Evaluation of postoperative pain in pediatric inguinal hernia patients using the FLACC scale

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【Purpose】

Comparison of postoperative pain due to traditional open repair (OA) or laparoscopic procedures (LPEC) to repair pediatric inguinal hernia is difficult in patients aged < 5 years. This single institute study was performed to quantitatively evaluate pain associated with LPEC and OA.

【Methods】

・Target : 59 patients aged ≦5 years underwent inguinal hernia surgery at our hospital

・Research Period : From July 2024 to September 2025

・Anesthesia : The general anesthesia and acetaminophen was administered, and a unified amount of 0.25% levobupivacaine was used as local anesthesia at the surgical site.

・Evaluation time : postoperative pain at 3 and 6 hour

・Score : FLACC scale (Each of five categories “F” Face; “L” Legs; “A” Activity; “C” Cry; “C” Consolability is scored from 0-2, resulting in a total score range of 0-10.)

FLACC scale

Categories	Scoring		
	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid or jerking
Cry	No cry(awake or asleep)	Moans or whimpers; occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to distractible	Difficult to console or comfort

SHOBHA M, et al. The revised FLACC observational pain tool:improved reliability and validity for painassessment in children with cognitive impairment: Pediatr Ane 2006

【Results】

Patients Characteristics:

Total Number : 59 (Male 35, Female 24)　Surgery Procedure : OA 41 cases, LPEC 18 cases

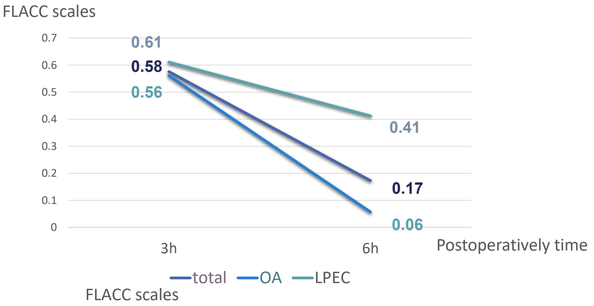
①Total

Operation time of LPEC is longer.

LPEC is more painful at 6 h postoperatively.

	Op time (min)	FLACC scale 3h	FLACC scale 6h
Total(n=59)	52.27	0.58	0.17
OA(n=41)	49.27	0.56	0.06
LPEC(n=18)	**54.28**	**0.61**	**0.41**

LPEC Pneumoperitoneum time : 41.17min



②Each gender

Male	Op time (min)	FLACC scale 3h	FLACC scale 6h
Total(n=35)	55.49	0.66	0.03
OA(n=31)	54.23	**0.71**	**0.04**
LPEC(n=4)	**65.25**	0.25	0

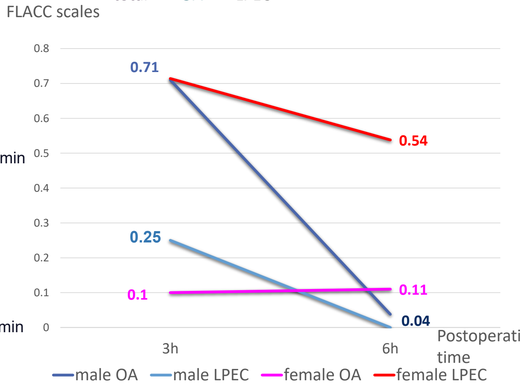
In the male group, OA is more painful at both of postoperatively time

LPEC Pneumoperitoneum time : 52.75min

Female	Op time (min)	FLACC scale 3h	FLACC scale 6h
Total(n=24)	47.58	0.46	0.36
OA(n=10)	42.6	0.1	0.11
LPEC(n=14)	**51.14**	**0.71**	**0.54**

In the female group, LPEC is more painful at both of postoperatively time

LPEC Pneumoperitoneum time : 37.86min



③Unilateral or Bilateral

Bilateral	Op time (min)	FLACC scale 3h	FLACC scale 6h
Total(n=18)	58.83	0.5	0.41
OA(n=3)	**72**	0.33	0
LPEC(n=15)	56.2	**0.53**	**0.5**

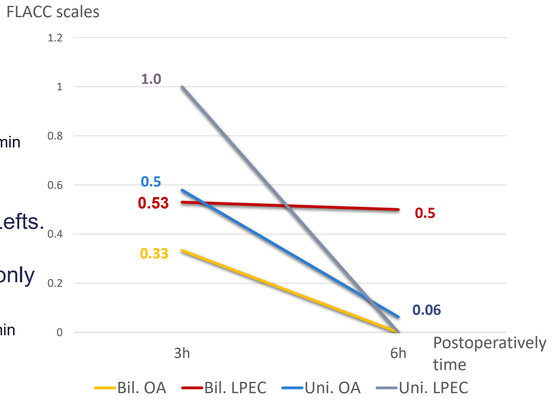
In the bilateral group, LPEC is more painful, though the only 3 patients underwent OA.

LPEC Pneumoperitoneum time : 43.2min

Unilateral	Op time (min)	FLACC scale 3h	FLACC scale 6h
Total(n=41)	49.39	0.61	0.06
OA(n=38)	49.76	0.58	0.06
LPEC(n=3)	44.67	**1**	0

In the 41 unilateral group, including 19 Rights and 22 Lefts. LPEC is more painful at 3 h postoperatively, though the only 3 patients underwent LPEC.

LPEC Pneumoperitoneum time : 31min



【Discussion】

①Total

OA can be a minimally invasive repair if the wound pain is controlled.

In LPEC, the pain is remaining due to the umbilical port site and pneumoperitoneum.

⇒・LPEC is more painful because of pneumoperitoneum and the operative time. (Matsunami, et al. Post operative Nausea, Vomiting and Pain after Pediatric Outpatient Surgery : Comparison of Laparoscopic and Conventional Inguinal Hernia Repair: Anesthesia 2009)

・Abdominal wall block is a better method to control postoperative pain. (Shinagawa, et al. Comparison of the Analgesic Efficacies of Ultrasound-guided Abdominal Wall Block and Local Anesthetic Infiltration for Laparoscopic Percutaneous Extraperitoneal Closure in Children: Anesthesia 2021)

②Male or Female

Male : OA is more painful even though the operation time of OA is shorter.

⇒・ OA is more painful 1 h postoperatively in male children older than 6 years. (Celebi S, et al. A single-blinded, randomized comparison of laparoscopic versus open bilateral hernia repair in boys: J Laparoendosc Adv Surg Tech 2014)

Female : LPEC is more painful

⇒ ・the uterine round ligament is preserved, which may lead to postoperative pain due to traction or adhesion.(Ishikawa T, et al. Case of chronic pain after laparoscopic percutaneous extraperitoneal closure in an adolescent girl with inguinal hernia in which open repair was effective, : Asian J Endosc Surg 2019)

③Unilateral or Bilateral

Bilateral surgery based on intraoperative diagnosis may be more invasive.

In unilateral, the 6 h postoperatively pain is nearly 0.

⇒・There is no difference of pain among the unilateral OA/LPEC and bilateral OA/LPEC groups, under the conditions that all patients received peripheral nerve blockade and wound infiltration. (Gause CD, et al. Laparoscopic versus open inguinal hernia repair in children ≦3: Pediatr Surg Int 2017)

【Conclusion】

The FLACC scale quantitatively revealed that LPEC is more painful in total.

An abdominal wall block may be effective in managing pain.

A larger study is required to verify these findings.

【Limitation】

Considering the small sample size in this study, evaluation using a larger number of cases is required.

This study is not randomized controlled study.