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External Abdominal Hernias

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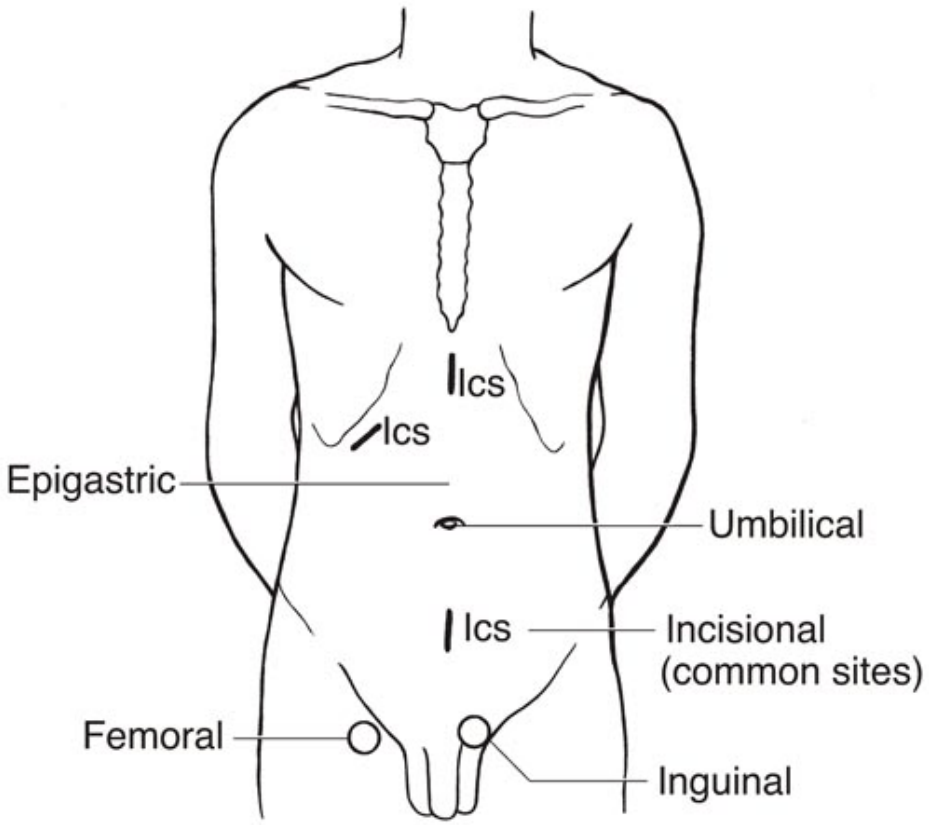
EXTERNAL ABDOMINAL HERNIAS

Definitions of Types of Abdominal Hernias

An abdominal hernia is a protrusion of all or part of an organ or tissue through an abnormal opening in the abdominal wall. Groin hernias are **inguinal** or **femoral.** In inguinal hernias, the hernial contents, organs or fatty tissue, protrude through the inguinal area, which is superior to the inguinal ligament. They form a mass at or superior to the inguinal ligament. In some cases, the contents pass through the inguinal canal to present as a scrotal mass. In femoral hernias, the hernial contents protrude through the femoral canal, which is immediately inferior to the inguinal ligament. **Umbilical** hernias come through the abdominal wall at or adjacent to the umbilicus. **Epigastric** hernias are uncommon. They protrude through a defect in the midline fascia between the xiphoid process (lower end of the breastbone) and the umbilicus. In **incisional** hernias, abdominal contents protrude through all of part of a healed abdominal incision.



External Abdominal Hernias - Illustration

A hernia is **reducible** when the contents slip back into the abdominal cavity spontaneously or with applied pressure. In **irreducible** or **incarcerated** hernias, the fascial defect through which the hernial contents pass traps the contents outside the abdominal wall. In a **strangulated** hernia, the fascial defect constricts and compromises the blood supply of the herniated tissue.

Relevant Anatomy of Inguinal Hernias

The contents of an inguinal hernia escape the abdominal cavity through the inguinal canal. This structure runs between the internal (deep) inguinal and the external (superficial) inguinal rings. It is immediately superior (cephalad) to the inguinal ligament. The inguinal canal contains the spermatic cord in men and the round ligament of the uterus in women. The spermatic cord contains the arteries and veins that supply the testes and the vas deferens (the excretory duct of the testis that conveys sperm). Nerves running superior to the internal ring and anterior to the spermatic cord in the inguinal canal provide sensation to the skin of the inguinal area and the medial thigh. Groin hernias seldom compromise these nerves but hernia surgery on rare occasions stimulates scar tissue that entraps these nerves. Nerve entrapment is one of the causes of chronic pain following inguinal hernia repair.

Indirect inguinal hernias are closely associated with the spermatic cord as the sac containing hernia contents courses through the inguinal canal with the spermatic cord. An underlying or contributing cause of some indirect hernias is a processus vaginalis that has persisted since birth. A processus vaginalis is a peritoneal diverticulum (pouch) in the embryonic lower anterior abdominal wall that traverses the inguinal canal into the scrotum to form the covering layer of the testis. Normally the processus vaginalis loses its connection with the peritoneal cavity and obliterates after birth.

Direct inguinal hernias come directly through a weakened area of abdominal wall medial to the inguinal canal. Distinguishing between direct and indirect hernias is useful in understanding theories of how inguinal hernias form. Otherwise, the distinction has little relevance.

In a sliding inguinal hernia, one organ (or part thereof), usually colon or bladder forms the posterior wall of the hernia sac. Surgeons diagnose this variation during surgery and modify the repair accordingly. Sliding hernias have no unique features related to causation or disability.

Approximately 70% of external abdominal hernias are inguinal, 15% are incisional, 10% are umbilical and epigastric and 5 % are femoral. Inguinal hernias are much more common in men, but are, nonetheless, the commonest hernia in women. Femoral and umbilical hernias are more common in women. The prevalence of inguinal, umbilical and femoral hernias increases with age.

Clinical Presentation-Groin Hernias

The presenting complaint of patients with groin hernias is usually a bulge. Patients may note vague discomfort in the groin area. However, severe pain is rare in the absence complications such as incarceration or strangulation. Severe pain suggests groin pathology other than hernia.

Some patients notice a bulge or lump in the groin immediately after an injury such as a heavy lift, a sudden severe strain, a blow to the groin area or a fall from a significant height. However, even with such injuries, some patients do not notice a bulge for days or weeks following the injury. Moreover, since pain is mild or absent, they often delay seeking medical assessment. Most complain of a gradual onset, which they cannot relate to a specific event or injury. In a few patients the groin mass appears intermittently and may not be present at the time of a physician's first examination. Repeated examinations are sometimes necessary to confirm the existence of a hernia.

Physicians diagnose inguinal and femoral hernias by observing and feeling a mass in the groin. Small hernias may not be visible, particularly in obese patients but are almost always palpable. Ultrasonography diagnoses occult hernias with high sensitivity and specificity, but is seldom required.

Groin Hernias and Workplace:

Acute strains and heavy manual labor

Since the majority of hernias appear without a history of an accident or sudden strain, it is difficult to be certain that single specific accidents cause hernias. Some accidents, by virtue or their severity and the immediate appearance of a hernia are clearly the primary cause. Case reports support this conclusion (1, 2). There is also evidence that prolonged and strenuous physical activity may be at least a contributing cause of hernia (3, 4). In a cross-sectional study, Kang found a higher rate ratio for hernia in male workers performing strenuous, heavy manual labor (5).

Approximately 10% of men over 20 years of age have a patent processus vaginalis i.e. a congenital sac of peritoneum running with the spermatic cord through the inguinal canal into the scrotum (6). It is logical to conclude that this population is at increased risk of developing a hernia as moderate to severe strain and prolonged strenuous work could cause a hernia by forcing abdominal organs or fatty tissue into this open sac.

If we accept the premise that excessive and prolonged straining is a contributing cause of groin hernia, the pathologic mechanism is most likely prolonged increase in intra-abdominal pressure. This concept lacks proof but has supportive evidence. Medical conditions not associated with trauma that cause prolonged increased intra- abdominal pressure such as chronic peritoneal dialysis, urethral stricture and ventriculoperitoneal shunts are associated with an increased risk of inguinal hernia (7, 8, 9).

Bilateral inguinal hernias share the same etiology as unilateral hernias. Up to one third of men who have a unilateral hernia eventually, develop a hernia on the opposite side. It follows that workers who have developed hernias from strains, lifts or prolonged strenuous work, and who return to the same work, will often develop a hernia on the opposite side. However, the sudden occurrence of bilateral hernias following a single injury would be an extremely rare event.

Complications of hernia repair

Most patients return to work 4-6 weeks following inguinal hernia repair. Late complications of inguinal hernia repair include persistent groin or testicular pain, ischemic orchitis and testicular atrophy. These complications are infrequent. However, they delay return to work and may become issues with regard to compensation. Chronic groin pain following hernia repair is not usually due to recurrence. Such patients exhibit few, if any relevant findings on examination and the pain tends to be refractory to conservative and operative management.

Incisional (Ventral) Hernias

Approximately 10% of abdominal incisions develop incisional hernias. Excessive tension and inadequate healing of a previous incision due to infection or other factors are primary causes. Risk factors include obesity, advanced age, malnutrition, ascites, pregnancy, chronic pulmonary disease, diabetes mellitus and conditions that increase intra-abdominal pressure. Incisional hernias usually contain small bowel and are associated with intra abdominal adhesions from previous surgery. They are prone to incarceration, bowel obstruction and strangulation. Incisional hernia repair has a recurrence rate of 25-50% (10). These hernias therefore, may lead to recurrent and long-term disability. There is indirect evidence that workplace factors, which cause prolonged increase in intra-abdominal pressure such as excessive straining and heavy lifting, are contributing causes of incisional hernias.

References

1. Mucciolo, RL. Godec, CJ. Traumatic acute incarcerated scrotal hernia J Trauma-Injury Infection & Critical Care 28(5):715-6, 1988 May

2. Smith, GD. Crosby, DL. Lewis, PA. Inguinal hernia and a single strenuous event Ann Royal Coll Surg Eng 78(4):367-8, 1996 Jul.

3. Carbonell, JF. Sanchez, JL. Peris, RT et al. Risk Factors associated with inguinal hernias: a case controlled study. Euro J Surg 159(9):481-6, 1993 Sep

4. Flich, J. Alfonso, JL. Delgado, F. Prado, MJ. Cortina, P. Inguinal hernia and certain risk factors. Euro J Epidemiology. 8(2):277-82, 1992 Mar.

5. Kang, SK, Burnett, CA. Freund, E. Sestito, J. Hernia: is it a work-related condition? Amer J Industrial Med 36(6):638-44, 1999 Dec.

6. Van Wessem, KJ. Simmons, MP. Plaisier, PW. Lange, JF. The etiology of inguinal hernias: anogenital and/or acquired? Hernia. 8(1):16-7, 2004 Feb.

7. Wetherington, GM. Leapman, SB. Robison, RJ. Filo, RS. Abdominal wall and inguinal hernias in continuous ambulatory peritoneal dialysis patients. Am J Surg. 150(3):357-60,1985 Sep

8. Lodding, P. Bergdahl, C. Nyberg, et al Inguinal hernia after radical retropubic prostatectomy for prostate cancer: a study of incidence and risk factors in comparison to no operation and lymphadenectomy. J Urol. 166(3):964-7, 2001 Sep.

9. Celik A. Ergun O. Arda MS. The incidence of inguinal complications after ventriculoperitoneal shunt for hydrocephalus. Child Nervous System 21(1):44- 7, 2005 Jan

10. Anthony T, Bergen PC, Kim LT, et al: Factors affecting recurrence following incisional herniorrhaphy. World J Surg 24:95-100, 2000.