

· 论著 · 腹部 ·

腹腔镜下小儿腹股沟斜疝疝囊高位结扎术与开放术式术后睾丸发育情况的比较分析及预后的影响

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【摘要】目的 探究腹腔镜下疝囊高位结扎术与开放术式在治疗小儿腹股沟斜疝中的临床应用差异,评估两类手术方案对患儿术后睾丸生长发育状态及预后结局的作用。**方法** 回顾性收集2022年2月至2023年5月本院收治的68例男性小儿腹股沟斜疝患儿,根据手术方式分为观察组(34例,采用腹腔镜下疝囊高位结扎术)和对照组(34例,采用开放术式)。比较两组临床指标、术前及术后患侧与健侧睾丸体积,并随访1年记录复发率及并发症发生率。**结果** 观察组双侧手术时间 $[(33.18 \pm 5.56) \text{ min}]$ 短于对照组 $[(38.51 \pm 6.42) \text{ min}]$,住院费用 $[(3616.14 \pm 571.03) \text{ 元}]$ 高于对照组 $[(2971.95 \pm 603.32) \text{ 元}]$,术中出血量 $[(6.82 \pm 2.71) \text{ mL}]$ 少于对照组 $[(13.31 \pm 4.61) \text{ mL}]$ ($P < 0.05$)。术后,观察组患侧睾丸发育情况优于对照组 ($P < 0.05$),对照组术后患侧睾丸体积 $[(2.12 \pm 0.51) \text{ mL}]$ 较术前 $[(2.69 \pm 0.62) \text{ mL}]$ 降低 ($P < 0.05$)。两组术后复发率(观察组2.94%vs对照组5.88%)、并发症总发生率(观察组5.88%vs对照组8.82%)比较, $P > 0.05$ 。**结论** 与开放术式相比,腹腔镜下疝囊高位结扎术治疗小儿腹股沟斜疝可缩短双侧手术时间、减少术中出血量,且对患儿睾丸发育的保护作用更优,但住院费用较高;临床可结合患儿耐受程度及家庭经济水平选择合适术式。

【关键词】 小儿腹股沟斜疝; 腹腔镜下疝囊高位结扎术; 开放术式; 睾丸发育; 预后

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Comparative Analysis of Testicular Development and Prognostic Impact between Laparoscopic High Ligation of Inguinal Hernia Sac and Open Surgery in Children

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Abstract: Objective To explore the clinical application differences between laparoscopic high ligation of hernia sacs and open surgical methods in the treatment of pediatric indirect inguinal hernia, and to evaluate the effects of the two surgical regimens on the postoperative testicular growth and development status and prognosis of children. **Methods** A retrospective collection was made of 68 male children with indirect inguinal hernia admitted to our hospital from February 2022 to May 2023. They were divided into the observation group (34 cases, treated with laparoscopic high ligation of the hernia sac) and the control group (34 cases, treated with open surgical method) according to the surgical methods. The clinical indicators of the two groups, the testicular volumes of the affected side and the healthy side before and after the operation were compared, and the recurrence rate and complication rate were recorded during the one-year follow-up. **Results** The bilateral operation time of the observation group $[(33.18 \pm 5.56) \text{ min}]$ was shorter than that of the control group $[(38.51 \pm 6.42) \text{ min}]$, and the hospitalization cost $[(3616.14 \pm 571.03) \text{ yuan}]$ was higher than that of the control group $[(2971.95 \pm 603.32) \text{ yuan}]$. The intraoperative blood loss $[(6.82 \pm 2.71) \text{ mL}]$ was less than that of the control group $[(13.31 \pm 4.61) \text{ mL}]$, and the differences were statistically significant ($P < 0.05$). After the operation, the development of the affected testicle in the observation group was better than that in the control group ($P < 0.05$). The volume of the affected testicle in the control group after the operation $[(2.12 \pm 0.51) \text{ mL}]$ was lower than that before the operation $[(2.69 \pm 0.62) \text{ mL}]$ ($P < 0.05$). the postoperative recurrence rate (2.94% in the observation group vs. 5.88% in the control group) and the total incidence of complications (5.88% in the observation group vs. 8.82% in the control group) between the two groups ($P > 0.05$). **Conclusion** Compared with the open surgical method, laparoscopic high ligation of the hernia sac for the treatment of indirect inguinal hernia in children can shorten the bilateral operation time, reduce intraoperative blood loss, and has a better protective effect on the testicular development of children, but the hospitalization cost is higher. Clinically, the appropriate surgical method can be selected based on the child's tolerance level and the family's economic status.

Keywords: Pediatric Inguinal Hernia; Laparoscopic High Ligation of Hernia sac; Open Surgery; Testicular Development; Prognosis

报道称,小儿腹股沟斜疝发病率为1.5%,此类疾病自愈可能性小^[1-2]。目前主要采用手术治疗,常规采用开放手术治疗,但是风险大^[3-4]。近年来,因腹腔镜技术不断发展,逐渐克服开放手术不足,具有切口较小、手术过后恢复较快、疼痛较轻、手术视野更清晰等优点^[5-6]。因手术期间血流随着腹股沟管流到阴囊,或手术期间因手术操作误伤输精管,或是止血不彻底及组织损伤出血均可能影响患者睾丸功能^[7-8]。且多项

研究均报道^[9-10],腹股沟斜疝手术可对睾丸功能产生影响。本次研究回顾性分析腹腔镜下小儿腹股沟斜疝采用上述两种手术方式对术后睾丸发育情况的比较分析及预后的影响,以进一步证实腹腔镜下疝囊高位结扎术有效性和安全性,现报告如下。

1 资料与方法

1.1 一般资料 回顾性收集2022年2月至2023年5月在本院经腹

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腔镜下疝囊高位结扎术治疗的小儿腹股沟斜疝患儿34例纳入观察组，同时期收集开放术式治疗的小儿腹股沟斜疝患儿34例纳入对照组。

纳入标准：符合小儿腹股沟斜疝诊断标准^[11]；初次进行腹股沟斜疝手术治疗；均为男性。排除标准：嵌顿疝、多次复发疝等；合并其他严重内科类疾病；随访数据缺失；存在手术禁忌；合并免疫系统类、先天性疾病等。对照组：年龄1~6岁，平均年龄(3.31±2.12)岁，病变部位：左侧18例，右侧12例，双侧4例。观察组：年龄1~6岁，平均年龄(3.25±2.11)岁，病变部位：左侧16例，右侧13例，双侧5例。两组一般资料在性别、年龄、病变部位方面比较不存在显著差异(P>0.05)。

1.2 方法

1.2.1 腹腔镜下疝囊高位结扎术 患儿采用全身麻醉，术前准备2-0丝线与3-0丝线，其中2-0丝线预先穿入硬膜外穿刺针内，3-0丝线备用。手术起始于脐部，作约5mm皮肤切口，插入穿刺装置建立气腹后，置入腹腔镜以观察腹腔内部及切口周围情况。随后在对应内环口的体表位置作1.5mm小切口，将穿刺针穿入腹膜外间隙，沿内环口绕过精索后穿出腹膜，将针内2-0丝线牵出，仅在腹腔内保留3cm线端。穿刺针再次沿内环口穿出腹膜，将硬膜外穿刺导管送入腹腔，在腹腔镜直视下套住腹腔内的2-0丝线，与穿刺针一同拔出体外。关闭气腹并排出疝囊内气体，将2-0丝线打结后埋于皮下以关闭内环口，经腹腔镜确认内环口关闭严密后，退出腹腔镜，逐层缝合切口。

1.2.2 开放术式 患儿采用静脉全身麻醉，待麻醉效果稳定后取仰卧位，双腿稍外展以充分暴露患侧腹股沟区域。于患侧对应内环口的腹横纹位置作长约1.0cm的横行切口，随后依次切开皮肤及皮下脂肪组织，期间对操作中遇到的小血管进行轻柔按压或必要时用细丝线结扎止血，逐步暴露深层组织。用组织钳

轻柔提起疝囊壁，以生理盐水纱布辅助进行钝性分离，将疝囊与周围精索相关组织(如输精管、精索血管)小心剥离，直至疝囊颈部(即内环口水平，此位置疝囊壁厚度明显增加，与周围组织界限更清晰)。在疝囊颈部用2-0丝线实施双重高位缝扎，确保内环口完全闭合以防复发，之后在结扎线远端约0.5cm处切除多余的疝囊组织。最后确认手术区域无活动性出血后，逐层缝合皮下组织及皮肤，覆盖无菌敷料完成手术。

1.3 观察指标 临床指标包括单侧和双侧手术时间、住院时间、住院费用、术中出血量；睾丸发育情况，分别于术前、术后采用彩色多普勒超声检测患侧与健侧睾丸体积，并采用椭圆体积公式($0.532 \times \text{长径} \times \text{横径} \times \text{前后径最大值}$)计算睾丸体积；术后随访1年记录复发情况、并发症发生情况。

1.4 统计学方法 采用SPSS 26.0软件分析，手术时间、住院时间、住院费用、术中出血量等用($\bar{x} \pm s$)表示，比较用t检验；计数资料用[n(%)]表示，比较用 χ^2 检验；以P<0.05为差异有统计学意义。

2 结 果

2.1 两组临床指标比较 两组单侧手术时间、住院时间比较，P>0.05；观察组双侧手术时间短于对照组(P<0.05)，住院费用高于对照组(P<0.05)，术中出血量少于对照组(P<0.05)，见表1。

2.2 两组睾丸发育情况比较 术后，观察组患侧睾丸发育情况优于对照组(P<0.05)，两组健侧睾丸发育情况比较不存在显著差异(P>0.05)，且对照组术后患侧睾丸发育较术前睾丸体积低(P<0.05)，见表2。

2.3 两组术后复发情况比较 两组术后复发情况比较，P>0.05，见表3。

2.4 两组术后并发症比较 两组术后并发症比较，P>0.05，见表4。

表1 两组临床指标比较

组别	例数	手术时间(min)		住院时间(d)	住院费用(元)	术中出血量(mL)
		单侧	双侧			
对照组	34	20.47±6.05	38.51±6.42	2.67±0.94	2971.95±603.32	13.31±4.61
观察组	34	21.52±5.18	33.18±5.56	2.72±1.14	3616.14±571.03	6.82±2.71
t		0.769	3.659	0.197	4.522	7.077
P		0.445	0.001	0.844	<0.001	<0.001

表2 两组睾丸发育情况比较

组别	例数	患侧		健侧	
		术前	术后	术前	术后
对照组	34	2.69±0.62	2.12±0.51	2.74±0.63	2.82±0.54
观察组	34	2.67±0.57	2.65±0.64	2.73±0.56	2.76±0.58
t		0.138	3.776	0.069	0.441
P		0.891	<0.001	0.945	0.660

表3 两组术后复发情况比较[n(%)]

组别	例数	复发
对照组	34	2(5.88)
观察组	34	1(2.94)
χ^2		0.349
P		0.555

表4 两组术后并发症比较[n(%)]

组别	例数	切口下出血	切口下线结反应	皮下气肿	阴囊肿胀	总发生率
对照组	34	1(2.94)	1(2.94)	0	1(2.94)	3(8.82)
观察组	34	0	0	1(2.94)	1(2.94)	2(5.88)
χ^2						0.216
P						0.642

3 讨 论

腹股沟斜疝在所有腹股沟疝中占比约90%，是临床最常见的腹股沟疝类型^[12]。从发病机制来看，目前临床上认为腹股沟斜疝的病因具有多元性：首先，腹壁结构薄弱以及腹内压力异常升高是公认的主要相关因素^[13]；其次，腹膜鞘状突未完成闭锁也与疾病发生密切相关—若腹膜鞘状突未闭锁且与腹腔保持相通，会自然形成先天性疝囊，此时腹腔内脏器或组织极易通过残留的腹膜鞘状突，经腹股沟管穿出外环口，最终发展为斜疝^[13-14]；除此之外，因先天性发育问题导致腹股沟管生理掩闭机制的功能存在不足，这同样是造成腹股沟斜疝发生的重要病因^[15]。在临床表现方面，该疾病最典型的特征为腹股沟管外环部位出现可复性肿块，这也是临床识别腹股沟斜疝的核心依据^[16]。从治疗原则来讲，腹股沟斜疝不存在自行愈合的可能，且病程中可能出现嵌顿或绞窄等严重并发症，因此临床通常建议以手术方式进行治疗^[17-18]。不过针对1周岁以内的患儿，由于其腹壁组织会随生长发育逐渐增厚、强度逐步提升，存在自愈的潜在可能性，故可暂时推迟手术干预，优先观察腹壁发育情况^[19-20]。疝气靠近睾丸，肿胀的疝气会对睾丸造成压力，因此一定程度上会对睾丸发育产生影响^[21]。腹腔镜下疝囊高位结扎术不需进行腹股沟管的解剖，不需游离疝囊，保持了腹股沟管、精索的完整性，降低精索、输精管以及膀胱损伤概率^[22-23]；还可清晰暴露腹腔内腹股沟管内环及腹壁下血管、髂血管，减少了副损伤。因此腹腔镜下疝囊高位结扎术已逐渐应用于临床^[24-25]。但是关于腹腔镜下疝囊高位结扎术与开放术式在小二腹股沟疝中的应用效果各研究报道不一，且关于其对患儿睾丸的影响报道较少。

本次研究结果显示，两组单侧手术时间、住院时间比较， $P>0.05$ ，但观察组双侧手术时间短于对照组，分析其原因，腹腔镜下疝囊高位结扎术通过构建气腹后，可直观进行手术治疗，但是开放术式需要另外获取切口，再次重复手术操作，因此开放术式双侧手术时间更长。但是观察组住院费用高于对照组，分析其原因可能与腹腔镜手术过程中需要使用的特殊器械有关，且腹腔镜手术操作更为复杂，费用更高。腹腔镜手术切口小，对患者的创伤性小，手术视野比较开阔，有利于操作者

观察内环口血管及输精管，可避免精索血管受损，另外还能够清晰观察到腹腔处是否存在其他病变，如果出现对侧隐性疝也可以一起解决，因此出血量更少^[26-27]。另外在Shalaby等人的研究中^[28]，腹腔镜下疝囊高位结扎术具备显著优势，不仅可缩短手术耗时，还能降低术中出血量，同时在其他围手术期相关指标上也可能存在积极作用。

一般情况下，腹股沟斜疝患者术后对患者睾丸无明显影响，但近年来，越来越多研究报道，腹股沟斜疝术后出现睾丸肿胀^[29-30]，且部分研究报道腹股沟斜疝并发睾丸炎或者坏死等^[31]。但腹腔镜下疝囊高位结扎术及开放术式对腹股沟斜疝患者睾丸影响报道较少。一项研究称^[32]，开放术式在游离疝囊期间容易对精索动脉及输精管等产生损伤，进而引发精索动脉及输精管相关并发症的产生，从而对睾丸血流、体积等产生影响。又有学者表示^[33]，睾丸是男性繁衍的重要器官，无论治疗情况怎么样，小儿腹股沟斜疝疾病本身就对睾丸发育过程存在影响。本次研究通过评估睾丸体积预测睾丸发育情况，结果发现，术前，患儿患侧与健侧睾丸体积比较无明显差异，术后，观察组患儿睾丸体积明显较对照组大，说明开放术式对腹股沟斜疝患者睾丸影响较腹腔镜下疝囊高位结扎术大，究其原因，腹腔镜下疝囊高位结扎术无需解剖腹股沟管，可在一定程度上避免输精管损伤及对睾丸功能的影响；而开放术式需解剖腹股沟管，难以避免机体损伤。

研究报道，腹股沟斜疝术后复发率为4%~15%^[34]。而本次研究观察发现，两组术后复发情况比较， $P>0.05$ 。在Varsha等人的研究中^[35]，也表示开放式与腹腔镜下腹股沟疝修补术治疗腹股沟疝患者复发情况比较无显著差异，与本研究结果一致。又有研究称，腹股沟斜疝术后出现复发主要包括以下几个方面的原因，一方面疝环口大，腹膜松弛，单纯进行高位结扎可能不牢靠；另外一方面患儿自身的因素，患儿年龄小，增加手术操作难度，尤其缝合腹膜期间易出现遗漏的情况，从而增加了复发风险；另外也可能由于手术操作者的原因，操作不熟练；还可能与缝线不坚韧等有关。

综上所述，腹腔镜下疝囊高位结扎术较开放术式治疗小儿

腹股沟斜疝患儿双侧手术时间更短,术中出血量更少,且不会对患儿睾丸发育产生影响,但住院费用更高,故推荐临床医师综合考量患者自身对手术的耐受能力,以及患者家庭的经济承受水平,进而选择更贴合实际需求的治疗方案。

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