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Inguinal

By Vincent M. Vacca, Jr., MSN, RN, CCRN, SCRN, ENLS

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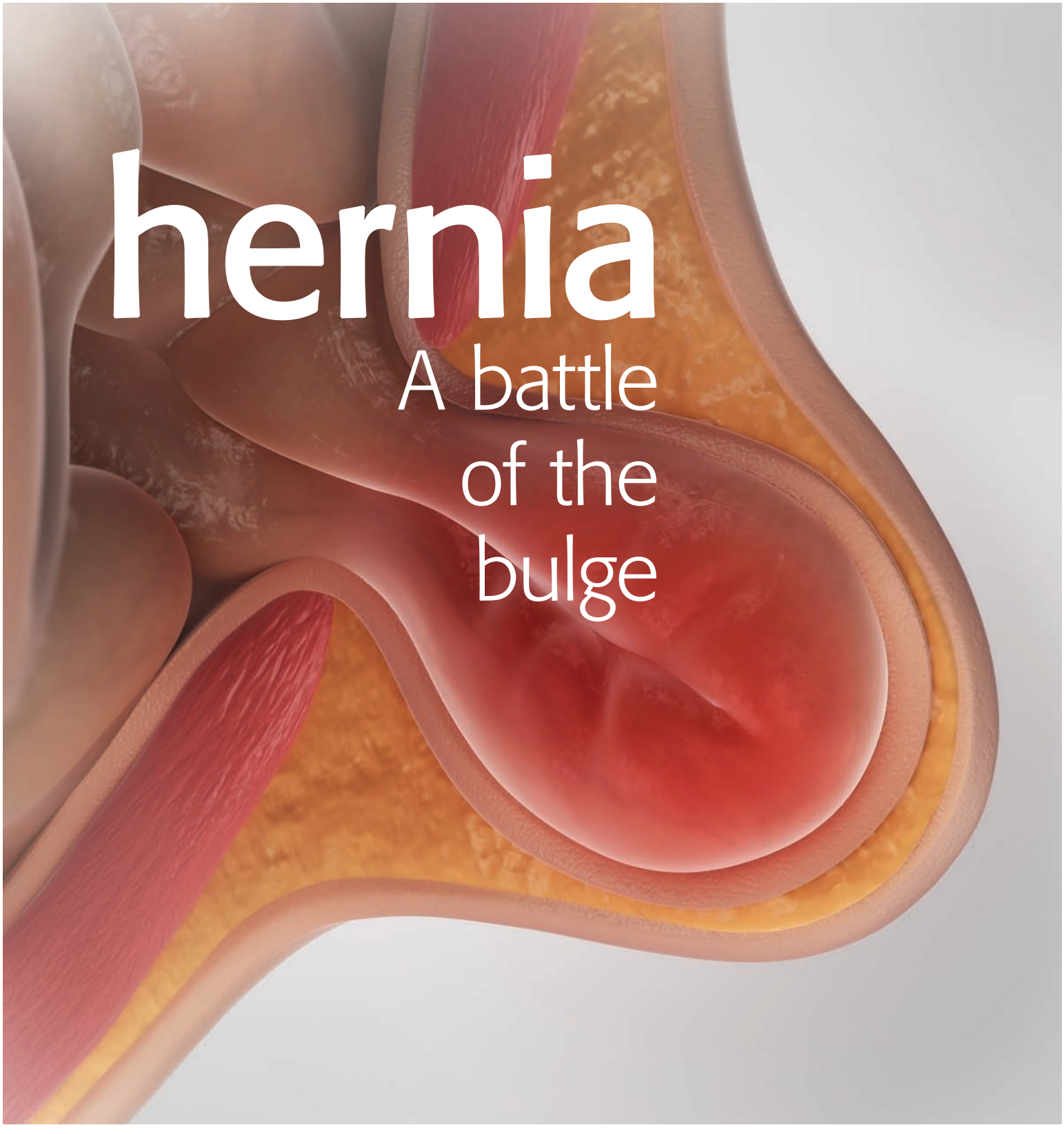
INGUINAL HERNIA (IH) is a common problem throughout the world. The lifetime risk is approximately 3% for women and 27% for men. This risk increases with age, with a reported peak incidence in males in their 60s. Eighty-six percent of all IHs occur in men.[1,2] Although many patients with IH are asymptomatic, bowel incarceration and strangulation are serious and potentially fatal complications. This article discusses the pathophysiology of IH, diagnosis, management, and nursing considerations for patients with IH.

Hernia basics

By definition, a hernia is a protrusion of an organ or other anatomic structure through the body wall that normally contains it.[3] Groin hernias can be classified as inguinal (direct or indirect) and femoral.

- A direct IH occurs when abdominal tissue protrudes through the posterior wall of the inguinal canal medially and inferiorly to the internal (deep) inguinal ring.[4] (See *Direct inguinal hernia*.)



hernia

A battle of the bulge

• An indirect IH occurs when abdominal tissue passes through an abdominal wall defect into both the internal inguinal ring and inguinal canal.[4] (See *Indirect inguinal hernia*.) This is the most common type of groin hernia.[5]
• A femoral hernia, which appears as a bulge in the upper thigh near the groin, is an extension of bowel or other abdominal structure through a defect in the femoral ring. Femoral hernia occurs most often in older multiparous women and typically affects the right side. Due to the narrow femoral canal and rigid femoral ring, bowel incarceration and strangulation are possible, making this presentation an emergency. A femoral hernia is typically painful and not reducible.[6]

Only about 4% of groin hernias are femoral.[5] (See *Fast facts about groin hernias*.) Because most groin hernias are inguinal, IH is the focus of this article. (See *Risk factors for developing IH*.)

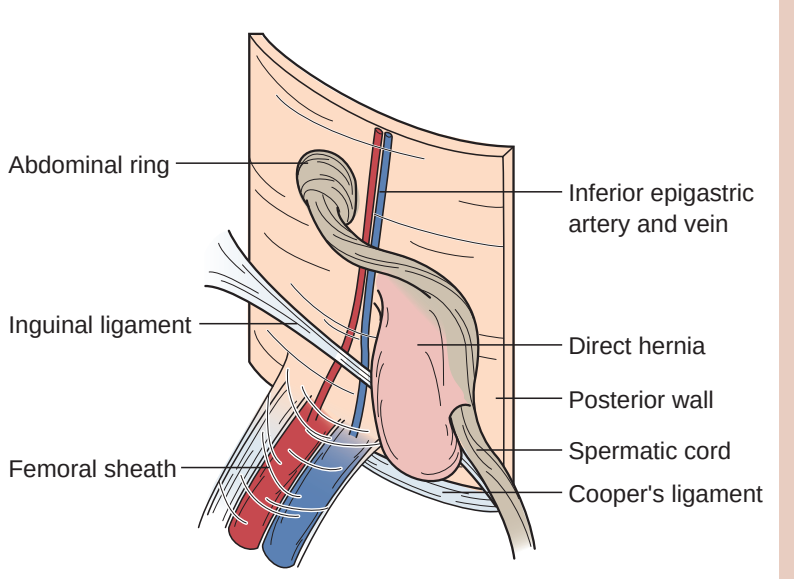
Signs and symptoms

About one-third of patients with IH have minimal symptoms or are asymptomatic.[7] The patient may have a visible bulge in the groin area, with or without pain. The patient may discover it, or a clinician may find it during a routine physical exam.

When IH onset is sudden, the pain is usually unilateral, sharp or burning in nature, and radiating to lower abdomen, proximal thigh, low back, perineum, or scrotum.[8] However, onset is more likely to be insidious.[5,8] Some patients complain of an uncomfortable heavy or dull feeling in the groin; women may describe pelvic pain.[5] Symptoms may be exacerbated by common activities such as climbing stairs, coughing, sneezing, or other Valsalva maneuvers. Athletic activities and certain movements, such as running, kicking a ball, twisting, sit-ups, or sidestepping, can also exacerbate symp-

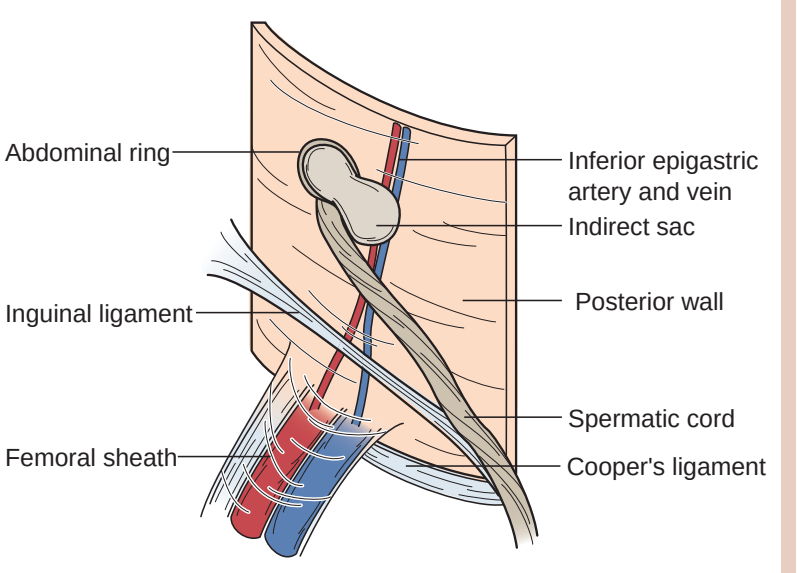
Direct inguinal hernia[3]

A direct IH bulges directly through the posterior inguinal wall. Unlike indirect hernias, direct hernias bulge medial to the inferior epigastric vessels and aren't associated with a patent processus vaginalis.



Indirect inguinal hernia[3]

An indirect IH occurs when bowel, omentum, or another intra-abdominal organ protrudes through the internal inguinal ring descending within the continuous peritoneal coverage of a patent processus vaginalis, which is anteromedial to the spermatic cord.



toms. Getting out of bed can cause pain too, but it rarely wakes patients from sleep because pain associated with an IH is typically activity-related and relieved by rest.[8]

If tissue herniates through a relatively small opening, it can become entrapped. In severe cases, entrapment can interrupt the blood supply to the bowel (strangulation), leading to tissue necrosis and intestinal perforation. (See *Signs and symptoms of strangulation*.) IH is unlikely to cause severe pain unless strangulation has occurred.[5]

Although rare, strangulation is a medical emergency.[3] However, Fitzgibbons et al. showed that serious complications are extremely rare, with a reported rate of 2.4%.[7]

Diagnosis

IH is diagnosed based on the patient's history and clinical exam findings. The clinical exam consists of inspection followed by palpation of the groin with the patient in standing and supine positions, and bilateral digital exploration of the inguinal canals. A reducible protrusion or bulge in the inguinal region is definitive evidence of an IH and typically requires no further diagnostic exploration.[2]

Due to the close proximity of numerous anatomical structures, clinicians must assess for coexisting pathologies, including muscle injuries; hip pathologies; low back problems; nerve entrapments; and intestinal, genitourinary, and gynecologic pathologies. In some cases, imaging studies are necessary to rule out these and other diagnoses.[1] Dynamic ultrasound can be valuable for detecting the defect of the posterior inguinal wall during Valsalva maneuvers and also allows the size of the defect to be measured.

In herniography (peritoneography), a contrast medium is injected into the peritoneal cavity and fluoroscopic views are obtained of the groin region after the patient performs Valsalva maneuvers. The study is positive if the contrast medium flows outside the peritoneum. Although contrast herniography is used infrequently, it's considered a safe diagnostic procedure and should be considered in the evaluation of patients when the etiology of inguinal pain is unclear.[1,9] If imaging studies are inconclusive, diagnostic laparoscopy may be indicated.[5]

Risk factors for developing IH[1,2,5]

- family history of hernia
- history of hernia or prior hernia repair (including during childhood)
- male gender
- age >60
- White race
- chronic obstructive pulmonary disease (defective connective tissue metabolism and chronic cough)
- chronic constipation
- abdominal wall injury
- cigarette smoking (can damage connective tissue in the groin as well as the lung)
- low BMI (overweight or obese patients have a lesser risk of developing an inguinal hernia)
- collagen diseases.

Treatment

Following an IH diagnosis, the initial nonsurgical treatment consists of watchful waiting with activity modification of 6 to 8 weeks of rest, anti-inflammatory medication, stool softeners, and supervised physical therapy with core strengthening and stretching exercises. Surgical exploration and repair should be considered when the patient is symptomatic and/or when nonsurgical treatment fails to improve symptoms.[1] The elective surgical setting is preferred over an emergency surgical repair as the nonelective repair has higher incidence of IH recurrence and is associated with increased complications, morbidity, and mortality.[10]

Surgical repair of IHs is one of the most commonly performed operations.[11] With surgical and anesthetic technical advances that avoid the need for general anesthesia, it's often performed as a same-day procedure at ambulatory surgical centers.

Surgical IH repair can improve the quality of life for patients with symptomatic IH regardless of age.[2] The primary goals of surgery are to:

- repair the IH.
- minimize the chance of recurrence.
- minimize postsurgical discomfort and postop complications.
- return the patient to normal activities quickly.
- improve quality of life.

Positioning a truss over the hernia was once a common nonsurgical treatment for groin hernias in men. This treatment is no longer recommended in most cases due to a lack of evidence supporting efficacy.[2,12,13] In addition, if used inappropriately, a truss may damage

Fast facts about groin hernias

Most groin hernias (96%) are inguinal; only about 4% are femoral.[5]

- Direct inguinal hernias account for 30% to 40% of groin hernias in men, compared with 14% to 21% of groin hernias in women.
- Indirect inguinal hernia is the most common groin hernia in both men and women.
- Femoral hernia repairs account for 20% to 31% of all groin hernia repairs in women, compared with only 1% in men.[5]

Inguinal hernia repair (inguinal hernioplasty) is the most common elective procedure in general surgery with over 20 million performed worldwide every year.[2,7,26] In the United States, approximately 800,000 inguinal hernioplasties are performed annually at a cost of about $500,000,000.[4,14]

abdominal contents or complicate surgical repair.[11]

Based on results of two recent randomized control trials conducted in the United Kingdom and in North America, watchful waiting for asymptomatic, nonprogressive IH in males has become an accepted alternative to routine surgical repair in selected cases.[2,7] Two other studies, however, reported that overall quality of life at 1 year was better after surgical repair than with watchful waiting.[12]

Although surgery isn't always indicated for asymptomatic IH in men, surgical repair of groin hernias in nonpregnant women is standard practice.[2] Groin hernias are uncommon in women, but these patients are more likely to have femoral hernias, recurrent hernias, and serious hernia complications such as entrapment or strangulation.[2,5,11]

Surgical repair techniques can be suture- or mesh-based, through an anterior or posterior approach, by either open surgery or laparoscopy/endoscopy. Minimally invasive procedures are always done through a posterior approach with the use of a mesh; open, suture-based operations are performed through the anterior approach.[2] (See *More about mesh*.)

Signs and symptoms of strangulation[5]

A strangulated hernia may be painful to the touch and surrounding groin skin may be erythemic. Other possible indicators include fever and signs and symptoms of bowel obstruction, such as nausea, vomiting, bloating, and abdominal pain. If bowel necrosis develops, the patient may have systemic signs and symptoms. Strangulation is a medical emergency requiring immediate intervention.

Surgical options

Surgical IH repair procedures generally fall into one of three categories:

- open surgical repair with sutures (OS); no mesh implant
- open surgical repair with mesh (OM)
- laparoscopic repair with mesh.

Studies comparing OM and laparoscopic repair show that minimally invasive laparoscopic IH repair is an acceptable alternative to open surgical repairs.[14,15] Surgical repair is indicated to treat all IHs in nonpregnant women and bilateral IHs; a laparoscopic approach is preferable to an open procedure.[1,2]

Meta-analyses comparing the laparoscopic approach with open surgical IH repairs have found comparable long-term results in relation to IH recurrence, postoperative pain, and quality of life. Differences between laparoscopic and open surgical approaches in the occurrence of chronic postoperative numbness were reported in one study as 9.2% versus 21.5%, favoring the minimally invasive techniques.[14,15]

The transabdominal preperitoneal patch (TAPP) and totally extraperitoneal (TEP) laparoscopic repair techniques are becoming more widely used due to higher patient satisfaction and lower rates of both relapse and complications.[14,15] With recent advancements in instrumentation as well as improved surgical techniques, laparoscopic repairs seem to offer better quality of life, decreasing hospital stay and earlier return to work.[10]

TAPP versus TEP

Surgeons using either of these minimally invasive laparoscopic techniques make two to four small keyhole incisions in the abdomen through which the laparoscope and surgical tools are passed to repair the IH. A single infraumbilical incision measuring 1 to 1½ cm can also used, depending on surgeon experience and expertise.[16]

A surgeon using the TAPP technique places mesh in the preperitoneal space between the abdominal wall and peritoneum. Because TAPP involves accessing the abdominal cavity, it exposes the patient to the risks of an intraperitoneal approach, including potential injury to abdominal organs (especially the bladder), vascular injuries, adhesions, and

More about mesh

Regardless of approach, the most effective method for an IH repair involves the use of synthetic mesh.[2,25] The ideal mesh for IH repair has the following characteristics:

- enough strength to withstand physiologic stresses for a long time
- ability to conform to the abdominal wall
- ability to promote host tissue in-growth, which mimics normal tissue healing
- resistance to the formation of bowel adhesions and erosions into visceral structures
- won't induce allergic reaction or adverse foreign body reactions
- resistant to infection
- noncarcinogenic.

The guidelines of the European Hernia Society and the Danish Hernia Database clearly state that mesh-based techniques have a lower recurrence rate than suture-based techniques.[2] In most countries, synthetic mesh is used in almost all IH repairs because of a significantly lower risk of recurrence than with nonmesh suture-based techniques.[1,25]

The main goal of mesh repair is to strengthen the fascia transversalis and abdominal wall. Mesh fixation techniques include sutures, glue, or self-gripping hemoclips or tacks. Each method has its risks and benefits. Physically active patients considering a mesh repair should be aware of possible postoperative consequences, including chronic pain. The presence of a foreign body or substance may cause exercise and activity to become uncomfortable.[12]

bowel herniation.[10,17] The TAPP approach is a suitable alternative to classic OS or OM repair, but only when performed by an experienced surgeon.[14,15]

TAPP can be performed with robot assistance to facilitate mesh fixation. Currently, however, little data are available on patient outcomes for procedures performed with robotic assistance.[17]

The TEP technique, which is performed outside the peritoneal cavity, was developed to avoid the risks of an intraperitoneal approach.[14,15] The surgeon creates a preperitoneal space without entering the abdominal cavity and uses mesh to seal the hernia from outside the peritoneum. Preparation for IH repair done in the preperitoneal space using the TEP technique is considered complex, as anatomical landmarks are more difficult to identify. TEP is associated with longer operating times and higher complication rates, especially when abdominal organs are attached to the peritoneum by adhesions.

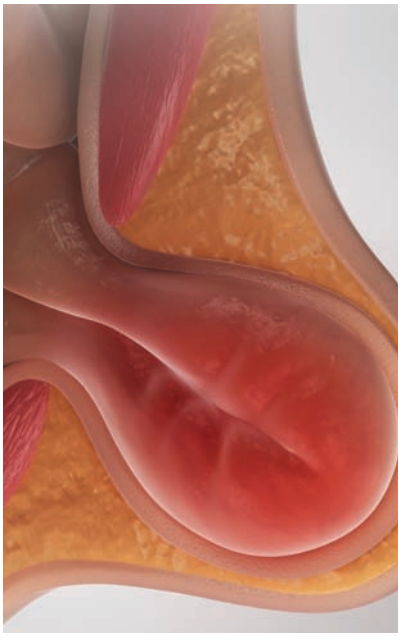
Evidence generally favors TAPP over TEP.[12,14] However, both techniques have a higher IH recurrence rate (10.1%) compared with an OM repair (4.9%); this may be because of an incomplete repair of the anatomic hernia disruption related to restricted visualization with the scope during the minimally invasive technique.[1,2] Independent risk factors for recurrence of an IH following open or minimally invasive repair include direct IH, female gender, history of recurrent IH, and cigarette smoking.[2]

Following the rising trend of minimally invasive IH repair, the medical device industry is focusing on developing products for minimally invasive IH repair to improve usability for the surgeon and safety for the patient.[14,15]

Postop complications

Complications associated with OS (nonmesh, suture-based) repairs are more severe compared with those associated with OM (mesh-based) repairs. Severe vascular, visceral complications and deep infections are more common in laparoscopic repairs, whereas in OS repairs, recurrences, and chronic neuropathic pain predominate.[12,18,19] Regardless of method, postoperative complications can also include hematoma, infections, and wound dehiscence.[19,20] A significantly increased risk for hemorrhage or hematoma within 30 days after IH surgery has been associated with older age, male gender, cirrhosis, occlusive peripheral arterial disease, and connective tissue disease. Older age (80 or older), previous history of peripheral vascular disease or connective tissue disease, and male gender are risk factors for wound dehiscence.[20]

A significantly increased risk for superficial infection or bleeding has been found in patients with peripheral vascular disease and in older patients. Cirrhosis, chronic kidney disease, and medications taken for these diseases can interfere with postoperative wound healing. A body mass index (BMI) of 25 or greater, which corresponds to approximately 172 lb (78 kg) in a male of average height, and male gender in general, are associated with increased risk for postoperative infection.[20] In addition, IH surgical repair of any method is associated with long-term chronic pain and an IH recurrence rate of 5% to 10%.[21]



A hernia is a protrusion of an organ or other anatomic structure through the body wall that normally contains it.

Nursing considerations

Same-day surgery for IH repair has increased the involvement of nurses throughout the perioperative period, beginning with preoperative evaluation and ending with postdischarge follow-up.[22] The nurse reviews the patient's health history, including medications and allergies, obtains vital signs, and performs a full assessment of the patients' cardiac and pulmonary systems. The nurse also ensures that the patient has a basic understanding of the procedure during the preprocedure visit. An evaluation of neck mobility, jaw opening, dentition, and airway patency will be conducted by the anesthesia care provider regardless of the type of anesthesia planned because the need to convert to general anesthesia is always a possibility.

The patient is instructed to shower with antibacterial soap the night before surgery and told not to eat or drink for at least 6 hours before the operation. If the patient must take medication on the day of surgery, it should be taken with a sip of water. The nurse reviews and confirms that anticoagulant and anti-inflammatory drugs, other prescribed medications, and over-the-counter and herbal supplements have been held unless directed otherwise by the surgeon. Further instructions include obtaining all relevant contact information and ensuring that a responsible adult

accompanies the patient to the center and provides transportation home following discharge.[22]

On the day of surgery, a nurse confirms the patient's identity using two unique patient identifiers, settles the patient in the preoperative holding area, and asks the patient to remove all clothing and jewelry and change into a hospital gown. The nurse also ensures that informed consent has been obtained, that all allergies and medical and surgical history have been reviewed, and that all prostheses have been removed, including contact lenses, glasses, dentures, and hearing aids.

Following Surgical Care Improvement Project recommendations, the nurse administers a prescribed antibiotic that's been proven beneficial when the procedure includes implants, even when the risk of infection is low.[23] The nurse also reviews all preoperative instructions and answers any questions the patient or care companion may have about the planned procedure.

The nurse confirms that the appropriate surgical site has been properly identified and marked, and initiates an infusion of the prescribed I.V. fluid at the prescribed rate.

Postoperative nursing care

Following the procedure, the patient is transported to the designated recovery area where a nurse provides care and assesses the patient's clinical status, including level of consciousness. The patient's care companion may be present as well.

The nurse assesses the surgical wound site and asks the patient to report pain intensity level using a validated pain rating scale. After providing pain medication as prescribed, the nurse assesses patient response for effectiveness.

A primary intervention is to provide adequate analgesia immediately after IH surgery; patients who report pain greater than 3 on the Visual Analog Scale in the early postoperative period are six times more likely to develop chronic pain.[2] Immediate postoperative pain delays recovery and discharge.[24] If the patient reports severe pain in the postanesthesia care unit, alert the surgeon immediately. This may signal a misplaced staple or tack.[17]

Immediately and up to 1 week after IH repair, patients may experience positional-related regional muscle spasms.[24] The administration of medications that act on central modulation of nociceptive pain transmission and muscle relaxation can both control pain and improve overall quality of life following IH repair. Clonidine has been shown to relieve pain and decrease opioid consumption after IH repair.[24]

Once the patient can tolerate oral fluids, the I.V. infusion is discontinued. The patient is then encouraged to sit on the side of the bed, stand, and ambulate to a chair. The nurse will advise the patient to avoid coughing and sneezing if possible, and teach the patient how to splint the incision if a cough or sneeze is unavoidable. The patient should be told to expect some swelling and bruising in the groin during recovery.[17]

Straining during bowel movements and other Valsalva maneuvers increase pain and may disrupt the surgical site. The nurse should explain the importance of taking a stool softener and a gentle laxative as prescribed to prevent pressure on the incision during bowel movements.

Before discharge, the nurse reviews postoperative wound care, pain management, and resumption of usual activities, including driving and returning to work, with the patient. The nurse will make certain to discuss with patient and care companion issues specific to safety. For example, the patient must understand that residual effects of sedation impair driving ability for 24 hours and that pain associated with the hernia repair may compromise the patient's ability to control the car safely or perform an emergency stop even beyond 24 hours. In addition, any prescribed physical activity limitations should be reviewed.

The patient and care companion should be given instructions on whom to call if potentially serious signs and symptoms develop. The patient should also be given follow-up appointment and a summary of medications, including the name, indication, dosages, and specific considerations for prescribed drugs (pain medications, laxatives, and stool softeners). The patient should also receive instructions regarding when to resume routine medications.

Other instructions include:

- Discharge diet. Resume preoperative diet and advance as tolerated.
- Activity instructions. Ambulate as able and tolerated without restriction. Don't lift more than 5 lb until cleared at the follow-up appointment. Avoid straining and any other Valsalva maneuvers.
- Wound-care instructions. For example, remove the dressing in 24 hours as directed.[22]

On the mend

IH is a common problem, and IH repair is among the most often-performed surgical procedures in this country. Knowledgeable nursing care and patient teaching are essential ingredients for successful recovery. ■

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Vincent M. Vacca, Jr., is a clinical nurse educator in the Neuroscience Intensive Care Unit at Brigham & Women's Hospital, Boston, Mass.

The author and planners have disclosed no potential conflicts of interest, financial or otherwise.

DOI-10.1097/01.NURSE.0000521020.84767.54

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