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肺叶切除与全肺切除术对肺癌患者右心功能的影响*

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摘要 目的:目前临床治疗肺癌的主要方法是手术治疗,但肺切除术会引起肺循环障碍而诱发心功能减退,影响手术效果及安全。本研究针对肺癌患者实施肺叶切除术与全肺切除术,观察患者右心功能各项指标的变化情况,分析不同术式对肺癌患者右心功能的影响,为该病的治疗积累临床经验。**方法:**选取2010年4月-2012年12月在我院心胸外科接受手术治疗的肺癌患者64例,分为对照组(30例)和研究组(34例)。对照组患者采用全肺切除术,研究组患者采用肺叶切除术。观察并比较两组患者手术前及手术后第八天的中心静脉压(CVP)、动脉血氧分压(PaO₂)、心率(HR)、右心室舒张末期容积指数(RVEDVI)、右心室射血分数(RVEF)及肺动脉平均压(mPAP)等右心功能各项指标的变化情况。**结果:**手术前,两组患者右心功能各指标无明显差异($P>0.05$);手术后第八天,研究组患者的PaO₂水平和RVEF均高于对照组,而HR、RVEDVI及mPAP则低于对照组,两组比较差异显著且具有统计学意义($P<0.05$)。**结论:**全肺切除术对肺癌患者右心功能的影响较肺叶切除术更为明显。我们在确保病灶能够被顺利切除的前提下,应选择肺叶切除术,以减少手术对患者右心功能的损害,从而提高手术的安全性及成功率。

关键词: 肺癌;肺叶切除术;全肺切除术;右心功能

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Effects of Lobectomy and Pneumonectomy on the Functions of Right Ventricular for Patients with Lung Cancer*

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ABSTRACT Objective: The major method at present for lung cancer is operation, but the influences of lobectomy and pneumonectomy on the right ventricular function of patients decline the successful rate and safety for operation. This study was written to explore different effects on the right ventricular functions respectively brought by the lobectomy and pneumonectomy through a clinical trial about the indicators for evaluate the right heart function so as to prospect accumulate experience for the clinical treatment of lung cancer. **Methods:** 64 patients with lung cancer who were treated in the department of cardiothoracic surgery in our hospital between April 2010 and December 2012 were selected and divided into control group and study group. Thirty patients in the control group were treated by the whole lung resection, while another thirty-four patients in the study group were conducted by the pulmonary lobectomy. Then the central venous pressure (CVP), the PaO₂, the heart rate (HR), the right ventricular end diastolic volume index (RVEDVI), the right ventricular ejection fraction (RVEF) and the mean pulmonary artery pressure (mPAP) of patients in the two groups were observed and analyzed to evaluate the right heart function. **Results:** There was no significant difference in the two groups of patients before operation ($P>0.05$); On the eighth day after the operation, the level of PaO₂ in study group was higher than that of the control group ($P<0.05$); the HR and RVEDVI in the study group were less than those of the patients in the control group ($P<0.05$); the RVEF of patients in the study group was higher than that of the patients in the control group ($P<0.05$); the mPAP was lower than that of the control group ($P<0.05$). **Conclusions:** It is indicated that the effects of the pneumonectomy could be much worse than the lobectomy on the right heart function for patients with lung cancer. Thus, we should better take the lobectomy in order to ensure the removal of the tumor and to improve the success rate of surgery.

Key words: Lung cancer; Lobectomy; Pneumonectomy; Right ventricular Function

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前言

肺癌(Lung cancer)是最常见的肺原发性恶性肿瘤,绝大多

数肺癌起源于支气管粘膜上皮,亦称支气管肺癌。近年来,大气污染越发严重,吸烟人群不断增多,肺癌的发病率和病死率呈逐年攀升趋势。肺癌已成为全球关注的公共卫生问题,而且引

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起国内外专家的广泛重视^[1-3]。手术治疗是肺癌的主要治疗手段之一,其原则是彻底切除肺部原发癌肿病灶和局部淋巴组织,尽可能地保留大量的健康肺组织,并发挥余肺的代偿功能^[4]。肺叶切除是肺癌手术中最常用的方法,但肺叶切除术可能会使肺循环血流动力学发生改变而引起患者的右心功能出现衰退。这不仅影响手术的成功率及安全性,也是术后发生并发症的危险因素^[5,6]。为了探讨手术治疗对肺癌患者右心功能的影响,我们观察肺癌患者肺叶切除术与全肺切除术右心功能的变化情况,为肺癌的临床诊疗提供可利用的依据。现将具体结果报道如下:

1 资料与方法

1.1 临床资料

选取 2010 年 4 月 -2012 年 12 月在我院心胸外科接受手术治疗的肺癌患者 64 例,其中男 42 例,女 22 例。患者入院后

经支气管纤维镜活检、胸片检查、结合临床症状及体征,均确诊为肺癌。纳入标准^[7]:无心肺肝等脏器功能不全;无原发性或继发性痴呆;无精神或心理疾患;无胸部手术史;术前未服用正性肌力药物;心电图检查为窦性心律。

1.2 分组

根据不同的手术方式,将研究对象分为对照组和研究组。对照组 30 例患者,包括男 20 例,女 10 例;平均年龄(63.9 ± 2.1)岁;肿瘤类型:腺癌 8 例,鳞癌 18 例,大细胞癌 3 例,类癌 1 例;该组患者实施全肺切除术,其中左肺切除 18 例,右肺切除 12 例。研究组 34 例患者,包括男 22 例,女 12 例;平均年龄(62.3 ± 1.7)岁;肿瘤类型:腺癌 10 例,鳞癌 19 例,大细胞癌 4 例,类癌 1 例;该组患者实施肺叶切除术,其中左上肺切除 8 例,左下肺切除 10 例,右上肺切除 7 例,右中肺切除 5 例,右下肺切除 4 例。两组患者的性别、年龄及肿瘤类型等一般资料无显著性差异,具有可比性。见表 1。

表 1 两组患者的一般资料比较
Table 1 Comparison of the baseline data between two groups

Group		Control(n=30)	Study(n=34)	t/x ²	P
Gender(Male/ Female)		20/10	22/12	2.971	>0.05
Average age(year)		63.9± 2.1	62.3± 1.7	1.528	>0.05
Tumor Types	Adenocarcinoma	8	10	3.102	>0.05
	Squamous carcinoma	18	19		
	Maxicell carcinoma	3	4		
	Carcinoid	1	1		

1.3 方法

患者术前经常规检查无手术禁忌症,可以接受手术治疗。其中对照组采取全肺切除术,包括左全肺及右全肺切除;研究组采取肺叶切除术,包括左上肺、左下肺、右上肺、右中肺及右下肺切除。利用 iE33 彩色超声诊断仪同步记录患者的心率(HR);利用 4DRV-Function 软件定量分析,平移、旋转、调整长轴、短轴及冠状面,重建右心室立体模型;手动校正三维立体图像至满意效果后进行四维分析,进而测得右心室舒张末期容积指数(RVEDVI)和右心室射血分数(RVEF);应用多普勒超声测定三尖瓣最大反流速度,利用柏努力方程测得肺动脉平均压(mPAP),作为右心室后负荷功能参数的指标^[8-10]。

1.4 观察指标

观察患者术前及术后第 8 天中心静脉压(CVP)、动脉氧分

压(PaO₂)、心率(HR)、右心室舒张末期容积指数(RVEDVI)、右心室射血(RVEF)及肺动脉平均压(mPAP)等。

1.5 统计分析

采用 SPSS19.0 软件进行分析,计量资料以($\bar{x} \pm s$)表示,组间比较用 t 检验,计数资料取 χ^2 检验,以 P<0.05 为差异有统计学意义。

2 结果

2.1 两组患者手术前后的 CVP 及 PaO₂ 水平

如表 2 所示,研究组术前 CVP 为(9.52 ± 2.10) mmHg,PaO₂ 为 (88.32 ± 12.30) mmHg; 对照组术前 CVP 为 (9.70 ± 2.23) mmHg,PaO₂ 为(86.57 ± 12.26) mmHg,两组术前中心静脉压和动脉血氧分压水平无明显差异 (P>0.05)。研究组术后第 8 天

表 2 两组患者手术前后的 CVP 及 PaO₂ 水平
Table 2 Levels of CVP and PaO₂ of patients between two groups before and after operation

Time		Pre operation			8 th day after operation	
Indicators (mmHg)		CVP	PaO ₂		CVP	PaO ₂
Group						
Study(34)		9.52± 2.10	88.32± 12.30		10.58± 3.11	84.16± 11.24
Control(30)		9.70± 2.23	86.57± 12.26		10.79± 3.14	75.38± 10.09
t		1.532	1.264		1.074	7.537
P		>0.05	>0.05		>0.05	<0.05

CVP 为(10.58± 3.11) mmHg, PaO₂ 为(84.16± 11.24) mmHg; 对照组术后第 8 天 CVP 为(10.79± 3.14) mmHg, PaO₂ 为(75.38± 10.09) mmHg, 研究组术后动脉血氧分压水平高于对照组, 差异具有统计学意义(P<0.05)。

2.2 两组患者手术前后右心功能的变化情况

由表 3 可知, 研究组术前 HR 为(72.3± 11.2) t/min, RVEDVI 为(42.76± 5.14), RVEF 为(0.55± 0.06)%; 对照组术前 HR 为

(89.1± 14.0) t/min, RVEDVI 为(43.02± 5.72), RVEF 为(0.56± 0.07)%; 两组术前右心功能无明显差异(P>0.05)。研究组术后 HR 为 (78.3± 13.1) t/min, RVEDVI 为 (45.36± 6.28), RVEF 为 (0.51± 0.04)%; 对照组术后 HR 为(89.1± 14.0) t/min, RVEDVI 为(50.50± 7.23), RVEF 为(0.44± 0.03)%; 研究组术后心率和右心室舒张末期容积指数均低于对照组, 右心室射血分数高于对照组, 差异具有统计学意义(P<0.05)。

表 3 两组患者手术前后右心功能比较

Table 3 Comparison of right heart functions before and after operation

Time	Pre operation			8 th day after operation		
Indicators	HR(t/min)	RVEDVI	RVEF(%)	HR(t/min)	RVEDVI	RVEDVI
Group						
Study(34)	72.3± 11.2	42.76± 5.14	0.55± 0.06	78.3± 13.1	45.36± 6.28	0.51± 0.04
Control(30)	75.4± 12.7	42.76± 5.14	0.56± 0.07	89.1± 14.0	0.44± 0.03	0.44± 0.03
t	1.275	1.386	1.424	6.823	5.297	6.280
P	>0.05	<0.05	>0.05	<0.05	>0.05	<0.05

2.3 两组患者手术前后 mPAP 变化情况

研究组术前 mPAP 为 (19.23± 4.11) mmHg, 对照组术前 mPAP 为(10.01± 4.03) mmHg, 两组术前肺动脉平均压无明显差异(P>0.05)。研究组术后 mPAP 为(20.23± 4.85) mmHg, 对照

组术后 mPAP 为(29.26± 5.18) mmHg, 研究组患者术后肺动脉平均压低于对照组, 差异显著且有统计学意义(P<0.05)。见表 4。

表 4 两组患者手术前后 mPAP 比较(mmHg)

Table 4 Comparison of the mPAP between two groups before and after operation

Group	Study	Control	t	p
Cases	34	30		
Pre operation	19.23± 4.11	10.01± 4.03	1.072	>0.05
8 th day after operation	20.23± 4.85	29.26± 5.18	8.927	>0.05

3 讨论

右心功能损伤是肺切除术后比较常见的并发症, 主要是由于肺循环血液受到障碍而引起血流动力学发生改变^[12]。相关研究表明, 肺动脉高压会导致肺部毛细血管扩张, 压力达到一定程度时, 血液会外渗至肺间质, 引起肺水肿等, 不利于患者术后恢复^[13,18]。因此, 深入了解肺切除术对右心功能的影响具有重大的临床指导意义。我们通过观察肺叶切除术与全肺切除术前、后, 肺癌患者的中心静脉压(CVP)、动脉血氧分压(PaO₂)、心率(HR)、右心室舒张末期容积指数(RVEDVI)、右心室射血分数(RVEF)及肺动脉平均压(mPAP)等右心功能的变化情况, 分析两种手术对患者右心功能的影响, 为肺癌的临床研究提供参考。

本研究中, 实施肺叶切除术的患者术后 mPAP 低于全肺切除术患者。我们分析原因有以下几点: ①一侧全肺切除后, 血管床面积大大降低, 而余肺的代偿性血流量却增多, 从而使肺动脉压升高^[14,15]; ②患者全肺切除后, 有效呼吸面积减少, 加之创伤及疼痛的刺激引起机体缺氧, 缺氧会引起毛细血管痉挛收缩, 从而导致肺动脉压升高^[11,16]; ③大多数人都会对手术产生畏

惧感, 当精神处于应激状态时, 交感神经张力就会增强, 促进人体内儿茶酚胺分泌增多, 从而导致血管收缩, 肺动脉压升高^[17,19]。随着肺动脉压的增高, 右心室容量负荷随之增高, 右心室容积增大, 心室壁张力加大, 心室肌收缩乏力, 引起右心室泵血功能减弱, 导致右心有效射血分数降低^[20]。研究还发现, 实施肺叶切除术的患者术后心率值低于全肺切除术患者。我们认为, 患者术后出现室性心动过速与右心室超负荷及疼痛密切相关, 还可能与迷走神经兴奋而引起的心肌自律性、传导性及应激性增高有关。这一结论还有待我们在临床实践中进一步研究证实。

综上所述, 肺叶切除术较全肺切除术对肺癌患者右心功能的影响要小。与肺叶切除术相比, 全肺切除术患者余肺面积变的更小、代偿能力更弱, 从而导致患者肺动脉压和右心室舒张末期容积指数变的更高, 而肺动脉血氧分压和右心室射血分数则变的更低。肺癌患者行肺叶切除术可提高手术成功率和治疗效果, 改善生活质量, 值得临床应用。

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