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单操作孔电视胸腔镜手术对老年孤立性肺结节患者肺功能和免疫球蛋白的影响*

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摘要 目的:探讨单操作孔电视胸腔镜手术(VATS)对老年孤立性肺结节(SPN)患者肺功能和免疫球蛋白的影响。方法:回顾性分析 2016 年 2 月~2019 年 1 月期间南京医科大学附属无锡人民医院收治的 78 例老年 SPN 患者的临床资料。根据手术方式的不同将患者分为对照组(n=43)和研究组(n=35),对照组给予传统多孔 VATS 肺结节切除术治疗,研究组给予单操作孔 VATS 肺结节切除术治疗,比较两组患者临床指标、肺功能、免疫球蛋白、视觉疼痛模拟评分量表(VAS)、并发症以及复发情况。结果:两组手术时间比较无差异($P>0.05$),研究组住院时间短于对照组,术后引流量、住院费用、术中出血量均少于对照组($P<0.05$)。两组均未见严重的并发症,且两组均无复发病例。两组术后 1 个月第 1 s 用力呼气容积(FEV1)、每分钟最大通气量(MVV)、用力肺活量(FVC)均下降,但研究组高于对照组($P<0.05$)。两组术后 3 d 免疫球蛋白 A(IgA)、免疫球蛋白 M(IgM)、免疫球蛋白 G(IgG)均下降,但研究组高于对照组($P<0.05$)。术后 1 d、3 d、5 d 研究组 VAS 评分较对照组降低($P<0.05$)。结论:单操作孔 VATS 治疗老年 SPN,可有效改善围术期指标,提高免疫力,减轻肺功能损伤,且安全性较好,临床应用价值较高。

关键词:单操作孔;电视胸腔镜手术;老年;孤立性肺结节;肺功能;免疫球蛋白

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Effect of Single-hole Video-assisted Thoracoscopic Surgery on Pulmonary Function and Immunoglobulin in Elderly Patients with Solitary Pulmonary Nodules*

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ABSTRACT Objective: To investigate the effect of single-hole video-assisted thoracoscopic surgery (VATS) on pulmonary function and immunoglobulin in elderly patients with solitary pulmonary nodules. **Methods:** The clinical data of 78 elderly patients with SPN who were admitted to Wuxi People's Hospital Affiliated to Nanjing Medical University from February 2016 to January 2019 were retrospectively selected. The patients were divided into control group (n=43) and study group (n=35) according to different surgical methods. The control group was treated with traditional porous VATS pulmonary nodule resection, while the study group was treated with single-hole VATS pulmonary nodule resection. The clinical indicators, pulmonary function, immunoglobulin, visual analogue pain scale (VAS), complications and recurrence were compared between the two groups. **Results:** There was no difference in operation time between the two groups ($P>0.05$). The hospitalization time in the study group was shorter than that in the control group. Postoperative drainage, hospitalization expenses and intraoperative bleeding were less than those in the control group ($P<0.05$). No serious complications were found in both groups, and no recurrence occurred in both groups. The forced expiratory volume (FEV1), maximum ventilation volume per minute (MVV) and forced vital capacity (FVC) of the two groups decreased at the 1st second of 1 month after operation, but those in the study group were higher than those in the control group ($P<0.05$). Immunoglobulin A (IgA), immunoglobulin M (IgM), and immunoglobulin G (IgG) decreased in both groups at 3 days after operation, but those in the study group were higher than those in the control group ($P<0.05$). The VAS scores of the study group were lower than those of the control group at the 1st, 3rd and 5th day after operation ($P<0.05$). **Conclusion:** Single-hole VATS treatment of elderly patients with SPN can effectively improve perioperative indicators, improve immunity, reduce lung function damage, and it has good safety, it has a high clinical value.

Key words: Single-hole; Video-assisted thoracoscopic surgery; Elderly; Solitary pulmonary nodules; Pulmonary function; Immunoglobulin

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前言

孤立性肺结节(Solitary pulmonary nodules, SPN)是指单一的、边界清晰的、影响不透明的、直径 ≤ 30 mm、周围为含气肺组织所包绕的病变^[1,2]。SPN 患者早期症状不明显,且未合并肺不张、胸腔积液等^[3]。SPN 有良恶性之分,特别是老年 SPN 患者,由于其原发疾病较多,自身体质偏差,若 SPN 良性病灶未能得到及时诊治,可发展至恶性 SPN,影响患者预后^[4,5]。电视胸腔镜手术(Video-assisted thoracic surgery, VATS)因其肺功能损伤小、创伤小、切口美观等特点已广泛应用于临床,并涵盖胸外科多种手术^[6,7]。传统的 VATS 为多孔操作,多孔 VATS 虽优于开胸手术,但仍需行多孔处理以进入胸腔,存在一定的弊端。近年来,单操作孔 VATS 逐渐应用于临床,然而关于上述两种手术方式在老年 SPN 患者中的治疗效果尚存在一定争议。鉴于此,本研究通过探讨单操作孔 VATS 对老年 SPN 患者肺功能和免疫球蛋白的影响,旨在为老年 SPN 患者术式的选择提供数据支持,现报道如下。

1 资料与方法

1.1 一般资料

回顾性分析 2016 年 2 月~2019 年 1 月期间南京医科大学附属无锡人民医院收治的 78 例老年 SPN 患者的临床资料。本研究已获南京医科大学附属无锡人民医院伦理学委员会批准。纳入标准:(1)临床症状表现为不同程度的胸闷、胸痛、气促等;(2)均经胸部 CT 等确诊;(3)年龄 ≥ 60 岁;(4)术前检查未见肺门及纵隔淋巴结肿大;(5)患者及其家属知情且签署了同意书;(6)能够耐受手术治疗并具备手术指征。排除标准:(1)合并心脑肾等脏器功能不全者;(2)术中单操作孔 VATS 因胸腔粘连而改小切口辅助者;(3)合并肿瘤、肺结核、胸腔积液者;(4)合并严重感染者;(5)胸部二次手术者。根据手术方式的不同将患者分为对照组($n=43$)和研究组($n=35$),其中对照组男 26 例,女 17 例,年龄 60~82 岁,平均(71.39 ± 3.38)岁;手术部位:左下叶 6 例,左上叶 5 例,右下叶 15 例,右上叶 17 例;肺结节平均直径(1.93 ± 0.21)cm;术式种类:解剖性肺段切除术 15 例,肺楔型切除术 21 例,肺叶切除术 7 例;术后病理诊断:良性 3 例,恶性 40 例。研究组男 21 例,女 14 例,年龄 61~83 岁,平均(71.43 ± 4.46)岁;手术部位:左下叶 5 例,左上叶 4 例,右下叶 14 例,右上叶 12 例;肺结节平均直径(1.89 ± 0.23)cm;术后病理诊断:良性 1 例,恶性 34 例;术式种类:解剖性肺段切除术 15 例,肺楔型切除术 16 例,肺叶切除术 4 例。两组一般资料对比无差异($P>0.05$),组间可比。

1.2 方法

术前准备:术前行肺功能等常规检查,练习深呼吸及咳嗽,适当应用雾化、抗生素及解痉药物等。对照组:取侧卧位,行双腔气管插管,单肺通气。视每位患者胸腔形状及病变位置,于患者腋中线第 4 或者第 5 肋间放置光源,同时取腋前线第 4 或者第 5 肋间作一切口作为主操作孔,长约 2~3 cm,取腋后线第 8 或者第 9 肋间作一切口作为副操作孔,长约 1.5 cm,随后视 SPN 患者具体情况采取肺楔型切除术、解剖性肺段切除术及肺叶切除术。研究组:患者取侧卧位,行双腔气管插管,单肺通气。于患者腋中线第八肋间放置光源,取腋前线第 4 或者第 5 肋间作一切口作为主操作孔,长约 2 cm,后续手术操作同对照组。两组术毕进行止血并留置胸腔闭式引流。术后常规抗感染、消炎处理。

1.3 观察指标

(1)记录两组围术期相关指标,包括术后引流量、住院时间、手术时间、住院费用、术中出血量。(2)于术前、术后 1 个月采用美国 SensorMedics 公司生产的 6200 型肺功能仪检测患者肺功能指标,包括第 1s 用力呼气容积(Forced expiratory volume in 1st second, FEV1)、每分钟最大通气量(Maximum voluntary ventilation, MVV)、用力肺活量(Forced vital capacity, FVC)。(3)于术前、术后 1 d、术后 3 d、术后 5 d 采用视觉疼痛模拟评分量表(Visual analogue pain scale, VAS)[®]评价患者疼痛情况,其中 VAS 评分 0~10 分,分数越高,疼痛感越强烈。(4)于术前、术后 3 d 抽取患者清晨空腹静脉血 5 mL,经 2900 r/min 离心 12 min,离心半径 9 cm,分离上清液,置于 -30℃ 冰箱中待测。采用免疫透射比浊法检测免疫球蛋白 A(Immunoglobulin A, IgA)、免疫球蛋白 M(Immunoglobulin M, IgM)、免疫球蛋白 G(Immunoglobulin G, IgG),严格遵守试剂盒(上海晶都生物技术有限公司)说明书进行操作。(5)记录两组术后并发症发生情况,两组均以门诊复查等方式随访半年,统计复发情况。

1.4 统计学方法

数据处理采用 SPSS23.0 统计学软件。计数资料以[n(%)]表示,行 χ^2 检验。计量资料以($\bar{x} \pm s$)表示,行 t 检验。检验水准为 $\alpha=0.05$ 。

2 结果

2.1 围术期相关指标比较

两组手术时间比较无差异($P>0.05$),研究组住院时间短于对照组,术后引流量、住院费用、术中出血量均少于对照组($P<0.05$);详见表 1。

表 1 两组围术期相关指标比较($\bar{x} \pm s$)

Table 1 Comparison of perioperative related indicators between two groups($\bar{x} \pm s$)

Groups	Operation time(min)	Postoperative drainage (mL)	Intraoperative bleeding volume(ml)	Hospitalization expenses (Ten thousand yuan)	Hospitalization time (d)
Control group($n=43$)	95.86 $\pm$ 6.21	634.66 $\pm$ 58.12	89.36 $\pm$ 9.18	5.18 $\pm$ 0.54	11.28 $\pm$ 1.03
Study group($n=35$)	97.09 $\pm$ 7.14	521.39 $\pm$ 49.08	73.40 $\pm$ 10.21	4.23 $\pm$ 0.39	8.77 $\pm$ 1.29
t	0.813	9.169	7.262	8.717	9.558
P	0.419	0.000	0.000	0.000	0.000

2.2 肺功能指标比较

后 1 个月 FEV₁、MVV、FVC 均下降,但研究组高于对照组
两组术前 FEV₁、MVV、FVC 比较无差异($P>0.05$);两组术 ($P<0.05$);详见表 2。

表 2 两组肺功能指标比较($\bar{x} \pm s$)

Table 2 Comparison of pulmonary function indexes between two groups($\bar{x} \pm s$)

Groups	FEV ₁ (L)		MVV(L/min)		FVC(L)	
	Preoperative	1 month after operation	Preoperative	1 month after operation	Preoperative	1 month after operation
Control group(n=43)	2.09± 0.35	1.56± 0.26*	74.23± 6.25	60.31± 7.69*	2.54± 0.35	1.64± 0.29*
Study group(n=35)	2.06± 0.42	1.81± 0.29*	73.91± 7.36	66.86± 9.71*	2.58± 0.36	2.13± 0.24*
t	0.344	4.010	0.208	3.325	0.496	8.008
P	0.732	0.000	0.836	0.001	0.622	0.000

Note: Compared with preoperative, * $P<0.05$.

2.3 免疫球蛋白比较

的 IgA、IgM、IgG 均下降,但研究组高于对照组($P<0.05$);详见
两组术前 IgA、IgM、IgG 比较无差异($P>0.05$);两组术后 3 d 表 3。

表 3 两组免疫球蛋白比较($\bar{x} \pm s$)

Table 3 Comparison of immunoglobulins between two groups($\bar{x} \pm s$)

Groups	IgA(U/L)		IgM(U/L)		IgG(U/L)	
	Preoperative	3 d after operation	Preoperative	3 d after operation	Preoperative	3 d after operation
Control group(n=43)	2.32± 0.31	1.66± 0.23*	1.28± 0.13	0.81± 0.14*	11.67± 2.45	7.98± 1.43*
Study group(n=35)	2.34± 0.29	1.91± 0.27*	1.31± 0.14	1.05± 0.16*	11.63± 2.58	9.23± 1.59*
t	0.292	4.416	0.979	7.062	0.070	3.652
P	0.771	0.000	0.311	0.000	0.944	0.000

Note: Compared with preoperative, * $P<0.05$.

2.4 不同时间点 VAS 评分比较

两组术前 VAS 评分比较无差异($P>0.05$),两组术后 1 d、术
后 3 d、术后 5 d 的 VAS 评分均呈现先升高后降低趋势($P<0.05$),
术后 1 d、3 d、5 d 研究组 VAS 评分较对照组降低 ($P<0.05$);详见表 4。

表 4 两组不同时间点 VAS 评分比较($\bar{x} \pm s$, 分)

Table 4 Comparison of VAS scores at different time points between two groups($\bar{x} \pm s$, score)

Groups	Preoperative	1 d after operation	3 d after operation	5 d after operation
Control group(n=43)	1.91± 0.17	4.93± 0.86*	3.57± 0.62* [#]	2.42± 0.45* ^{#&}
Study group(n=35)	1.96± 0.16	4.28± 0.74*	2.88± 0.56* [#]	1.99± 0.32 ^{#&}
t	1.326	3.531	5.103	4.756
P	0.189	0.001	0.000	0.000

Note: Compared with preoperative, * $P<0.05$; Compared with 1 d after operation, [#] $P<0.05$; Compared with 3 d after operation, [&] $P<0.05$.

2.5 并发症发生情况和复发情况比较

两组术后均未见严重的并发症,随访半年,两组均无复发
病例。

3 讨论

SPN 在影像学检查上表现为实性、部分实性以及非实性三种形态,以往数据显示^[9]约有 1.1%~12%的 SPN 为恶性。因此,临床中对于良恶性的 SPN 诊断及治疗尤为重要。SPN 由于病因及其复杂,加之目前 CT、X 线胸片、MRI 分辨率较低,经皮肺穿刺针吸活检又存在较多的并发症,位于肺外周部分的病灶无

法通过纤维支气管镜取活检,因此术前往难以确诊^[10-12]。而老年 SPN 患者由于年龄偏大,体质下降,不能排除恶性病变,因此手术治疗的难度加大^[13,14]。以往常规的开胸手术虽然视野暴露良好,操作方便,但创伤极大,并产生较为明显的术后疼痛和手术瘢痕,往往不易被患者所接受^[15,16]。VATS 是近年新兴的胸外科微创技术,在 SPN 的诊断和治疗中已显示出其独特的优势^[17]。传统的多孔 VATS 分别为腹腔镜孔及主、副操作孔,与开胸手术相比,其手术入路创伤小,术后并发症少^[18],但近年来临床实践证实^[19,20],因副操作孔切口入路需逐层分离背阔肌、大圆肌等肌群,而供血极其丰富的肌肉易导致术中、术后止血困难;

另较为狭窄的后肋间隙,减小了可操作空间,损伤血管及肋间神经,术后康复深受影响。近年来,随着外科技术的发展,多孔 VATS 手术逐渐发展成为两孔甚至单操作孔,其中单操作孔 VATS 最先于胸膜活检手术中所应用,单操作孔 VATS 的手术操作要点在于只保留一个操作孔,放弃副操作孔以避免给患者造成神经及组织损伤,现已逐渐在简单的胸部手术中使用^[21,22]。

本研究表明,研究组住院时间较对照组缩短,住院费用、术后引流量、术中出血量均较对照组减少,可见单操作孔 VATS 治疗可有效改善 SPN 患者临床指标,分析原因可能是因为单操作孔 VATS 仅保留了一个主操作孔,减少了其他的副操作孔,减少术中损伤,降低出血量,术后有利于患者早日恢复,减少了住院时间,进而降低住院费用^[23]。而两组手术时间对比未见差异可能是因为单操作孔 VATS 术中视野有限,同时还与施术者对手术的了解程度有关,单操作孔 VATS 一般要求施术者精通开胸手术,并拥有丰富的胸腔镜操作经验^[24]。此外,研究组术后 1 d、3 d、5 d VAS 评分均低于对照组,可见单操作孔 VATS 可有效减轻老年 SPN 患者术后疼痛,这主要是因为单操作孔无需行辅助操作孔,肋骨不被撑开,术后疼痛减轻^[25,26]。同时本次研究结果还证实,两种手术操作均会对患者肺功能及免疫球蛋白造成一定影响,但单操作孔 VATS 的影响更轻。可能是因为单操作孔 VATS 具有更佳的微创特性,可较好的控制手术伤口,减少术中创伤,术后利于患者早期有效地咳嗽和下床活动,有效保护患者肺功能^[27,28],且单操作孔 VATS 可明显减少切口,避免破坏切口区域的神经以及肌肉组织,对患者免疫功能造成的影响也相对较小^[29,30]。两组均未见严重的并发症,且两组均无复发病例,可见单操作孔 VATS 治疗老年 SPN,安全性较好。

综上所述,单操作孔 VATS 治疗老年 SPN,可有效改善围术期指标,缓解术后疼痛,减轻肺功能损伤,改善免疫功能,且安全性较好,临床应用价值较高。

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