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单孔与三孔胸腔镜治疗肺大泡并自发性气胸的临床对比研究*

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摘要 目的:对比肺大泡并自发性气胸患者经单孔与三孔胸腔镜治疗后的临床疗效。**方法:**回顾性分析 2016 年 6 月~2019 年 4 月期间我院收治的 93 例肺大泡并自发性气胸患者的临床资料,根据手术方式的不同将其分为单孔组($n=45$,单孔胸腔镜治疗)和三孔组($n=48$,三孔胸腔镜治疗),比较两组患者围术期指标、视觉疼痛模拟量表(VAS)评分、并发症、血气分析指标、肺功能指标。**结果:**单孔组住院时间短于三孔组,出血量少于三孔组($P<0.05$);两组手术时间、术后引流量比较无差异($P>0.05$)。两组术后并发症发生率比较无差异($P>0.05$)。两组患者术后 3d 血氧分压(PaO_2)较术前升高,且单孔组较三孔组高($P<0.05$);两组患者术后 3d 二氧化碳分压(PaCO_2)较术前降低,且单孔组低于三孔组($P<0.05$)。两组患者术后 3d 第一秒用力呼吸容积(FEV_1)较术前升高,肺总量(TLC)及肺残气量(RV)较术前降低($P<0.05$),但组间比较无统计学差异($P>0.05$)。两组患者术后 1d、术后 2d、术后 3d VAS 评分呈先升高后降低趋势,且单孔组低于三孔组($P<0.05$)。**结论:**与三孔胸腔镜治疗相比,单孔胸腔镜治疗肺大泡并自发性气胸,可有效减少术中出血量,减轻疼痛,促进患者恢复,同时还可改善血气指标,安全性较好。

关键词:单孔胸腔镜;三孔胸腔镜;肺大泡;自发性气胸;疗效

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A Comparative Study of Single Hole and Three Hole Thoracoscopy in the Treatment of Bullae and Spontaneous Pneumothorax*

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ABSTRACT Objective: To compare the clinical effect of single hole and three hole thoracoscopy in the treatment of bullous and spontaneous pneumothorax. **Methods:** The clinical data of 93 patients with pulmonary bullae and spontaneous pneumothorax who were admitted to our hospital from June 2016 to April 2019 were analyzed retrospectively. According to the different operation methods, they were divided into single hole group ($n=45$, single hole thoracoscopy) and three hole group ($n=48$, three hole thoracoscopy). The perioperative indexes, visual pain simulation scale (VAS), complications, blood gas analysis indexes and pulmonary function indexes were compared between the two groups. **Results:** The hospitalization time in the single hole group was shorter than that in the three hole group, and the amount of bleeding was less than that in the three hole group ($P<0.05$). There was no significant difference in operation time and postoperative drainage between the two groups ($P>0.05$). There was no significant difference in the incidence of postoperative complications between the two groups ($P>0.05$). The partial pressure of blood oxygen (PaO_2) of the two groups at 3d after operation were higher than that of the patients before operation, and that in the single hole group was higher than that in the three hole group ($P<0.05$). The partial pressure of carbon dioxide (PaCO_2) of the two groups at 3d after operation were lower than that before operation, and that in the single hole group was lower than that in the three hole group ($P<0.05$). The first second forced breathing volume (FEV_1) of the patients in the two groups at 3d after operation were higher than that before the operation, total lung volume (TLC) and residual lung volume (RV) were lower than those before operation ($P<0.05$), but there was no significant difference between the two groups ($P>0.05$). The VAS scores of patients in the two groups increased first and then decreased at 1d after operation, 2d after operation and 3d after operation, and that in the single hole group was lower than that in the three hole group ($P<0.05$). **Conclusion:** Compared with three hole thoracoscopy, single hole thoracoscopy in the treatment of bullae and spontaneous pneumothorax can effectively reduce the amount of bleeding, reduce the pain, promote patient recovery and improve the blood gas index, and which has a better security.

Key words: Single hole thoracoscopy; Three hole thoracoscopy; Pulmonary bullae; Spontaneous pneumothorax; Efficacy

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前言

肺大泡是指由于各种原因引起的肺泡腔内压力升高,肺泡壁破裂,互相融合,进而在肺组织形成的含气囊腔^[1,2]。较小的、数目少的肺大泡无明显临床症状,只在胸片或CT检查时偶然发现,而随着病情进展,肺大泡可逐渐增大,增大到一定程度即可引起破裂,而自发性气胸则是肺大泡破裂后的常见并发症之一^[3-5]。既往临床针对肺大泡并自发性气胸的治疗主要是对胸膜腔进行穿刺或者给予胸腔闭式引流术,此类治疗方法短期内方便有效,但长远来看极易复发,远期预后较差^[6,7]。部分患者为了行根治治疗,会选择开胸手术,但开胸手术创伤较大,不利于患者术后恢复。随着微创技术的发展,胸腔镜治疗逐渐成为肺大泡并自发性气胸的有效手段,其中三孔胸腔镜采用的微创可视技术给患者带来了较多的益处^[8],随着医学模式的转变,人们追求更为高效的微创术式,单孔胸腔镜逐渐成为临床治疗肺大泡并自发性气胸的焦点^[9]。现临床有关肺大泡并自发性气胸采用单孔或三孔胸腔镜的疗效尚存在一定的争议。鉴于此,本研究通过对比上述两种术式治疗肺大泡并自发性气胸患者的疗效,以期临床选择术式提供参考。

1 资料与方法

1.1 基线资料

回顾性分析2016年6月~2019年4月间我院收治的肺大泡并自发性气胸患者($n=93$)的临床资料,纳入标准:(1)手术操作均由同一组医师完成;(2)均为单侧自发性气胸;(3)均具备手术指征;(4)均行胸部X线片或CT检查确诊为肺大泡。排除标准:(1)合并心肝肾等重要实质脏器障碍者;(2)伴有其他呼吸系统慢性疾病,如肺结核、慢性阻塞性肺疾病等;(3)合并精神疾病,无法正常沟通交流者;(4)妊娠及哺乳期妇女;(5)存在明显的胸膜增厚和粘连等情况;(6)双侧肺大泡且需同时手术切除者。根据手术方式的不同将其分为三孔组($n=48$)、单孔组($n=45$),其中单孔组男24例,女21例,年龄33~69岁,平均 (48.56 ± 5.38) 岁;体质量指数 $21.5\sim 26.3\text{kg/m}^2$,平均 $(24.08\pm 0.96)\text{kg/m}^2$;肺压缩程度: $<30\%$ 18例, $30\%\sim 60\%$ 20例, $>60\%$ 7例;发作次数:首次发作25例,发作 ≥ 2 次20例。三孔组男26例,女22例,年龄32~69岁,平均 (48.73 ± 4.26) 岁;体质量指数 $21.3\sim 27.3\text{kg/m}^2$,平均 $(24.16\pm 1.16)\text{kg/m}^2$;肺压缩程度: $<30\%$ 16例, $30\%\sim 60\%$ 21例, $>60\%$ 11例;发作次数:首次发作27例,发作 ≥ 2 次21例。两组一般资料对比未见显著差异($P>0.05$)。

1.2 方法

两组术前均行血常规、胸部CT、心电图、肝肾功能等常规检查,针对病情严重者可给予引流减压处理。患者术中采用静脉复合麻醉,体位取健侧卧位,健侧单肺通气,胸腔镜及内镜手术器械选用美国Baxter公司生产的器械。三孔组采用三孔胸腔镜治疗,具体操作如下:于患者腋中线第7肋间作一切口,长约1cm,将胸腔镜置入,随后取腋后线第7肋间、腋前线第4肋间分别作切口,长约2cm。观察胸腔内情况,若有小血管则用超声刀进行夹闭离断,若有粘连则用电凝钩分离,随后逐步探查查找肺大泡,肺大泡发现后用双关节卵圆钳提起,经另一操作孔使用直线型切割缝合器于肺大泡基底部正常的肺组织进行切割缝合。单孔组给予单孔胸腔镜治疗,于患者腋中线第7肋间作一切口,长约1cm,将胸腔镜置入,随后取腋前线第4肋间作切口作为操作孔,长约2cm。后续术中操作同三孔组。

1.3 观察指标

(1)比较两组围术期指标,包括术中出血量、术后引流量、住院时间、手术时间。(2)于术前、术后1d、术后2d、术后3d采用视觉疼痛模拟量表(Visual pain simulation scale, VAS)^[10]评价患者疼痛状况,其中VAS评分0~10分,分数越高,疼痛感越强烈。(3)于术前、术后3d分别采用美国实验仪器公司生产的IL-1302型血气分析仪检测两组患者的血氧分压(Partial pressure of blood oxygen, PaO_2)、二氧化碳分压(Partial pressure of carbon dioxide, PaCO_2)。(4)于术前、术后3d采用日本MINATO公司System-7型肺功能仪检测所有患者的第一秒用力呼吸容积(First second forced breathing volume, FEV_1)、肺总量(Total lung volume, TLC)及肺残气量(Residual lung volume, RV),均连测3次,取平均值。(5)记录术后并发症。

1.4 统计学方法

采用SPSS20.0进行数据分析。计数资料以例数及率的形式表示,行卡方检验。计量资料均符合正态分布,以均值 $\pm$ 标准差($\bar{x}\pm s$)的形式表示,组间比较行成组t检验,组内治疗前后比较为配对t检验。检验标准设置为 $\alpha=0.05$ 。

2 结果

2.1 围术期指标比较

两组术后引流量、手术时间比较无差异($P>0.05$);单孔组住院时间短于三孔组,术中出血量少于三孔组($P<0.05$);见表1。

表1 围术期指标比较($\bar{x}\pm s$)

Table 1 Comparison of perioperative indexes($\bar{x}\pm s$)

Groups	Amount of bleeding(mL)	Operation time(min)	Hospitalization time(d)	Postoperative drainage(mL)
Single hole group($n=45$)	5.79 ± 0.56	59.73 ± 4.69	4.36 ± 0.38	231.49 ± 16.37
Three hole group($n=48$)	14.41 ± 1.37	58.75 ± 3.39	6.24 ± 0.49	233.72 ± 19.11
t	39.236	1.160	20.580	0.602
P	0.000	0.249	0.000	0.548

2.2 两组患者血气分析指标比较

两组术前 PaO_2 、 PaCO_2 比较无差异($P>0.05$);两组术后3d

PaO_2 升高,且单孔组高于三孔组($P<0.05$);两组术后3d PaCO_2 降低,且单孔组较三孔组低($P<0.05$);见表2。

表 2 两组患者血气分析指标比较($\bar{x} \pm s$, mmHg)Table 2 Comparison of blood gas analysis indexes between the two groups($\bar{x} \pm s$, mmHg)

Groups	PaO ₂		PaCO ₂	
	Before operation	3d after operation	Before operation	3d after operation
Single hole group(n=45)	85.71±9.52	101.72±10.69*	46.83±5.42	35.64±5.17*
Three hole group(n=48)	84.48±8.42	92.39±9.53*	45.39±6.28	40.46±4.12*
t	0.661	4.449	1.180	4.988
P	0.510	0.000	0.241	0.000

Note: compared with that before operation, * $P < 0.05$.

2.3 两组患者肺功能指标比较

差异($P > 0.05$);两组患者术后 3d FEV₁ 较术前升高,TLC、RV 较两组患者术前、术后 3d 的 FEV₁、TLC、RV 比较无统计学 术前降低($P < 0.05$);详见表 3。表 3 两组患者肺功能指标比较($\bar{x} \pm s$, L)Table 3 Comparison of pulmonary function indexes between the two groups($\bar{x} \pm s$, L)

Groups	FEV ₁		TLC		RV	
	Before operation	3d after operation	Before operation	3d after operation	Before operation	3d after operation
Single hole group(n=45)	0.75±0.23	1.03±0.24*	6.68±1.40	5.37±0.71*	4.27±0.48	3.38±0.49*
Three hole group(n=48)	0.72±0.17	0.96±0.33*	6.59±0.92	5.42±0.87*	4.24±0.57	3.42±0.38*
t	0.718	1.163	0.369	0.302	0.274	0.441
P	0.474	0.248	0.713	0.763	0.785	0.660

Note: compared with that before operation, * $P < 0.05$.

2.4 两组患者疼痛情况比较

后 2d、术后 3d VAS 评分呈先升高后降低趋势,且单孔组低于

两组术前 VAS 评分比较无差异($P > 0.05$);两组术后 1d、术 三孔组($P < 0.05$);详见表 4。表 4 两组患者 VAS 评分比较($\bar{x} \pm s$, 分)Table 4 Comparison of VAS scores between the two groups($\bar{x} \pm s$, score)

Groups	Before operation	1d after operation	2d after operation	3d after operation
Single hole group(n=45)	3.09±0.53	5.61±0.57*	2.68±0.73 [#]	1.93±0.48 [@]
Three hole group(n=48)	3.02±0.41	6.46±0.62*	3.71±0.92 [#]	2.66±0.73 [@]
t	0.715	6.869	5.955	5.658
P	0.476	0.000	0.000	0.000

Note: compared with before operation, * $P < 0.05$; compared with 1d after operation, [#] $P < 0.05$; compared with 2d after operation, [@] $P < 0.05$.

2.5 并发症发生情况比较

三孔组发生 1 例切口感染、2 例术后漏气, 并发症发生率为 6.25%(3/48); 单孔组发生术后漏气 2 例, 并发症发生率为 4.44%(2/45); 两组术后并发症发生率比较无差异($\chi^2=0.149$, $P=0.700$)。

3 讨论

肺大泡并自发性气胸是一种作用于胸腔的常见疾病, 临床多表现为胸闷、气短、呼吸困难等症状, 其主要发病机制为负责保护胸腔的脏胸膜出现问题, 致使气体进入胸腔而导致出现积气^[11-13]。以往针对此类患者医生会视患者具体情况采取保守治疗或者开胸手术, 但因药物无法进行有效的对症治疗, 或开胸手术虽然视野暴露良好, 操作方便, 但创伤极大, 术后并发症多, 严重影响患者预后, 均受到一定的限制^[14, 15]。随着胸腔镜的

引入, 胸腔镜可将体内的画面通过胸腔镜呈现出现, 有效避免大面积损伤, 减轻患者术后恢复压力。在胸腔镜的治疗过程中, 其主要关键点在于切口的选择, 合理的切口不仅可让术者清除了解患者体内情况, 还应有利于手术操作, 可减少术后并发症的发生风险^[16, 17]。三孔胸腔镜是目前常用的术式, 分别为胸腔镜孔及主、副操作孔, 其虽优越于开胸手术, 但仍需行多孔处理以进入胸腔。对于外科医师来说, 手术治疗疾病并不是现代医学的关键, 而应更多将重点放在患者的术后恢复中, 做到微创治疗。随着外科技术的发展, 三孔胸腔镜已逐渐发展至单孔胸腔镜, 即术中只保留一个操作孔完成整个手术操作^[18-20]。我国单孔胸腔镜手术起步较晚, 其在肺大泡并自发性气胸中的疗效尚待进一步研究已证实, 故本研究就此展开分析。

本次研究中, 两组患者术后肺功能均有所改善, 且单孔组术中出血量少于三孔组, 住院时间短于三孔组, 可见与三孔组

腔镜相比,单孔胸腔镜治疗肺大泡并自发性气胸,可获得与其相当的治疗效果,并发挥更佳的微创治疗效果。主要是因其只有一个操作孔,术后创伤小,可有效促进患者术后恢复,缩短住院时间^[21,22]。但两组患者手术时间、术后引流量比较无统计学差异,主要考虑到单孔胸腔镜为新开展的激素项目,术者学习曲线较长,初期操作不熟练,加之单孔操作器械易互相干扰,需小心使用切割缝合器,从而导致未能有效缩短手术时间^[23-25]。本次研究组,两种手术方式均可引起患者不同程度的疼痛,且单孔组的疼痛程度更轻,分析其原因可能是三孔胸腔镜的副操作孔处于后胸壁,其肋间相对狭窄,反复进出术中器械易扰动肋间神经,术后疼痛引起。而单孔胸腔镜废除了背部切口,可减少因器械的反复进出对背部肌肉的损伤以及操作孔本身所致的切口损伤,从而减轻患者术后进行有效活动时所引起的疼痛^[26]。本次研究结果还显示,两组患者的血气分析指标均有所改善,且单孔组的改善效果更佳,这可能与单孔胸腔镜治疗可减少患者疼痛,促进患者进行有效的氧合活动,进而改善其血气分析指标有关。两组患者术后并发症发生率无差异,可见单孔胸腔镜治疗安全性较好。

综上所述,与三孔胸腔镜治疗相比,单孔胸腔镜治疗肺大泡并自发性气胸,可有效减少术中出血量,减轻疼痛,促进患者恢复,同时还可改善血气指标,安全性较好。

参考文献(References)

- [1] Inoue H, Okazaki T, Minowa M, et al. Anaphylaxis Induced by Fibrin Glue During Surgery for Pneumothorax[J]. Kyobu Geka, 2019, 72(8): 605-608
- [2] Asano H, Ohtsuka T, Noda Y, et al. Risk factors for recurrence of primary spontaneous pneumothorax after thoracoscopic surgery [J]. J Thorac Dis, 2019, 11(5): 1940-1944
- [3] 陈寅,林之枫,刘法兵,等. 胸顶胸膜部分切除翻转与机械摩擦行胸膜固定应用于胸腔镜肺大疱切除治疗自发性气胸中的对比研究[J].现代生物医学进展, 2017, 17(4): 725-727, 790
- [4] Almajid FM, Aljehani YM, Alabkary S, et al. The accuracy of computed tomography in detecting surgically resectable blebs or bullae in primary spontaneous pneumothorax [J]. Radiol Med, 2019, 124(9): 833-837
- [5] Underner M, Urban T, Perriot J, et al. Spontaneous pneumothorax and lung emphysema in cannabis users [J]. Rev Pneumol Clin, 2018, 74(6): 400-415
- [6] Park S, Jang HJ, Song JH, et al. Do Blebs or Bullae on High-Resolution Computed Tomography Predict Ipsilateral Recurrence in Young Patients at the First Episode of Primary Spontaneous Pneumothorax? [J]. Korean J Thorac Cardiovasc Surg, 2019, 52(2): 91-99
- [7] 单颖军,张智强,梅运清,等. 18~35岁原发性自发性气胸患者首次发作后同侧复发原因分析 [J]. 同济大学学报(医学版), 2016, 37(3): 60-65
- [8] Perry Y, Fernando HC. Three-field minimally invasive esophagectomy: current results and technique[J]. J Thorac Cardiovasc Surg, 2012, 144(3): S63-S66
- [9] Huang S, Cao X, Li J, et al. Analgesic effect of flurbiprofen axetil in treatment of single hole thoracoscopic surgery for pneumothorax[J]. Pak J Pharm Sci, 2017, 30(5(Special)): 1875-1882
- [10] 高万露,汪小海. 患者疼痛评分法的术前选择及术后疼痛评估的效果分析[J].实用医学杂志, 2013, 29(23): 3892-3894
- [11] Choi SY, Kim DY, Suh JH, et al. New bullae formation in the staple line increases the risk of recurrent pneumothorax following video-assisted thoracoscopic surgery bullectomy for primary spontaneous pneumothorax[J]. J Thorac Dis, 2018, 10(7): 4287-4292
- [12] Li X, Wang X, Zhang H, et al. Unilateral single-port thoracoscopic surgery for bilateral pneumothorax or pulmonary bullae [J]. J Cardiothorac Surg, 2019, 14(1): 71
- [13] Chiu CY, Chen TP, Chen JR, et al. Overexpression of matrix metalloproteinase-9 in adolescents with primary spontaneous pneumothorax for surgical intervention[J]. J Thorac Cardiovasc Surg, 2018, 156(6): 2328-2336.e2
- [14] Barril Merino C, Solovera R ME, Bannura Y F, et al. Pulmonary expansion edema during the management of a spontaneous pneumothorax. Report of one case [J]. Rev Med Chil, 2018, 146(11): 1343-1346
- [15] Tsuboshima K, Matoba Y, Wakahara T, et al. Natural history of bulla neogenesis for primary spontaneous pneumothorax: a propensity score analysis[J]. Gen Thorac Cardiovasc Surg, 2019, 67(5): 464-469
- [16] Onuki T, Kawamura T, Kawabata S, et al. Neo-generation of neogenetic bullae after surgery for spontaneous pneumothorax in young adults: a prospective study [J]. J Cardiothorac Surg, 2019, 14(1): 20
- [17] Asghar Nawaz M, Apparau D, Zacharias J, et al. Approach to pneumothorax surgery: a national survey of current UK practice[J]. Asian Cardiovasc Thorac Ann, 2019, 27(3): 180-186
- [18] Berger AC, Bloomenthal A, Weksler B, et al. Oncologic efficacy is not compromised, and may be improved with minimally invasive esophagectomy[J]. J Am Coll Surg, 2011, 212(4): 560-566
- [19] 晋云鹏,卢喜科,张逊,等. 单孔与三孔胸腔镜肺叶切除术的临床疗效对比[J].天津医药, 2016, 44(1): 101-104
- [20] 宋焕,王坤,茹玉航,等. 自发性气胸手术治疗中单孔与双孔胸腔镜肺大疱切除术的应用对比研究 [J]. 解放军预防医学杂志, 2019, 37(5): 189-190
- [21] 赵亮,董天剑,翟建宾,等. 单孔法和单操作孔法胸腔镜手术治疗自发性气胸并肺大疱的效果比较 [J]. 临床误诊误治, 2016, 29(11): 93-95
- [22] Wang X, Wang L, Zhang H, et al. Feasibility and application of single-hole video-assisted thoracoscope in pulmonary peripheral tumors[J]. Oncol Lett, 2016, 12(6): 4957-4960
- [23] Imperatori A, Fontana F, Dominioni L, et al. Video-assisted thoracoscopic resection of lung nodules localized with a hydrogel plug[J]. Interact Cardiovasc Thorac Surg, 2019, 29(1): 137-143
- [24] Chhabra Y, Wong HY, Nikolajsen LF, et al. A growth hormone receptor SNP promotes lung cancer by impairment of SOCS2-mediated degradation[J]. Oncogene, 2018, 37(4): 489-501
- [25] 李钢,甘崇志,罗青松,等. 单孔法与双孔法胸腔镜肺大疱切除术治疗自发性气胸的对比研究 [J]. 中国微创外科杂志, 2016, 16(11): 961-964
- [26] Wang J, Zhang L, Kang D, et al. Activation of PGE2/EP2 and PGE2/EP4 signaling pathways positively regulate the level of PD-1 in infiltrating CD8⁺ T cells in patients with lung cancer [J]. Oncol Lett, 2018, 15(1): 552-558