

OPEN HERNIOTOMY VERSUS LAPAROSCOPIC SURGERY IN INGUINAL HERNIA REPAIR IN CHILDREN

CRISTIAN ȘTEFAN BERGHEA NEAMȚU¹, DAN SABĂU²

¹“Lucian Blaga” University of Sibiu, Children’s Hospital of Sibiu, ²“Lucian Blaga” University of Sibiu, County Clinical Emergency Hospital of Sibiu

Keywords: inguinal hernia in children, laparoscopic surgery, open herniotomy, comparative studies

Abstract: Open surgical repair of inguinal hernia, also called open herniotomy in scientific literature, is one of the most common and most commonly used surgical procedures in infancy and childhood. Classical methods still remain very well credited because of its ease, high rate of success and low incidence of complications. Modern surgery provides as alternative procedures some of minimally invasive or laparoscopic methods. In the last years, in several centres, laparoscopic procedures for inguinal hernia repair in children are routinely performed, some advantages having been reported compared to open herniotomy such as excellent intraoperative viewing, minimal incision, fewer complications, improved postsurgical cosmetic appearance but almost equally or even fewer recurrence as well as classical surgery. A comparative evaluation of the two methods becomes an objective necessity, and in scientific literature there are some studies that try to do it. As a conclusion to mentioned studies, the laparoscopic surgery seems to bring elements of superiority versus open herniotomy, such as long term cosmetic aspects of suture, the absence of complications, patient high level of satisfaction, lower number of recurrences.

Cuvinte cheie: hernia inghinală la copil, chirurgie laparoscopică, herniotomie deschisă, studii comparative

Rezumat: Cura chirurgicală deschisă a herniei inghinale (herniotomia deschisă) este tratamentul standard al herniei inghinale și este una din cele mai frecvente și mai uzitate proceduri chirurgicale la sugar și copil. Metoda clasică este încă foarte bine creditată, datorită ușurinței executării, ratei înalte de succes și incidenței mici a complicațiilor. Chirurgia modernă oferă ca alternativă la această intervenție clasică, metode miniinvasive sau laparoscopice. În ultimii ani, în multe centre, intervențiile laparoscopice pentru cura chirurgicală a herniei inghinale la copil se efectuează de rutină raportându-se unele avantaje versus herniotomia deschisă, câmp vizual excelent, disecție minimală, mai puține complicații, aspecte cosmetice postoperator tardiv ameliorate față de intervenția clasică și recurențe comparabile chiar mai puține numeric decât cele consecutive intervenției clasice. O evaluare comparativă a celor două metode devine o necesitate obiectivă și în literatura de specialitate din ultimii ani sunt studii care încearcă să o facă. Ca și concluzii la studiile citate, chirurgia laparoscopică pare să aducă elemente de superioritate versus herniotomia deschisă pe termen lung privind aspectul cosmetic, absența complicațiilor postoperatorii, satisfacția pacientului și diminuarea numărului de recurențe.

Open surgical repair of inguinal hernia, also called open herniotomy in scientific literature, is one of the most common and most commonly used surgical procedures in infancy and childhood. Open herniotomy represents the standard treatment of the inguinal hernia to which modern surgery comes to counterbalance minimally invasive and laparoscopic methods. Certainly, they require comparative assessment with classical method which is still very well credited because of its ease, high rate of success, and low incidence of complications. In the last years, in several centres, laparoscopic procedures for inguinal hernia repair in children are routinely performed, some advantages having been reported compared to open herniotomy, such as excellent intraoperative viewing, minimal incision, fewer complications, improved postsurgical cosmetic appearance but almost equally recurrence as well as classical surgery.

A comparative evaluation of the two methods becomes an objective necessity, and in scientific literature are some studies that try to do it.

The minimally invasive and laparoscopic procedures introduced in the last 2-3 decades are proving to be superior to conventional open surgical repair in terms of recovering, postsurgical pain, complications and recurrences.(1,2,3,4)

However, in children, this evaluation does not benefit from too many controlled and randomized studies, especially those.(5,6)

Hereinafter, we will review some of these.

In October 2005, Mohamed E. Hassan has communicated a study which compared the results of laparoscopic procedures conducted on a group of 15 patients, mean age of 39 months, to those obtained by conventional procedure conducted on a group of 18 patients, mean age of 44 months.(7) The following were compared: average operating time (47,5 minutes versus 27,5), postsurgical complications, respectively vas deferens injury, in 1 patient (7 %), flaps rupture during suture, in 3 patients (20 %), both in laparoscopic group, none in conventional group. At 6 months postsurgical assessment, there were reported 4 recurrences in laparoscopic

¹Corresponding author: Cristian Berghea Neamțu, Str. Gheorghe Barițiu, Nr. 1-3, Cod 550178, Sibiu, România, Tel: +40722 641331, E-mail: cristianneamtu@yahoo.com

Article received on 22.01.2014 and accepted for publication on 25.03.2014
ACTA MEDICA TRANSILVANICA June 2014;2(2):265-267

CLINICAL ASPECTS

group (27 %), none in conventional group. Concluding, the author considered the study as a preliminary experience, which certifies the conventional procedure as gold standard for inguinal hernia surgical repair at mentioned age.

Ramanathan Saranga Bharathi, Manu Arora and Vasudevan Baskaran have published in 2008 a comparative study which evaluated 2 groups, the laparoscopic group with 51 patients and the open surgical group with 34 patients; the mean age was 3,5 months; the comparative analysis provides the following results: average operating time slightly smaller (25,31 minutes) in laparoscopic group compared with 30,65 minutes in open surgical group. No significance between groups regarding the difference in pain perception. Postsurgical recovery was delayed in laparoscopic group ($p = 0,02$), even though the length of stay was similar in both groups. Better surgical appearance, more ability to detect and simultaneous repairs of current hernias of contralateral vaginal processes are granted by the authors to laparoscopic procedure. (8)

S.A. Nah et al., in 2010, published a comparative study which evaluated 2 groups, open surgical group with 35 patients, respectively laparoscopic group with 28 patients. The 2 groups were homogeneous in terms gender, age, length of admittance and surgical performance, ratio of pre-surgical manual reduction of hernias. The results reveals: a better operating time in laparoscopic group ($p = 0,01$), similar length of stay, more complications at postsurgical 3,5 months evaluation (vas deferens injury in one patient, testicular atrophy in two patients, ascending testis in one patient, recurrence in one patient) in open surgical group. The authors concluded that laparoscopic procedure is safer, avoids difficult dissection of edematous bag hernias, allows direct view of reducing hernias, and allows repairing of contralateral hernias, while open surgical group may be associated with severe complications.(9)

In 2011, Abdulrahman Alzahem has published a meta-analysis of relevant controlled and randomized studies consulting Medline, Embase and The Cochrane Central Controlled Trials Registry. The author has identified 10 comparative studies totalling 2699 patients. The results and the conclusions of the meta-analysis associated laparoscopic group reveal an ascending trend of hernia's recurrences [OR = 1,81; 95% CI 0,89 – 3,67; $p = 0,10$]; higher average operating time of unilateral hernias [WMD (weighted mean difference) = 10,23; 95% CI 8,82 – 11,64; $p < 0,00001$]; shortening trend toward average operating time of bilateral hernias (WMD = - 4,54; 95% CI -11,63 up to 2,55; $p = 0,21$), significant descending trend of contralateral methachronic inguinal hernia development (OR = 0,37, 95% CI 0,20 – 0,67; $p = 0,001$). (10)

Yang C et al. from University of Science and Technology Wuhan, Department of Pediatric Surgery, Union Hospital of Tongji Medical College, Huazhong, China, have published in 2011 „Laparoscopic vs. open herniorrhaphy in the management of pediatric inguinal hernia: a systemic review and meta-analysis“. The purpose of the analysis was to evaluate critically the scientific literature in order to establish the efficacy of Laparoscopic surgery (LS) versus Open surgery (OS) given discussion and disputes regarding the existing on that date effectiveness. There have been reviewed all studies published up to 30.07.2010 selected from Medline, Embase, Ovid, Web of Science and Cochrane databases, randomized controlled trials (RCTs), observational studies, in which laparoscopic and open surgery were weighed. The systematic evaluation and meta-analysis have been performing using odds ratios for dichotomous variables, respectively WMD for continuous variables. The authors have been selected 138 studies, 3 RCTs, 4 OCSs including 1543 patients with laparoscopic surgery and 657 patients with open surgery. By comparing LS with OS, LS

has recorded a shorter average operating time (WMD = - 11,4; 95% CI, - 20,61 up to -1,68; $p = 0,02$) and a lower incidence of methachronic contralateral hernia (OR, 0,26; 95% CI, 0,09 – 0,76; $p = 0,01$). The other parameters, such as age, gender, localization of hernia, operating time for unilateral hernia, length of stay, required time to return to activity, recurrences and complications had no significant differences. The authors concluded: laparoscopic surgery is superior to open surgery regarding bilateral inguinal hernia by lower ratio of contralateral methachronic hernia; similar results with open surgery for unilateral hernia operating time, length of stay, recurrences and complications. The authors have been reported as final conclusions the necessity of RCTs for these complex and complete issues.(11)

In 2012, Rafik Shalaby et al. have been published a controlled and randomized study in which they compared LS with OS having as study parameters average operating time, length of stay, complications (hydrocele testis, iatrogenic ascending testis, testicular atrophy, postsurgical aspect of suture, recurrence ratio). The study included 250 patients with inguinal hernia surgery randomized in 2 homogenous groups regarding number of patients, gender, age, demographic data, A group (Reverdin Needle laparoscopic surgery, RN) and B group (open surgery). The study also included a comparative evaluation of testicular volume, early after surgery (at 48 hours) and later (at 6 months) using gray-scale ultrasonography and Doppler ultrasonography. The results have provided the following data: all laparoscopic surgery group patient did not require conversion, $7,6 \pm 3,5$ minutes for unilateral hernia average operating time, $9,2 \pm 4,6$ minutes for obese patients with unilateral hernia, and $11,4 \pm 2,7$ minutes for bilateral hernia; 0,8 % recurrence ratio in A group, and 2,4 % in B group. The author emphasized that RN laparoscopic surgery is an effective method in order to reduce the operating time, to decrease the recurrence ratio, for the absence of iatrogenic complications (testicular atrophy, ascending testis) and for the excellent aspect of suture.(12)

Treadwell J et al. in a 2012 study, have been selected as relevant parameters for comparative evaluation the following: recurrence of hernia, length of stay, required time to return to activity, satisfaction level of parents/patients. Relating to results, the authors observed the superiority of laparoscopic surgery towards length of stay, level of satisfaction of patients and long term postsurgical aspects of suture but similarity towards required time to return to complete activity.(13)

Conclusions:

As it results from the reviewed studies, the comparative evaluation between laparoscopic and open surgery designed to highlights the superiority of one of them is still a process in progress requiring other controlled and randomized studies, which bring necessary evidence in order to make the good choice between the 2 procedures.

However, the laparoscopic surgery seems to bring elements of superiority versus open herniotomy, such as long term cosmetic aspects of suture, the absence of complications, patient high level of satisfaction, lower number of recurrences.

REFERENCES

1. Stoker DI, Spiegelhalter IDJ, Singh R, Wellwood JM, Laparoscopic versus open inguinal hernia repair: randomised prospective trial. *Lancet* 1994;343:1243-5.
2. Lawrence K, Mc Whinnie D et al. Randomised controlled trial of laparoscopic versus open repair of inguinal hernia; early results. *BMJ* 1995;311:981-5.
3. Barkun JS, Wexler MJ, Hinchey EJ, Thibeault D, Meakins

- JL. laparoscopic versus open inguinal herniorrhaphy: preliminary results of a randomised controlled trial. *Surgery* 1995;118:703-10.
4. Tsai YC, Wu CC, Yang SSD. Open versus minilaparoscopic herniorrhaphy for children: a prospective comparative trial with midterm follow-up evaluation. *Surgical Endoscopy* 2009;24(1):332-337.
 5. Koivusalo AL, Korpela R, Wirtavuori K, Piiparinen S, Rintala RJ, Pakarinen MP. A single-blinded, randomised comparison of laparoscopic versus open hernia repair in children. *Pediatrics* 2009;123(1):332-337.
 6. Chan LK, Hui WC, Tam PKT. Prospective randomised single-center, single-blind comparison of laparoscopic versus open repair of pediatric inguinal hernia. *Surgical Endoscopy* 2005;19(7):927-932.
 7. Hassan ME. Laparoscopic Flip Flap technique versus Conventional Inguinal Repair in Children *Annals of Pediatric Surgery* 2005;11(1):17-20.
 8. Ramanathan SB, Manu A, and Vasudevan B. Pediatric Inguinal Hernia: Laparoscopic Versus Open Surgery, *Journal of the Society of Laparoendoscopic Surgeons (JSLS)* 2008;12:277-28.
 9. Nah SA, Giacomelo L, Eaton S, De Coppi P, Curry JJ, Drake DP, Kiely EM, Pierro A. Surgical Repair of Incarcerated Inguinal Hernia in Children: Laparoscopic or Open. *European Journal Pediatric Surgery*; 2010.
 10. Abdulrahman A. Laparoscopic versus open inguinal herniotomy in infants and children: a meta-analysis. *Pediatric Surgery International* 2011;27(6):605-612.
 11. Yang C, Zhang H, Pu J, Mei H, Zheng L, Tong Q. Laparoscopic vs. open herniorrhaphy in the management of pediatric inguinal hernia: a systemic review and meta-analysis; 2011.
 12. Shalaby R, Ibrahim R, Shahin M, Yehya A, Razek MA, Alsayaad A, Shouker M. Laparoscopic Hernia Repair versus Open Herniotomy in Children: A controlled Randomized Study. *Minimally Invasive Surgery*; 2012 Article ID 484135, 8 pages doi:101155/2012.
 13. Treadwell J, Tipton K, Oyesanmi O, Sun F, Schoelles K. Surgical Options for Inguinal hernia: Comparative Effectiveness Review. Comparative Effectiveness Review No.70. AHRQ Publication No. 12 - EHC091-EF. Rockville, MD: Agency for Healthcare Research and Quality; August 2012.