outcomes.

Valvular heart disease is the third most common cause of heart problems in the US. Heart valve disease can occur with any one or a combination of the valves, and it will often lead to heart failure if left untreated. Diseases of the mitral or aortic valves are most common, affecting over 5 percent of the population. Heart valve disease implies that a valve either fails to open properly (stenosis) or fails to close properly, allowing backward flow of blood (regurgitation). Ms. Walsh in her article describes both medical and surgical management of aortic valve disease.

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Management Of Aortic Valve Disease

By Adrienne Walsh RN, BSN

The primary function of the heart valves is to maintain the unidirectional flow of blood from the atria to the ventricles and from the ventricles into the aorta and pulmonary artery. The valves are made of thin but extremely strong flaps of tissue that open and close passively in response to pressure and volume changes within the heart chambers. The atrioventricular (AV) valves separate the atria from the ventricles. The tricuspid valve is composed of three leaflets and separates the right atria from the right ventricle. The mitral (bicuspid) valve is composed of two leaflets and separates the left atrium from the left ventricle. The semilunar

valves consist of the pulmonic valve, which separates the right ventricle from the pulmonary artery, and the aortic valve, which separates the left ventricle and the aorta. These valves are structurally different from the AV valves and consist of three cup-like cusps, or pockets, around the inside wall of the arteries.² Competent valves ensure that blood flows forward as the heart contracts and relaxes. A human heart beats more than 100,000 times each day so its valves must stretch, flex, and hold back pressure hundreds of millions of times in an average lifetime¹

Valvular Disease

Valvular disorders are caused by both congenital and acquired factors. Valve dysfunction can affect one or more valves and the development of valve disease, while occasionally acute, is usually a gradual process. Valves on the left side of the heart, the mitral and aortic, are most commonly affected by diseases that degenerate the valve because they are constantly exposed to higher pressures. The tricuspid valve may be affected if abnormal pressure builds up because other heart valves are diseased. The pulmonary valve may become abnormal but this is usually related to some deformity at birth.¹ Normally, when a valve opens, there are no pressure gradients, or differences between the chambers or vessels above and below the valve. As valve

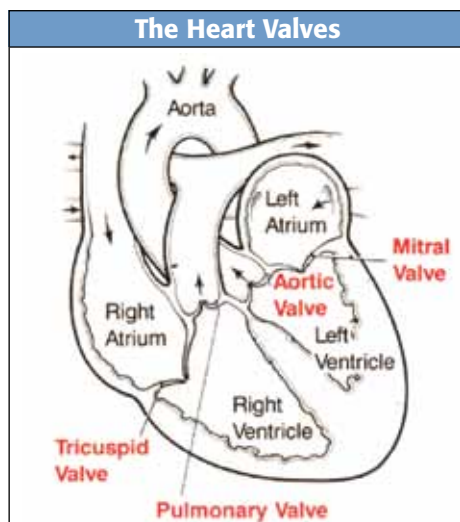


Figure 1.



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Nursing Care of the Post-Colectomy Patient

By Kathleen C. Wright RN, MS, CWOCN, APRN

Colorectal cancers are the second leading cause of cancer death in the United States, and the greatest cause of cancer death among non-smokers. While appropriate screening can reduce cancer risks by up to 20%, the American Cancer Society estimates that each year more than 50,000 women and 43,000 men are diagnosed with colon cancer, and further, more than 16,000 women and 20,000 men are diagnosed with rectal cancer.¹

Patients with rectal cancers, inflammatory bowel disease and familial adenomatous polyposis (FAP) may require surgical intervention to best manage their disease processes. FAP is an inherited disease causing formation of thousands of polyps along the entire gastrointestinal tract. If left untreated, these polyps can become malignant before the patient turns 40 years of age.

Ulcerative colitis affects 8 to 15 people per 100,000 in the United States and Northern Europe and is one of the most common indications for a total colectomy. The incidence of ulcerative colitis peaks during the third decade of life and again during the seventh decade. Individuals with ulcerative colitis are 30 times more likely to develop colorectal cancer than members of the unaffected population.² Surgery is the only way to remove the disease entirely and is the treatment of choice when medical management has been unsuccessful. Total colectomy entails the removal of the entire colon, rectum and anus. The ileum is then brought to the surface of the abdomen to create an end ileostomy.

Depending on the reason for surgery and the postoperative plan, patients may or may not have their rectum removed. Removal of the rectum cures ulcerative colitis. In patients with Crohn's disease removal of the rectum is indicated when it is compromised by fistulae, severe inflammation or strictures. If the surgery is urgent or must be performed in an emergency setting, it may be safer to perform a total colectomy with end ileostomy and leave the rectum in place. The distal bowel or retained rectum may be sutured to create a Hartman's pouch, named after the

Ulcerative colitis affects 8 to 15 people per 100,000 in the United States and Northern Europe and is one of the most common indications for a total colectomy.

French surgeon who performed this surgery in the early 1900's. An alternative to closing off the end of the distal bowel is to construct a second, non-functional stoma, commonly called a mucus fistula.

When surgery can be planned in advance, a preoperative visit with a certified ostomy care nurse (COCN) can facilitate patient education and allow for marking of the abdomen for a stomal location consistent with body contours, waist and belt lines. The chosen stoma site is placed to allow visualization and to facilitate self care. To promote pouching system adherence and avoid leakage of stool beneath the wafer, the surgeon should avoid placing the stoma near previous surgical scars and folds in the skin created by patient movement. The stoma is made within the rectus abdominus muscle, a striated muscle that runs vertically from the xiphoid process to the pubis symphysis.

Patients should be advised that while the surgeon will make every effort to locate the stoma as marked, limitations in bowel mobilization during surgery may require alternative placement. Patients who are prepared to receive a stoma adjust better to postoperative care and stoma management. Health care providers must be sensitive to the anticipated alteration in the patient's body image and life routines. Educating supportive family members and/or significant others throughout the continuum of care will optimize the

patient's coping mechanisms.

A restorative proctocolectomy or ileal pouch anal anastomosis (IPAA) with sparing of the rectal sphincter to preserve anal continence is an alternative surgical option. Sphincter tone must be evaluated to ensure adequate muscle tone for postoperative continence. Poor sphincter function can lead to disabling fecal incontinence and is a contraindication for this restorative surgical procedure. Individuals with significant learning disabilities or other conditions that prevent self care may also be poor candidates for ileoanal reservoirs.³ If appropriate, a temporary loop ileostomy may be created in a two-step procedure to allow for healing of the anastomosis line. A neorectum (ileal pouch) is formed with the distal ileum and is later attached to the anal stump.⁴ Once again, preoperative education by a COCN will help facilitate the patient's postoperative expectations.

With regard to the immediate postoperative period, the patient should be educated about:

- * the presence, purpose and duration of drains/tubes (e.g., urinary catheter, nasogastric tube)
- * the purpose and function of post-operative equipment (e.g., antiembolism devices, intravenous pumps)
- * pharmacologic and nonpharmacologic pain management techniques, including the need to notify caretakers if pain is not sufficiently controlled
- * the importance of deep breathing and physical activity
- * when oral food intake can be initiated

Postoperative Management

Anxiety about postoperative pain is one of the most common fears associated with any surgery, especially in patients who have had difficult recoveries from previous surgeries. A patient-controlled analgesia (PCA) pump will facilitate prompt intervention and enhance the patient's feeling of control over their pain. Patients need to be reminded of the non-pharmacologic measures which may assist in pain control, such as splinting the abdomen with a pillow or blanket when coughing or moving. The use of an adjustable abdominal binder (figure 1) may also provide comfort and support wound healing. Distraction with television or visitors are also components of effective pain management. Patients must be reminded that repositioning and early ambulation is important for reducing postoperative complications. Adjustable abdominal binders can promote postoperative activity by en-

couraging deep breathing, turning and coughing.

Respiratory exchange increases with activity, assisting in the prevention of atelectasis and pneumonia. Mobilization of the calf muscle increases circulation to the extremities, allowing adequate venous return to the heart and decreasing the risk of thrombophlebitis. Sequential compression to the lower extremities can be discontinued once the patient begins ambulation.

A urinary Foley catheter is placed and secured during surgery. Securement of indwelling urinary catheters with a strap to stabilize the catheter and prevent tension on the distal urethra at the meatus is recommended. The catheter can be removed as activity levels increase, after which patients should be encouraged to walk to the bathroom.

Peristalsis usually resumes within 48 to 72 hours postoperatively and is stimulated with increased patient mobility. It is not unusual for the patients to experience a postoperative delay in return to normal bowel function secondary to anesthesia and surgical intestinal manipulation. This may cause a delay in initiating oral food and fluid intake and may require temporary use of a nasogastric tube. Once bowel activity resumes, as evidenced by bowel sounds with flatus and/or fecal passage through the stoma, oral intake may be gradually progressed from clear liquids to a diet low in insoluble fiber.

Output must be carefully monitored, as high volumes of electrolyte-rich effluent can be problematic. Ileostomy pouching systems can be attached to bedside straight drainage to decrease the need for constant pouch emptying and to promote effective pouch adherence.

The colon absorbs up to 5 liters of water per day along with 400 mEq of sodium. This absorptive function is reduced with ileostomy, therefore, in preparation for discharge, patients must be taught to recognize the symptoms of dehydration, including fatigue, headache, nausea, and increased ileostomy output. Dietary modifications to thicken the stool and decrease bowel motility should be considered. The use of bulking agents (e.g., Citrucel or Metamucil) and antidiarrheal agents (e.g., Lomotil or Imodium) are frequently beneficial.³

Nutrient absorption is often reduced with extensive bowel resections. The patient who has had a significant portion of the terminal ileum removed may experience altered absorption of Vitamin B₁₂. Depletion of this vitamin results in pernicious



Figure 1. Abdominal Binder (Dale Medical Products, Inc.)

anemia, which may manifest as peripheral neuropathy. Because the liver stores Vitamin B₁₂, the patient should be monitored for declining serum B₁₂ levels, so that replacement can be initiated when appropriate.

Along with the standard assessment variables for postoperative care, the nurse must assess the color and hydration of the stoma. The end ileostomy should appear moist and pink. A pale pink stoma may be indicative of anemia; a dusky (dark red or purplish) stoma should be promptly reported to the surgeon for evaluation. This alteration in stomal appearance most commonly appears during the first 3 to 5 days postoperatively and may be due to stretching and tension of the mesenteric vessels, indicating inadequate perfusion. This requires surgical revision.

With each pouch change, the integrity of the mucocutaneous junction should be assessed. A patient at risk for compromised wound healing may also develop mucocutaneous separation – a breakdown of the suture line securing the stoma to the abdominal surface. This in turn may cause stomal retraction resulting from the loss of stomal support at the abdominal surface. Most often, this complication can be managed conservatively, with the assistance of the COCN and the use of absorptive products to facilitate wound healing and the integrity of the pouching system.

Surgical Wound Healing

Aseptic wounds made in the operating room are most often sutured or stapled post-procedure. Immediate postoperative care involves assessment of the postoperative dressing for evidence of increasing drainage or bleeding. The expected healing sign for this closure by primary intention is development of a healing ridge within 48 to 72 hours. The wound site should continue to be assessed for

evidence of infection, such as periwound edema/induration, erythema/redness or increased wound exudate. Sutures or staples are removed when deemed appropriate by the surgeon, as evidenced by the presence of a healing ridge.

In surgical cases involving peritonitis or abdominal abscess, the wound site is usually left open to heal by secondary intention. A surgical drain may be left in place to allow for removal of residual exudate and to prevent recurrent abscess formation. Granulation tissue grows from the base of the wound with regular dressing changes that support moist wound healing. Negative pressure wound therapy devices may be utilized to diminish periwound edema and bioburden in the wound, while promoting angiogenesis and rapid growth of healing tissues. Many patients find that operative site pain decreases with this type of dressing because it supports the wound and surrounding tissues. Additionally, dressing change intervals are extended to every second day and wound drainage is effectively contained.

Adequate nutrition is crucial to wound healing. Predisposing conditions for potential wound dehiscence include malnutrition, corticosteroid dependency, or history of abdominal radiation therapy. These risk factors may contribute to anastomotic leaks – a post-bowel resection complication that can cause significant morbidity and mortality. Early signs include abdominal distention, symptoms of peritoneal irritation (e.g. increased pain, ileus), and drainage of feces through a drain or the incision line. The associated abscess formation frequently requires an operative revisit and aggressive antibiotic therapy.

Laparoscopic bowel surgery is increasingly available to this patient population. Benefits may include decreased duration of hospital stays, smaller incisions and lower risk of cardiopulmonary complications, wound infection or small bowel obstructions. Postoperative ambulation and dietary advancement may be accelerated. Laparoscopic colectomy has been associated with a reduction of approximately 2 hospital days as compared to open surgery.⁴⁻⁶ Typically the patient who has undergone an open colectomy remains in the hospital for 4 to 7 days.

Ongoing Patient Education

The COCN is crucial for helping the ostomy patient resume activities of daily living post-hospital discharge. In the acute care setting, patient education fo-

cuses on basic skills, such as pouch emptying and changing techniques. As hospital stays become increasingly shorter, unit nursing staff must reinforce educational messages. It has been found that written instructions provide the most effective means for promoting retention of crucial information.³ The patient's preferred learning style and reading ability should be determined. Most ostomy product manufacturers offer well-illustrated teaching materials in written and video/compact disc formats.

In addition to reinforcing dietary modifications to maintain appropriate stool consistency and adequate hydration, patients should be reminded of the need to continue a low residue diet. Food should be thoroughly chewed and output monitored for possible obstruction. Colicky cramping and decreased output may indicate partial obstruction; a warm bath may provide relaxation and early resolution of this complication. The surgeon may order lavage of the ileostomy if blockage persists.

The hospital discharge "hand-off" to a home health nurse should include communication about the patient's progress toward effective ostomy management. Follow-up by the COCN after discharge will contribute to effective self-care skills.

The size of the stoma routinely decreases as postoperative edema resolves; the size of the pouching system opening must be adjusted accordingly to prevent peristomal skin complications. As the end ileostomy patient develops some comfort with ostomy management, further education will allow the patient to choose a pouching system that best suits his or her personal preference and lifestyle.

The patient with an end ostomy and retained rectal stump should be told that this defunctionalized rectum may occasionally pass material that resembles stool or blood-tinged mucus. Some surgeons or gastroenterologists recommend a low-volume tap water or fatty acid enema once or twice weekly to stimulate blood flow to the area and to wash out retained mucus and sloughing cells. Patients with a retained rectum should be monitored at regular intervals with a proctoscope or flexible sigmoidoscope for the development of polyps or cancer. If bowel reanastomosis is not planned, the residual rectum can later be removed.

Restoration of Bowel Continuity

Patients with a temporary loop ileostomy typically return to the hospital approximately 3 months after the initial sur-

gery for take-down of the stoma. Prior to this second surgery, the integrity of the anastomotic suture line and internal ileal pouch is assessed by injecting gastrografin dye via a rubber catheter passed through the anus and observing for extravasation. If no leakage is noted, surgical restoration of bowel continuity is performed. Recovery time is shorter than for the initial surgery, with postoperative hospitalization lasting usually only 4 days. Initially, patients may pass up to 10 stools per day as the body adjusts over the next few months. The frequency of bowel movements ranges from 4-9 per day, for an average of 6 over 24 hours. Perirectal use of protective ointments or creams will help maintain skin integrity and promote comfort.⁷

Potential IPAA Complications

While the restorative proctocolectomy offers patients an alternative to a permanent ileostomy, there are potential risks and complications.^{8,9} Anal strictures at the anastomotic site may require dilation. Pelvic abscesses occur in 4% to 6% of patients,^{2,10} presenting with fever, pelvic or low back pain and elevated white blood cell counts. In this situation, the patient may require a diagnostic computerized tomography (CT) scan, allowing image-guided drainage of the abscess. Patients who develop pelvic abscesses will require reestablishment of their ileostomy.

If the ileal pouch becomes inflamed, the patient will experience urgency and frequency with occasional fecal soilage at night. A 10 to 14 day course of antibiotics is typically curative, although longer treatment courses may be required. Patients with persistent pouchitis or pelvic infections unresponsive to medical treatment may result in pouch failure, with excessive frequency or incontinence. Excision of the pouch and creation of a permanent ostomy may be required.¹¹⁻¹⁴ Sexual dysfunction is another potential complication for the patient who has undergone a restorative proctocolectomy.¹⁰⁻¹³ Impotence or retrograde ejaculation occurs in 1 to 3% of males. Dyspareunia occurs in 7% of females with 2% reporting involuntary stool leakage during intercourse.^{2,17,18}

Conclusions

Patients with diseases of the large intestine have surgical options that require informed choice. While the severity of disease may make the IPAA unfeasible for some patients, those who can potentially benefit from this surgical intervention should be fully advised of the expect-

ed functional outcomes. Throughout the continuum of care, the health care team must provide thorough patient education, including the family and significant others, to facilitate the recovery process and return to optimal levels of self care.

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disease progresses, pressure gradients between the two structures develop. Valvular disorders are commonly classified as valve stenosis or valve insufficiency. A stenotic valve has a narrowed opening, permitting less blood flow. An insufficient valve does not close properly, allowing some blood to leak back through the opening. Valve insufficiency is also referred to as valve regurgitation or valve incompetence.

Figure 2 shows the four heart valves as if you are looking down on the heart with the filling chambers removed.¹ Any problem with a heart valve greatly increases the heart's work and causes the heart to enlarge to compensate for the extra workload. When the heart can no longer compensate, heart failure soon follows, and over time, the heart muscle becomes permanently damaged.

There are three causes of acquired valve disorders: degenerative disease, rheumatic disease and infective endocarditis. Degenerative disease occurs as the valve, is damaged over time due to constant mechanical stress. This may occur with aging or may be aggravated by conditions such as hypertension. Hypertension places significant pressure on the aortic valve often causing insufficiency. Individuals who develop rheumatic fever often experience valvular disease years later. Rheumatic disease contributes to gradual fibrotic changes of the valve in addition to calcification of the valve cusps. Shortening of the chordae tendineae also may occur. Rheumatic fever commonly affects the mitral valve. Infective endocarditis may occur as a primary or secondary infection. The valve tissue is destroyed by the infectious organism.

Similar etiologies and processes lead to right and left sided valvular dysfunction. At this point, the scope of the article will emphasize the etiology, pathophysiology and clinical presentation of aortic valve dysfunction.

Pathophysiology of Aortic Stenosis

Aortic stenosis, or narrowing of the aortic valve orifice, can be caused by rheumatic disease, a congenital defect, or degenerative processes. Fusion of the commissures (the valve leaflet edges), fibrosis of the valve leaflets and calcium deposits may occur on the aortic valve leaflets, impeding their movement. In aortic stenosis, the left ventricle must

Normal and Diseased Heart Valves

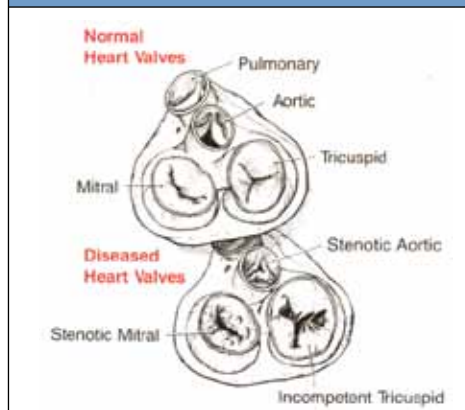


Figure 2.

generate sufficient pressure to propel blood forward through the aortic valve into the aorta and maintain an adequate cardiac output. Increases in left ventricular pressures lead to left ventricular dilation and hypertrophy. As the stenosis progresses, cardiac output becomes fixed and increases are not possible with added exertion. Left atrial volume and pressure increases as pressure backs up from the left ventricle. Left atrial dilation eventually occurs and fluid can continue to back up into the pulmonary vascular system and to the right side of the heart, eventually causing right-sided heart failure. Aortic stenosis can lead to sudden cardiac death.⁴

Pathophysiology of Aortic Insufficiency

Aortic insufficiency can be caused by rheumatic disease, a congenital defect, hypertension, endocarditis and Marfan's syndrome. If the aortic valve does not close properly, blood flows backward from the aorta into the left ventricle during diastole, seriously affecting blood flow into the aorta and reducing cardiac output. This causes significant increases in the volumes and pressures of the left ventricle with the gradual development of left ventricular dilation and hypertrophy leading to a less effective pumping action. As with other left-sided valve dysfunctions, pulmonary vascular system dysfunction and right-sided failure eventually occur.

Clinical Presentation

Signs, symptoms and physical findings specific to aortic stenosis are dyspnea on exertion, angina, syncope on exertion, fatigue, orthopnea, paroxysmal nocturnal dyspnea, a harsh, loud, crescendo-decrescendo systolic ejection

murmur loudest at the second right intercostal space, diminished carotid pulse, and narrowed pulse pressure.

Signs, symptoms and physical findings specific to aortic insufficiency include^{2,4}:

- Angina, as a result of decreased blood flow to coronary arteries during diastole that causes myocardial ischemia
- Dyspnea at rest
- Fatigue
- Exertional syncope
- Palpitations
- Left sided heart failure
- A high pitched, blowing, decrescendo diastolic murmur
- Widened pulse pressure as a result of low aortic diastolic pressures and high systolic pressures, and
- de Musset's sign (nodding of the head).

Diagnostic Tests

Chest x-ray: Shows specific cardiac chamber enlargement, pulmonary congestion, presence of valve calcification.

12-Lead EKG: Useful in the diagnosis of right ventricular, left atrial and left ventricular hypertrophy. A left ventricular hypertrophic pattern manifests as exaggerated R waves and prolonged QRS duration. In addition, patients with aortic stenosis will show ST-T wave changes consistent with left ventricular strain.⁴

Echocardiogram: Demonstrates the size of the four heart chambers, presence of hypertrophy, abnormal movement of valve leaflets, valve vegetation, ejection fraction, amount of regurgitant flow, and flow gradient across the valves.

Transesophageal echocardiography (TEE): provides a more detailed view of the heart valves. The study requires conscious sedation but is useful when diagnosis is difficult.

Radionuclide studies: Identify abnormal ejection fraction during rest and exertion.

Cardiac catheterization: Provides a hemodynamic profile, identifies perfusion defects of the coronary arteries, assesses LV function and chamber pressures, ejection fraction, regurgitation, and pressure gradients.

Patient Needs and Principles Of Management

The primary objectives in the management of valvular disorders are to maximize cardiac function, reduce anxiety, and prevent complications associ-

ated with valve disease.

Medical Management

Improve myocardial oxygenation:

As ventricular dilatation occurs, there is an increase in ventricular wall tension, myocardial workload, and oxygen consumption. Oxygen therapy should be initiated to increase oxygen saturation. Pulse oximetry, mixed venous saturation, (SvO₂), and arterial blood gases are helpful in guiding oxygen therapy.

Decrease preload: Diuretics will decrease excess fluid and ventricular end-diastolic volumes. Fluid and sodium restrictions also may be necessary. Exception: preload is not usually decreased in aortic insufficiency, since decreased left ventricular end-diastolic volumes may accentuate decreases in cardiac output.

Decrease afterload: Afterload reduction has shown to be effective in slowing the rate of left ventricular dilation and delaying surgical intervention in adults with chronic regurgitation. Several studies have shown improvement in patient outcomes with the use of angiotensin converting enzyme (ACE) inhibitors and nifedipine as afterload reducers. Afterload reduction treatment is now standard of care in treating patients with severe aortic regurgitation and evidence of left ventricular dilation.⁵

Improve contractility: Inotropic agents such as digoxin and dobutamine strengthen myocardial contractions and improve cardiac output.

Prevent coagulation: Thrombi can form on defective valve segments and result in systemic emboli.

Prophylactic antibiotic therapy: To prevent infective endocarditis before selective invasive procedures.

Modify activity: Activity limitation will help to decrease myocardial oxygen consumption. Teach patients the importance of rest between activities.

Balloon valvuloplasty: may be an option for a stenotic mitral or aortic valve. A percutaneous catheter is inserted via the femoral artery under fluoroscopy and the balloon is inflated at the stenotic lesion in an effort to force open the fused edges and improve valve leaflet mobility.

Surgical Management

Cardiac surgery is indicated when medical management doesn't alleviate patient symptoms. Patients will have better surgical outcomes if surgery is done prior to irreversible left ventricular dysfunction.

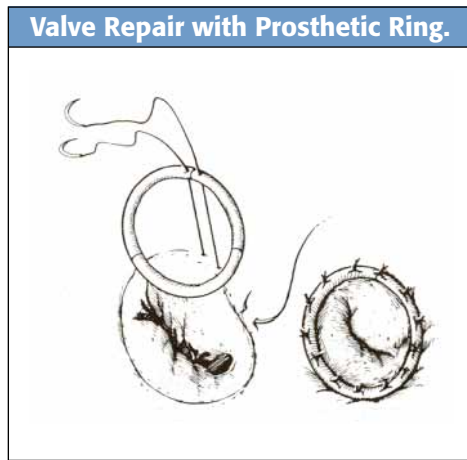


Figure 3

Aortic valve replacement remains the definitive treatment for symptomatic aortic stenosis. Balloon aortic valvuloplasty and surgical valve debridement have not been shown effective. Aortic stenosis in adults is rarely amenable to repair although commissurotomy may be an option in carefully selected young adults with non-calcified valves.⁵

Valve repair: An open commissurotomy may be performed to relieve stenosis of any of the four heart valves. During open commissurotomy, the fused commissures are incised, thus mobilizing the valve leaflets. Valve leaflet reconstruction may be done to patch tears in valve leaflets using pericardial patches for the repair. An annuloplasty ring may also be inserted to correct dilatation of the valve annulus (figure 3).⁴

Prosthetic valve replacement: Replacement of the native valve is done for severely damaged valves or when repair is not possible. The entire native valve is

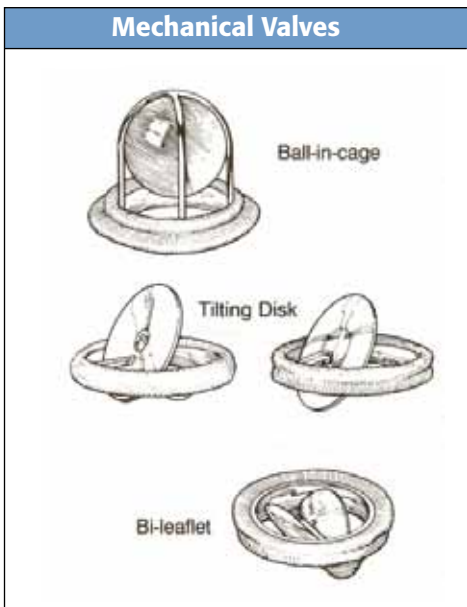


Figure 4

removed and replaced with a new valve mechanism. The new valve is firmly attached by sewing it to a rim of tissue kept from the original valve. Replacement valve mechanisms fall into two groups; biological or tissue (porcine, bovine, or allograft) and mechanical (steel, carbon ceramic, or plastic). Figure 4 illustrates some of the different types of mechanical valves.⁵

An advantage of mechanical valves is that they are durable; however, they are not natural to the body so they can cause blood clots to form. Most patients with mechanical valves must take anticoagulants for the rest of their lives.

Early Postoperative Management

Postoperative management after valvular repair or replacement is similar to patient management after coronary artery bypass graft (CABG). Most institutions have clinical pathways and open heart surgery standing postoperative orders. The following is a general overview of early post operative management:

Maintain ventilation and oxygenation. Ventilation and oxygenation are maximized in the early postoperative period with mechanical ventilation. Commercially available endotracheal tube (ET) holders tube holder (Dale Medical Products, Inc.) can help secure the ET tube and prevent accidental extubation. Within 4 to 12 hours most patients have recovered from anesthesia and are sufficiently stable to allow for initiation of a weaning protocol. Individuals with pre-existing pulmonary problems may require longer periods of intubation. Following weaning and extubation, supplemental oxygen is usually required for 1-2 days to maintain PaO₂ or SaO₂ in normal ranges. Post operative atelectasis is a common occurrence after open heart surgery, usually requiring frequent pulmonary interventions such as incentive spirometry, coughing and deep breathing exercises.

Maintain hemodynamic stability. A variety of cardiac drugs are administered to maintain hemodynamic stability in the first 24 hours postoperatively. Various hemodynamic values need to be accurately measured and interpreted. These measurements are obtained from a pulmonary artery catheter inserted during surgery. Improved accurate measurements can be obtained with the use of a securement device to maintain the transducer/air fluid interface stopcock at the phlebostatic axis (figure 5). Using this method of securement reduces the likeli-



Figure 5. Transducer Holder (Dale Medical Products, Inc.)

hood of errors associated with improper leveling. The following hemodynamic parameters serve as guides for appropriate interventions to maintain patient stability: Arterial blood pressure, mean arterial pressure (MAP), central venous pressure (CVP) or right atrial pressure (RA), cardiac output/cardiac index (CO/CI), stroke volume/stroke index (SV/SI), pulmonary artery systolic and diastolic pressure (PAS/PAD), pulmonary capillary wedge pressure (PCWP), mixed venous saturation (SvO₂), and systemic vascular resistance (SVR). In addition, autotransfusion of chest tube drainage, laboratory analysis of electrolytes, coagulation factors, hemoglobin and hematocrit levels are closely monitored and treated in the immediate postoperative period.

Maintain adequate preload: Patients with valvular disease are usually accustomed to increased end-diastolic volumes. Although the valve is repaired, the heart will need time to adjust to the hemodynamic changes. Most patients will do better in the post operative phase if fluids are adjusted based on presurgical RA/CVP and PCWP pressures.

Monitor for conduction disturbances and arrhythmias: The mitral, tricuspid and aortic valves lie in close proximity to conduction pathways. Conduction disorders are treated by temporary epicardial pacing. Monitor for arrhythmias with continuous EKG monitoring, serial EKGs as ordered in the immediate postoperative period. Advanced Cardiac Life Support (ACLS) protocols are followed for treatment. Observe for side effects of specific cardiac medications.

Initiate anticoagulation therapy: Anticoagulation therapy is usually initiated for patients having valve replacement after the epicardial pacing wires are removed. Lifelong anticoagulation therapy is required for patients after mechanical valve replacement to prevent a thromboembolic cerebral event. Short term antico-

agulation is usually initiated for patients having a biological valve replacement just until epithelial tissue covers the rough edges left by suture material that holds the valve in place.

Late Postoperative Management and Beyond

Pain management, early ambulation, aggressive pulmonary toilet and specific inpatient cardiac rehabilitation on a step-down unit or general ward advances to discharge planning. After assessing a patient's learning needs and possible cultural barriers, postoperative discussions are initiated. The following points are not all inclusive and most institutions have standard of care teaching flow sheets. Some important points to review are: continuing cardiac rehabilitation as an outpatient, lifting and driving restrictions, incision care, differentiation of pain, (sternal healing vs angina), signs and symptoms of infection, symptoms that require a call to a physician such as ankle edema, weight gain of 5 lbs in 1-2 days, and/or increasing shortness of breath. In addition, extensive patient education regarding warfarin (Coumadin[®], Bristol-Myers Squibb Co., Princeton, New Jersey) therapy and endocarditis prophylaxis is imperative. Procedures that require prophylactic therapy include dental procedures, invasive gastrointestinal, genitourinary and pulmonary procedures.

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After reading this article, the learner should be able to:

1. Identify the differences between the clinical manifestations of aortic stenosis and aortic regurgitation.
2. List diagnostic procedures for aortic valve disease.
3. Identify interventions to maximize cardiac function with medical and surgical management.
4. Describe two surgical options for the management of ulcerative colitis.
5. List three significant nursing interventions involving postoperative care of the patient who has undergone colectomy surgery.
6. Identify four potential complications of the IPAA.

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1. **Oxygenated blood is pumped into the systemic circulation via the:**
 - a. Mitral valve
 - b. Coronary sinus
 - c. Aortic valve
 - d. Tricuspid valve
2. **A valve that does not close properly and allows blood to leak back through the opening is referred to by all of the following descriptions except:**
 - a. Insufficient valve
 - b. Incompetent valve
 - c. Stenotic valve
 - d. Regurgitant valve
3. **All the following signs and symptoms reflect the pathology of aortic stenosis except:**
 - a. Angina
 - b. Fatigue
 - c. Palpitations
 - d. Harsh, loud systolic ejection murmur
4. **Which of the following non-invasive diagnostic tests shows leaflet movement, valve vegetation and flow gradient across heart valves?**
 - a. 12 lead ECG
 - b. Cardiac catheterization
 - c. Echocardiogram
 - d. Chest x-ray
5. **Which of the following outcomes would be desired in the medical management of patients presenting with valvular disease?**
 - a. Improve myocardial oxygenation
 - b. Decrease afterload
 - c. Improve contractility
 - d. All of the above
6. **The definitive treatment for symptomatic aortic stenosis is:**
 - a. Valve replacement
 - b. Commissurotomy
 - c. CABG
 - d. Balloon valvuloplasty
7. **How would you manage a conduction disturbance in the immediate post-operative period?**
 - a. IV Morphine
 - b. Atropine
 - c. Temporary epicardial pacing
 - d. Valsalva maneuver
8. **Discharge planning for an aortic valve surgery includes intensive teaching regarding:**
 - a. Anticoagulation therapy
 - b. Endocarditis prophylaxis
 - c. Outpatient cardiac rehabilitation
 - d. All of the above
9. **The curative surgical procedure for ulcerative colitis is referred to as a:**
 - a. loop ileostomy.
 - b. total colectomy.
 - c. Hartman's pouch.
 - d. proctectomy.
10. **The benefits of laparoscopic surgery include:**
 - a. shorter hospitalization.
 - b. smaller incision.
 - c. lower risk of cardiopulmonary complications.
 - d. all of the above.
11. **Essentials of ostomy care to be covered prior to hospital discharge include:**
 - a. pouch emptying and changing techniques.
 - b. where to purchase supplies.
 - c. management of peristomal complications.
 - d. alternative pouching options.
12. **Potential postoperative complications of the IPAA include:**
 - a. pouchitis.
 - b. anastomotic stricture.
 - c. impotence.
 - d. all of the above.
13. **A patient who has recently undergone IPAA presenting with fever, pelvic or low-back pain and elevated white blood cell count most likely has:**
 - a. pelvic abscess.
 - b. anastomotic stricture.
 - c. surgical wound dehiscence.
 - d. Dyspareunia.
14. **Considerations for pre-operative stoma siting include:**
 - a. Placement within the Rectus Abdominus muscle.
 - b. Avoidance of skin folds or previous surgical scars.
 - c. Facilitating patient visualization for self care.
 - d. All of the above.
15. **Patients with a temporary ileostomy typically return to the hospital for the second step in creation of the IPAA after approximately:**
 - a. 1 month.
 - b. 3 months
 - c. 6 months
 - d. one year.

Participant's Evaluation

What is the highest degree you have earned (circle one) ?

1. Diploma 2. Associate 3. Bachelor's
4. Master's 5. Doctorate

Indicate to what degree you met the objectives for this program: Using 1 = Strongly disagree to 6 = strongly agree rating scale, please circle the number that best reflects the extent of your agreement to each statement.

	Strongly Disagree				Strongly Agree	
	1	2	3	4	5	6
1. Identify the differences between the clinical manifestations of aortic stenosis and aortic regurgitation.						
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Name & Credentials _____
 Position/Title _____
 Address _____
 City _____ State _____ Zip _____
 Phone _____ Fax _____
 email address _____

Mark your answers with an X in the box next to the correct answer

1	A	B	C	D	9	A	B	C	D
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	A	B	C	D	10	A	B	C	D
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3	A	B	C	D	11	A	B	C	D
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5	A	B	C	D	13	A	B	C	D
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6	A	B	C	D	14	A	B	C	D
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7	A	B	C	D	15	A	B	C	D
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8	A	B	C	D	16	A	B	C	D
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How long did it take you to complete this home-study program? _____

What other areas would you like to cover through home study? _____