

Giant Inguinal Hernia in a 5-Year-Old Boy With Hydrocephalus: A Case Report

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● A case of giant left inguinal hernia in a 5-year-old boy is presented. The patient had multiple neurosurgical procedures performed in the neonatal period for spina bifida and hydrocephalus, including the placement of a ventriculoperitoneal shunt. The hernia was first noted during this period but was not repaired, and the child was lost to follow-up until age 5. The hernia underwent progressive enlargement over this interval, and the eventual development of gastrointestinal symptoms prompted the "rediscovery" of the defect. The majority of the child's intestines were within the hernia, with at least partial loss of domain. The unique preoperative and postoperative management of this difficult problem is described.

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INDEX WORDS: Giant inguinal hernia; hydrocephalus.

MOST OF THE REPORTS of giant inguinal hernias involve the elderly adult population. This entity is decidedly unusual in children; there have been no reports in the English language literature over the past 20 years. The potential complications associated with returning the extravasated bowel back into the peritoneal cavity are similar to the complications attendant with the primary skin and fascial closure of a neonatal gastroschisis or omphalocele, namely: (1) inhibition of adequate respirations by limiting the lung volumes; (2) impairment of venous return, with a resultant low-flow state from the diminished cardiac output; and (3) impaired renal function. In addition, our patient was potentially prone to complications related to the presence of a ventriculoperitoneal shunt for hydrocephalus.

CASE REPORT

J.K. was born with spina bifida and hydrocephalus. He underwent placement of a ventriculoatrial shunt at age 6 weeks, and subsequent closure of his spinal defect was performed at age 10 months. Cystostomy was also performed for recurrent urinary infections secondary to obstruction. His shunt was revised to a ventriculoperitoneal shunt at age 14 months. A left inguinal hernia was noted during this period but was not repaired due to anesthetic difficulties associated with his previous neurosurgical and urologic procedures. The hernia progressively enlarged over the ensuing 4 years, and at

the time of presentation he was symptomatic. He admitted to daily episodes of abdominal pain and bloating as well as anorexia and periodic vomiting. Three different surgical consultants had examined the child and considered the hernia too large to be safely repaired.

Physical examination showed pectus excavatum, a scaphoid abdomen, a huge left inguinal hernia with contained bowel, and a small right inguinal hernia (Fig 1). It was possible to reduce the hernia, albeit with difficulty. There was no clinical or radiological evidence of obstruction. A chest radiograph showed severe kyphosis in addition to his pectus defect. An abdominal film demonstrated that the hernia sac contained most of the small bowel and a portion of the colon as well.

The prospect of returning the herniated bowel to the abdominal cavity prompted concerns over increased intraabdominal pressure and consequent adverse effects on respiratory function, venous return, and continued function of the ventriculoperitoneal shunt. We felt that the potential risks of pneumoperitoneum in a patient with a ventriculoperitoneal shunt (infection, pneumocephalus, shunt failure) contraindicated this technique.

The patient was begun on an elemental diet (Vivonex, Norwich-Eaton) several days before operation to diminish bowel gas and stool bulk, and laxatives were administered. On the day prior to his scheduled surgery, reduction of the hernia for 1 hour resulted in moderate tachypnea. However, there were no hemodynamic changes and no appreciable fall in oxygen saturation as measured by transcutaneous oximetry.

At operation, the hernia was found to contain essentially all of the small bowel and most of the right colon. The contents were returned to the abdomen, and Bassini repair was performed with a buttress of polypropylene mesh.

Postoperatively for a 10-day period nasogastric decompression was instituted, no oral intake was allowed, and parenteral hyperalimentation was administered. The patient was mechanically ventilated for the first 24 hours and then gradually weaned from the ventilator and extubated without difficulty. The adequacy of subsequent oxygenation was assessed with transcutaneous oximetry. Continuous supplementary oxygen was needed to maintain oxygen saturation at a 90% level or greater for the first 3 postoperative days. Supplemental inspired oxygen was able to be discontinued by the sixth postoperative day. His respiratory rate remained in the range of 32 to 38 breaths per minute initially, before gradually returning to normal by the seventh postoperative day. Chest radiographs showed diminished inspiratory volume, but no evidence of infiltrates or visible atelectasis. Throughout this period, the ventriculoperitoneal shunt continued to function well, and the patient's abdomen remained nontender.

Nine days after his initial surgery, the patient was returned to the operating room for repair of the right inguinal hernia. This procedure was accomplished without incident, and he was easily extubated in the recovery room. The following day, he was started on gradually increasing volumes and concentrations of an elemental diet (Vivonex). Hyperalimentation was slowly discontinued, and the patient was discharged from the hospital on the day 17 postoperatively. Over the ensuing 3 weeks, he gradually returned to a normal diet. There were no subsequent gastrointestinal complaints, and there have been no complications with either bowel function or the

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Fig 1. A giant left inguinal hernia in a 5-year-old child.

herniorrhaphies. The cosmetic results were also quite satisfactory (Fig 2).

DISCUSSION

Giant inguinal hernias are primarily found in the elderly adult population. The most common reason for these hernias attaining massive size is simple neglect, and such was the case with our patient. We were not able to find any cases reported in the pediatric patient population in the last 20 years.

There is a well-known association between the presence of a ventriculoperitoneal shunt and the subsequent development of inguinal hernias in the pediatric population. Grosfeld et al¹⁻³ have written extensively on this subject. In a series of 185 patients, they found an incidence of 16% of inguinal hernia development following ventriculoperitoneal shunting, with a 75% incidence of bilaterality. In comparison, Grosfeld et al reviewed a series of 242 patients who had undergone ventriculoatrial shunting, and the incidence of inguinal hernia in this group was only 1.2%. They recommend: (1) close observation of hydrocephalic patients who receive ventriculoperitoneal shunts, since they may

represent a subgroup of children at risk for the development of inguinal hernias; (2) caution in the operative repair of the hernia, since inadvertent damage may be done to the catheter, which may actually lie within the hernia sac; and (3) contralateral inguinal herniorrhaphy, since their incidence of bilateral hernia was 75%.

Moreno^{4,5} first described the technique of progressive pneumoperitoneum in the treatment of massive herniation and eventration. His personal series of more than 4,500 pneumoperitoneums must surely rank as the world's largest. Prior to the advent of this technique, repair of a giant hernia was often a hazardous undertaking with a prohibitive mortality rate and a high rate of recurrence. Early surgical attempts at repair often resulted in closure of the hernia defect under tension, occasional bowel resection in order to enable the surgeon to return the bowel to the abdominal cavity, and a stormy postoperative course due to the impairment of venous return and limitation of respiratory excursion by the acutely increased abdominal volume and pressure.

While the technique of pneumoperitoneum is unquestionably of benefit, it is time consuming, taking

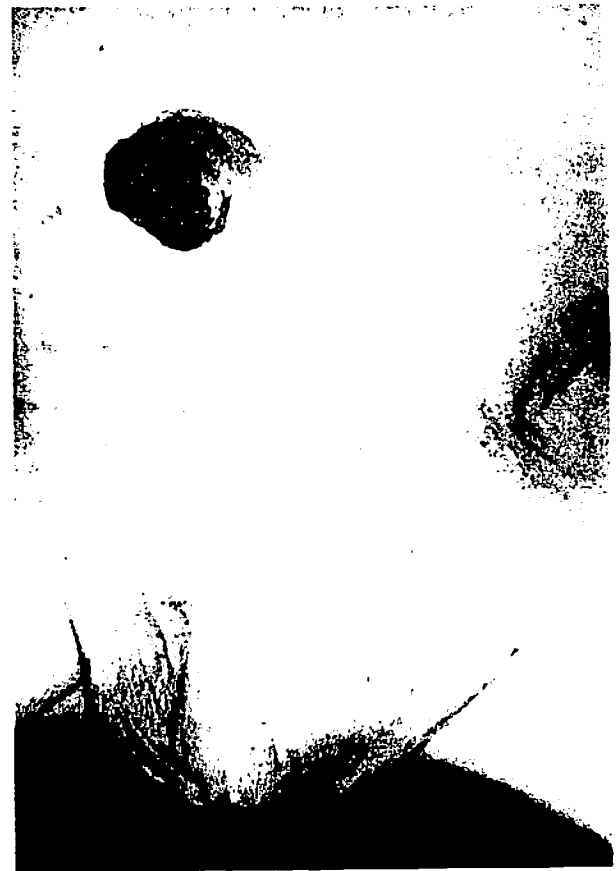


Fig 2. Postoperative results after reduction and herniorrhaphy. The cystostomy site is visible above the repair.

several days or weeks (often 7 to 10 days) for adequate expansion of the peritoneal cavity. This would not be well tolerated by a 5-year-old child. Although many surgeons have reported success with this method,⁶⁻⁹ the procedure is not without complications, the most frequent being those related to the aforementioned embarrassment of venous return and pulmonary function, as well as phlebitis, embolization, and peritonitis. However, the primary contraindication for this technique in our patient was the ventriculoperitoneal shunt. We felt the risk of shunt occlusion, potential introduction of large quantities of air into the cerebral ventricles, and the risk of infection precluded the use of progressive pneumoperitoneum in our patient.

Our technique for the treatment of massive inguinal hernia focused on the reduction of the volume of the bowel by reducing its content of gas and stool. This reduction was accomplished by: (1) use of an elemental diet in the preoperative and late postoperative period, (2) use of hyperalimentation coupled with avoidance of any enteral intake in the immediate postoperative period, (3) careful preoperative and postoperative monitoring of respiratory status with emphasis on the use of transcutaneous oxygen tension. We feel that the unusual occurrence of a massive inguinal hernia in a pediatric patient with a functional ventriculoperitoneal shunt mandated a unique therapeutic approach.

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