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## Substantiation for the method of surgical treatment of inguinal hernia in boys by ultrasonic inspection

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### Abstract

In 98 boys aged from 6 months to 12 years with the inguinal hernia was conducted the ultrasonic inspection of intratesticular blood flow before and on the 1, 7, 14, 21 days in postoperative period after laparoscopic and traditional surgical treatment. We used clinical significance of resistive index (RI) of the testicular artery measured by Doppler ultrasound as a predictor of testicular ischemia. During the monitoring of the RI we observed the highest positive dynamics in patients operated by laparoscopic method (PIRS). Found that the resistance index in the junior, middle and senior by laparoscopic operated group (subgroup A) was significantly lower than in the group operated by traditional method.

**Keywords:** inguinal hernia, testis, laparoscopy, traditional herniotomy, resistance index

### 1. Introduction

Inguinal hernia occurs from 1-5% among children, and is the most common disease that require surgical intervention [4, 7]. This type of inguinal hernia occurs in 8-10 times more often in boys than in girls. In 60% of cases it turns right, 30% - on the left, 10% - a bilateral hernia. In newborn risk of congenital oblique inguinal hernia increases to 44-55% [5, 7].

Inguinal herniotomy today is one of the most frequently performed surgery in children. Open herniotomy remains a standard treatment, compared with that evaluated all alternative treatments. This is due to the simplicity of surgical intervention. The essence of the operation is high ligation of processus vaginalis at the internal inguinal ring. There intraoperative and early postoperative complications of traditional method of surgical treatment: swelling of the testicles and scrotum, ischemic orchitis, high standing and testicular atrophy. Ultrasonic inspection using Doppler technology is a highly effective way of assessing blood flow and the testicular ischemia [1, 2]. Proved that one of the causes of infertility men may be damage to the spermatic cord during herniotomy in childhood. Since 1990, there is mention of the beginning of the use of laparoscopic treatment of inguinal hernias [3]. Today, the surgeon are used a different technique: extracorporeal equipment or intracorporeal stitching and blending units, three- or single-access inversion of hernia sack, flip-flap technique, and using techniques of tissue adhesion [3, 4, 6]. In 2004 Patkowski proposed a new technique of laparoscopic hernioraphy PIRS (Percutaneous Internal Ring Suturing).

The aim was to determine the advantages and disadvantages of the laparoscopic and traditional methods of inguinal hernia treatment in boys, using the index of peripheral resistance during ultrasonic inspection.

### 2. Materials and Methods

The 98 boys with inguinal hernias, aged from 6 months to 12 years were operated on the base of the second Surgery Department of Lviv City Community Children's Hospital for the period 2013 - 2016 gg. The 30 were children operated by laparoscopic technique by PIRS (Percutaneous Internal Ring Suturing) and 68 boys – operated by the traditional method by Duhamel. By type conducted surgery patients were divided into subgroups: A - operated by laparoscopic (n = 30), B - by the traditional method (n = 68). In addition, depending on age, all patients were divided into 3 groups: group (n = 16) - 0 - 6 months. (Average age  $0,3 \pm 0,045$  years), the second group (n = 50) - 6 months - 3 years, the third group (n = 32) - 3 senior years. For comparison, we used ultrasound with color Doppler mapping on the device TOSHIBA, Xario SSA-660 A. Compared vascular resistance index testicles of the testicular artery (RI). Before surgical treatment IR in three groups and between A and B subgroups did not differ. We traced the dynamics of 1, 7, 14, 21 days in post-operative period.

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### 3. Results

Found that the resistance index in the junior, middle and senior group of laparoscopic operated by (subgroup A) was significantly lower than in the group operated by traditional method. Operated by laparoscopic in A group it was  $0,723 \pm 0,01$ , against B group it was  $0,765 \pm 0,03$ ,  $p < 0,05$ ; And in the second group of  $0,714 \pm 0,01$  to  $0,829 \pm 0,01$  in II B,  $p < 0,001$ . In the third group RI on day 1 and day 7 was higher at the start of treatment. It is important to note, the worst rates were at 1 day after surgery, which is associated with postoperative

edema. Until the entry-level IR back in IA has 14 days, and in subgroups B, regardless of age, the average starting level IR has not reached initial preoperative level. At 21 days post-operative observation and IR group and became lower than the preoperative parameters and was  $0,655 \pm 0,01$ , while in group B and was  $0,710 \pm 0,02$  and not yet reached the baseline,  $p < 0,05$ . In groups II A and II B traced a similar trend. RI II A to meet  $0,660 \pm 0,01$  to  $0,705 \pm 0,01$  in II B,  $p < 0,001$ . And in the third group RI was  $0,610 \pm 0,01$  to  $0,684 \pm 0,01$ ,  $p < 0,001$ . (Table 1).

**Table 1:** The dynamics of RI

Days of observation	I Group (n=16)		II Group (n=50)		III Group (n=32)	
	A (n=12)	B (n=4)	A (n=15)	B (n=35)	A(n=3)	B(n=29)
Before surgery	0,684±0,01	0,682±0,01	0,684±0,01	0,691±0,01	0,630±0,02	0,651±0,01
1 day	0,723±0,01*	0,765±0,03	0,714±0,01***	0,829±0,01	0,667±0,01**	0,776±0,01
7 day	0,699±0,01**	0,785±0,03	0,688±0,01***	0,785±0,01	0,653±0,01***	0,755±0,01
14 day	0,678±0,01**	0,748±0,03	0,665±0,01***	0,748±0,01	0,620±0,02***	0,718±0,01
21 day	0,655±0,01*	0,710±0,02	0,660±0,01***	0,705±0,01	0,610±0,01***	0,684±0,01

Note: \* -  $p < 0,05$ ; \*\* -  $P < 0,01$ ; \*\*\* -  $P < 0,001$  - reliability between subgroups A and B

### 4. Conclusions

1. A group of children operated by laparoscopic technique RI entry level reached at the 14 day postoperative period, and in the subgroups, regardless of age average starting level not reached initial preoperative values.
2. The period of "local" vascular rehabilitation was the best week earlier in a subgroup A of children undergoing surgery laparoscopically than in subgroup B
3. Comparative analysis of the dynamics of RI once again proves that laparoscopic surgery is low-impact and safe against the elements of the spermatic cord and testicles in terms of prognosis for boys is a very important factor to reduce the risk of infertility.
4. The method of laparoscopic inguinal hernia surgery PIRS can be recommended for boys, in terms of prognosis is a very important factor to reduce the risk of infertility.

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