

Inguinal Hernia

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KEYWORDS

- Inguinal hernia • Laparoscopic herniorrhaphy • Incarcerated inguinal hernia
- Hydrodissection • Patent processus vaginalis

KEY POINTS

- The incidence of a patent processus vaginalis (or canal of Nuck in females) is highest in premature infants, and many of them close before 2 years of age.
- Not all patent processus vaginalis will develop into a clinical hernia.
- The optimal time of repair for premature and low birth weight infants is controversial.
- Laparoscopy is a safe and possibly technically easier technique, especially for incarcerated inguinal hernias.
- Recurrence rates are reported between 0.4% and 4.1%, but the recurrence rates are decreasing with increasing surgeon experience and are now comparable with open repair.

INTRODUCTION

Inguinal hernias are one of the most common congenital anomalies seen by pediatric surgeons. The overall incidence ranges from 0.8% to 5.0% in full-term infants and up to 30.0% in low birth weight and premature infants.¹⁻³

Although open repair is still widely performed, laparoscopic repair is now known to be a safe and effective alternative, with postoperative complication rates comparable with open repair.^{4,5} Given the minimal dissection required, especially in complex hernia repairs (ie, incarcerated, recurrent, obese patients), laparoscopy has also been reported by some surgeons to be technically easier.^{4,6-9} Laparoscopy may also result in a shorter hospital stay, decreased postoperative pain, and better cosmesis.^{9,10} Additionally, laparoscopy also allows for contralateral evaluation and repair of a patent processus vaginalis (PPV) without the need of an additional incision.^{11,12}

INDICATIONS/CONTRAINDICATIONS

Clinical Presentation

Most inguinal hernias are found incidentally by a parent or during a routine medical examination. Inguinal hernias present as an intermittent groin bulge that most often

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occurs when patients bear down. If the hernia is incarcerated, it will present as an irreducible bulge that is not fluctuant but possibly erythematous. Patients may also have obstructive symptoms, such as nausea/vomiting, abdominal distention, and obstipation. Strangulated hernias may also present with peritonitis, bloody stools, and hemodynamic changes.

Premature/Low Birth Weight Infants

There is currently no clear consensus as to the optimal time for herniorrhaphy in premature and low birth weight infants. The argument is that although premature and low birth weight infants are at a high risk of incarceration and infarction,^{13,14} they are also at a high risk of anesthesia-related postoperative cardiopulmonary complications, particularly apnea and bradycardia.¹⁵

Vaos and colleagues¹⁶ recommend early elective herniorrhaphy in premature infants given the high risk of incarceration and postoperative complications; however, Lee and colleagues¹⁷ found the risk of incarceration in their patient population to be low and herniorrhaphy before discharge from the neonatal intensive care unit (NICU) was associated with a prolonged hospital stay. A survey of pediatric surgeons in the United States found that most (63%) will operate before discharge from the NICU.¹⁸

Timing of Surgery

Although there is concern about the effects of early anesthetic exposure on neurodevelopment,¹⁹ it is recommended that all patients with an inguinal hernia undergo a repair shortly after diagnosis given the risk of incarceration. Stylianos and colleagues¹³ found that up to 35% of their patients who presented with an incarcerated hernia were known to have an asymptomatic inguinal hernia. Additionally, the risk of complications, such as infections, recurrence, and testicular atrophy, are increased in incarcerated hernias compared with elective repairs.^{13,20,21}

Contraindications

The pneumoperitoneum used during laparoscopy may result in multiple physiologic changes secondary to increased intra-abdominal pressure, such as decreased cardiac filling, reduced functional residual capacity, and increased intracranial pressure.^{22,23} It should be used with caution in patients with cardiopulmonary and neurologic issues. Other potential contraindications to laparoscopy include coagulopathies, multiple previous abdominal surgeries, or hemodynamic instability (**Table 1**).

SURGICAL TECHNIQUE/PROCEDURE

Anatomy

Most pediatric inguinal hernias are indirect, resulting from failure of the processus vaginalis (or canal of Nuck in females) to obliterate during fetal development. The

Table 1
Contraindications to laparoscopy

Relative Contraindications to Laparoscopy	Absolute Contraindication to Laparoscopy
Coagulopathies	Hemodynamic instability
Previous abdominal surgery	
Increased intracranial pressure	
Cardiopulmonary disorders	

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