

CASE REPORT

Nagoya J. Med. Sci. 77. 531 ~ 535, 2015

A new modification of laparoscopic percutaneous extraperitoneal closure procedure for repairing pediatric femoral hernias involving a special needle and a wire loop

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ABSTRACT

Femoral hernias are relatively rare in children, and more than half of pediatric femoral hernias are misdiagnosed. A 3-year-old boy was treated for an indirect inguinal hernia at the age of 2, but he exhibited an inguinal bulge one month after the operation. He underwent laparoscopy, and a right femoral hernia was detected. The femoral hernia was laparoscopically repaired via two small incisions: a 1.0-cm umbilical incision for a 3-mm 30° laparoscope and 3-mm grasping forceps and a 5-mm right lateral incision for 3-mm grasping forceps. After the hernia sac had been reflected into the abdominal cavity and resected, the iliopubic tract was sutured to Cooper's ligament using a laparoscopic percutaneous extracorporeal closure (LPEC) needle and 2-0 non-absorbable sutures. Laparoscopy enables the accurate diagnosis of rare and often missed pediatric femoral hernias. Our laparoscopic technique for treating femoral hernias is easy and effective. Although these early results are encouraging, more cases involving longer follow-up periods should be accumulated to confirm the efficacy of our technique.

Key Words: femoral hernia, laparoscopic repair, LPEC needle

INTRODUCTION

Femoral hernias are uncommon in children.¹⁻³⁾ At present, most pediatric femoral hernias are repaired using the conventional McVay procedure, in which closure is performed between the transversal fascia and Cooper's ligament through the open anterior approach. Recently, a laparoscopic technique, in which the inguinal ligament was sutured to Cooper's ligament, was reported.⁴⁾ Herein, we report a new modification of laparoscopic percutaneous extraperitoneal closure (LPEC) procedure, in which the iliopubic tract is sutured to Cooper's ligament using an LPEC needle to close the femoral orifice. This technique is easy, feasible, and produces good cosmetic results.

Received: April 2, 2015; accepted: June 23, 2015

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CASE REPORT

A 3-year-old boy was admitted to our hospital for a recurrent inguinal bulge. He had undergone a Potts' procedure for a right indirect inguinal hernia at the age of 2 at a regional hospital. The patient's surgical records showed that a narrow processus vaginalis had been observed during the operation. However, a right inguinal bulge developed at one month after the first operation (Fig. 1). A laparoscopic operation was scheduled to evaluate the suspected recurrent inguinal hernia. After the induction of general anesthesia, the patient was placed in the supine position, and a viewing monitor was placed at the patient's feet. A 3-mm port for a 3-mm, 30° laparoscope was produced using the open technique via a 1.0-cm vertical transumbilical incision. The abdomen was insufflated to a pressure of 8 mmHg. A 3-mm grasping forceps was inserted through the same transumbilical incision, but a different entrance, as was performed in a previously reported single incision LPEC procedure.⁵⁾ The 3-mm grasping forceps was inserted into the left lateral abdomen. Laparoscopy demonstrated that the patient had bilateral femoral hernias, which were located easily. It was confirmed that the femoral orifice was located medial to the external iliac vein, under the iliopubic tract, and above Cooper's ligament (Fig. 2a). After the hernia sac had been reflected into the abdominal cavity and resected with an electric cauterizer, a 19-gauge LPEC needle (Hakko, Nagano, Japan) and non-absorbable sutures (2-0 polyester sutures) were used to close the femoral orifice. Sutures were inserted into the iliopubic tract, followed by Cooper's ligament, and then the suture material was released from the LPEC needle into the abdominal cavity (Fig. 2b). Then, an LPEC needle without suture material was inserted through the same skin puncture point and passed to the lateral side. The suture line in the abdominal cavity was grasped with the wire loop inside the LPEC needle and exteriorized. The resultant U-shaped suture line was tied extracorporeally. One more suture was added on the lateral side of the first suture. Finally, the iliopubic tract was sutured to Cooper's ligament, resulting in complete closure of the femoral orifice. The peritoneum was closed at the same time (Fig. 2c). As an asymptomatic contralateral femoral hernia was observed, left femoral hernia closure was performed using the same procedure. The total operative time was 68 minutes. The patient's postoperative course was uneventful, and he had not suffered any recurrence at seven months after the second operation.

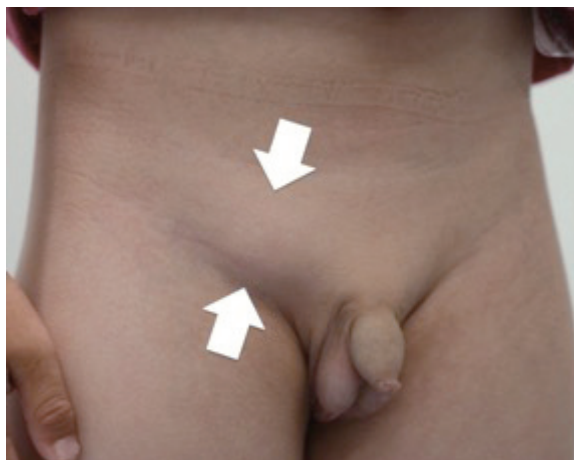


Fig. 1 The patient exhibited a right inguinal bulge at one month after the first operation

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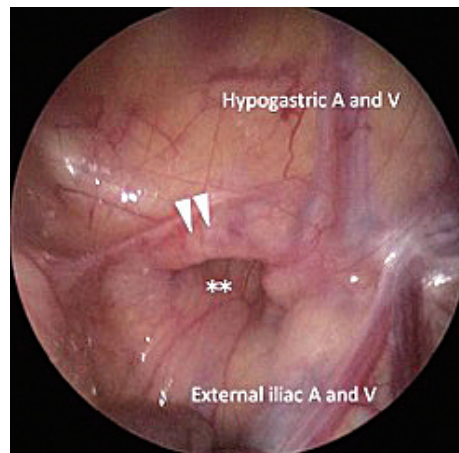


Fig. 2a A right femoral hernia (**) was observed below the iliopubic tract (arrowheads)



Fig. 2b The iliopubic tract (arrowheads) was sutured to Cooper's ligament (arrows) using non-absorbable sutures and an LPEC needle to close the femoral orifice



Fig. 2c The femoral orifice was completely closed

DISCUSSION

Femoral hernias are relatively rare in children, accounting for about 1% of all groin hernias.¹⁻³⁾ In fact, pediatric surgeons only see a few direct inguinal hernias or femoral hernias among hundreds of hernia repairs.⁶⁾ Femoral hernias are often misdiagnosed (they are only correctly diagnosed in 53% of cases), and hence, are sometimes treated as regular inguinal hernias with open approaches.⁷⁻⁸⁾ In our case, the patient was also treated under a misdiagnosis of inguinal hernia. At present, McVay's procedure is often used to treat femoral hernias in children.⁹⁾ In the latter procedure, Cooper's ligament is sutured to the transversalis muscle and transversalis fascia.²⁾ It is considered to be important to utilize Cooper's ligament; i.e., to attach it to the transversalis fascia or the iliopubic tract, during femoral hernia repair.¹⁾ However, there is still no consensus about what the simplest, most effective, and durable approach is. Recently, several laparoscopic femoral hernia repair techniques involving posterior approaches have been reported. Adibe reported a procedure in which the femoral sac was twisted and tied under laparoscopy, and the medial pectineal and inguinal ligaments were closed externally.¹⁰⁾ The use of prosthetic materials such as polypropylene mesh or Teflon plugs for pediatric femoral hernia repair has been reported^{11,12)}; however, the extent to which foreign materials should be used in children is disputed.³⁾ It is necessary to investigate what happens to pediatric hernia defects treated with prosthetic materials as the number of such cases accumulates because prosthetic materials do not grow with the patient. Laparoscopic direct closure using the inguinal ligament and Cooper's ligament was reported as a new repair method that does not involve the use of prosthetic materials.⁴⁾ In these 10 cases, no recurrence occurred during a mean follow-up period of 40.2 months. In a previous study, the inguinal ligament could not be seen from the abdominal cavity¹³⁾, but we suspect that the inguinal ligament described in the latter paper might actually have been the iliopubic tract. We were able to directly close the femoral orifice by suturing the iliopubic tract to Cooper's ligament. Our applied method using an LPEC needle enables clear laparoscopic visual inspection and reduction of numbers of incisions, the femoral defect is extracorporeally closed by directly suturing the abovementioned structures. We required only two incisions in combination with the SILPEC procedure.⁵⁾ We did think that it might be hard to attach the inguinal ligament to Cooper's ligament using sutures because these structures are fixed strongly in place. However, our new femoral hernia repair method using an LPEC needle which involves the extracorporeal suturing of the iliopubic tract to Cooper's ligament, turned out to be easy, safe and produce good cosmetic results. A suture has potential to loose because it must be to involved with tissues surrounding the iliopubic tract in this method. There are no complications with this technique as with other past reports.

The present case is limited by the short duration of the follow-up period. Further cases with longer follow-up periods should be accumulated to confirm the efficacy and safety of our technique.

Conflict of interest: The authors have declared no conflicts of interest.

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