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# 胸腔镜下肺叶切除术后发生肺部并发症的危险因素分析 *

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**摘要 目的:**探讨胸腔镜下肺叶切除术后发生肺部并发症的危险因素。**方法:**连续收集从 2015 年 1 月至 2017 年 6 月份我科收治的因肺癌行胸腔镜下肺叶切除的患者,收集患者的基本资料,包括性别、年龄、一秒用气呼气容积百分比(Percentage predicted forced expiratory volume in 1 s,FEV1%)、美国麻醉医师协会评分(American Society of Anesthesiologists,ASA)、BMI 指数、慢性阻塞性肺疾病(Chronic obstructive pulmonary disease,COPD)和肿瘤的发生情况。统计患者的术后住院时间、ICU 停留时间和住院死亡率,收集患者术后肺部并发症的发生情况、术后第一天活动和是否需要理疗。对比分析发生肺部并发症和不发生并发症患者的差异,对有差异的因素利用 Logistic 回归分析发生肺部并发症的独立危险因素。**结果:**根据纳入排除标准,共有 256 例患者纳入研究,其中男性 126 例,平均年龄为 67.2± 13.7 岁,术后共有 19 例(7.4%)患者发生肺部并发症。发生并发症的患者较未发生并发症的患者术后住院时间长、ICU 停留时间长、死亡率高($P<0.05$)。发生并发症的患者术后下地活动情况差。两组患者的年龄、COPD 和吸烟情况有统计学差异($P<0.05$),Logistic 回归分析显示吸烟是术后发生肺部并发症的独立危险因素。**结论:**胸腔镜下肺叶切除患者术后肺部并发症增加术后死亡率,吸烟是患者术后发生肺部并发症的独立危险因素。

**关键词:**胸腔镜;肺部并发症;危险因素

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# Analysis of Risk Factors of Postoperative Pulmonary Complications in Patients Undergoing Thoracoscopic Lobectomy*

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**ABSTRACT Objective:** To investigate the risk factors of pulmonary complications after thoracoscopic lobectomy. **Methods:** Consecutive patients who underwent thoracoscopic lobectomy in our department for lung cancer from January 2015 to June 2017 were collected. Patients' basic informations, including gender, age, percentage of expiratory volume of the first second (FEV1%), American Society of Anesthesiologists scores (ASA), BMI index, Chronic obstructive pulmonary disease (COPD) incidence and tumor status, were reviewed. The postoperative hospital stay, ICU stay time, and hospital mortality were counted, and the postoperative pulmonary complications, postoperative first day activities, and physiotherapy were recorded. The differences between patients with pulmonary complications and non-complication were comparatively analyzed, and Logistic regression was used to analyze the independent risk factors for pulmonary complications among the differential factors. **Results:** According to the exclusion criteria, a total of 256 patients were included in the study, including 126 males, and the average age was 67.2 ± 13.7 years. A total of 19 patients (7.4%) developed pulmonary complications. Patients with pulmonary complications had longer postoperative hospital stay, longer ICU stay, and higher mortality ($P<0.05$). Patients with pulmonary complications have poor postoperative activity. There were significant differences in age, COPD, and smoking between the two groups ($P<0.05$), but logistic regression analysis found that smoking was an independent risk factor for postoperative pulmonary complications. **Conclusions:** Postoperative pulmonary complications in patients undergoing thoracoscopic lobectomy have increased postoperative mortality, and smoking is an independent risk factor for postoperative pulmonary complications in patients.

**Key words:** Thoracoscopic surgery; Pulmonary complications; Risk factors

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## 前言

肺叶切除是治疗早期非小细胞肺癌 (Non-small cell lung cancer,NSCLC) 的有效手段 [1,2]。电视辅助胸腔镜技术(Video-assisted thoracoscopic surgery,VATS)比开胸手术的创伤小,越来越成为胸外科医生治疗早期 NSCLC 的方法[3]。胸外科术后肺部并发症包括肺炎和肺不张等在临床较常见,明显延长住院期间死亡率、ICU 过渡时间和术后住院时间[4]。开胸行肺切除术后并发肺部并发症的患者在术后 6 个月的生存率降低[5]。有研究表明年龄、吸烟、慢性阻塞性肺疾病(Chronic obstructive pulmonary disease,COPD)、1 秒内用力呼气百分比(Percentage predicted forced expiratory volume in 1 s,FEV1%) 和 BMI 指数是开胸行肺切除术后发生肺部并发症的危险因素[4-8]。VAST 下肺叶切除比开胸缩短了术后住院时间并减轻了术后疼痛[9-11]。VAST 可能会减少术后肺部并发症的发生[12-16],但是 VAST 肺叶切除术后仍有可能发生肺部并发症。目前,有关 VAST 下肺叶切除术后肺部并发症发生情况和影响因素报道较少。因此,本文主要探讨了 VAST 肺叶切除术后肺部并发症的发生情况和危险因素,以期为 VAST 肺叶切除术后并发症的预防提供参考依据。

## 1 资料与方法

### 1.1 一般资料

收集 2015 年 1 月至 2017 年 6 月就诊于我科因肺肿瘤行胸腔镜下肺叶切除的患者,纳入标准:① 肿瘤大小＜7 cm;② 术前薄层 CT 扫描提示肺癌且未发现明显纵膈淋巴结转移;③ 未接受新辅助放疗和放疗;④ 未侵及叶支气管;⑤ 没有肺部手术史;⑥ 没有肺部感染;⑦ 术前检查未见明显手术禁忌症;⑧ 术后病理确诊为 NSCLC。关于患者能否行手术切除参照胸外科肺癌切除指南[17]。所有的患者均是由我科同一个医疗组在全麻单肺通气下进行手术,病人在手术结束后拔出气管插管并转入我科 ICU, 术后第 1 天由 ICU 医生决定是否转入普通病房。VAST 均是通过传统三孔进行。患者术后镇痛方案由麻醉医生制定。转入普通病房后由胸外科理疗师评估患者是否有肺不张、排痰困难、活动耐力下降等决定需要理疗干预。不需要进行理疗干预的患者行标准的术后护理。该研究经空军军医大学唐都医院伦理委员会通过。

### 1.2 临床资料

收集患者的基本临床资料,包括性别、年龄、FEV1%、ASA 评分、术前走路距离、BMI 指数、是否合并 COPD、是否吸烟情况、术后病理结果,住院时间为术后到出院的住院时间。

肺部并发症的定义[18-20]参照文献,主要包括肺部感染、肺不张、呼吸衰竭、胸腔积液、气胸和吸入性肺炎。肺部感染:患者因怀疑呼吸道感染使用抗生素且合并下列表现中的一项或多项:出现浓痰;新发肺部阴影;发热;白细胞计数＞12× $10^9$/L。肺不张:肺组织局部密度增高,纵膈或者肺门向病变区移位,临近肺组织代偿性肺气肿。呼吸衰竭:术后不吸氧状态下 $PaO_2$<8 KPa (60 mmHg),$PaO_2$:$FiO_2$<40 KPa(300 mmHg)或脉搏血氧饱和度测定的动脉血氧饱和度 <90%并且需要氧疗。胸腔积液:胸部 X 线片显示肋膈角变钝,同侧膈肌在直立位置未见锋利的轮廓提示胸腔积液。气胸:胸腔积气＞30%。支气管痉挛:新出现的呼气喘息需要用支气管扩张剂治疗。吸入性肺炎:吸入胃内容物引起急性肺损伤。

### 1.3 统计学分析

所有统计操作均在 SPSS 20.0 版本下进行, 计量资料差异采用 t 检验分析,计数资料的差异采用卡方检验或者 Fisher 精确检验进行,影响因素分析采用 Logistic 回归分析进行,以 $P<0.05$ 为差异有统计学意义。

## 2 结果

根据纳入排除标准, 从 2015 年 1 月至 2017 年 6 月共有 259 例患者,其中有 3 名患者术中由胸腔镜转为开胸手术故排除研究,共有 256 例患者纳入研究,其中男性 126 例(49.2%),年龄为 67.2± 13.7 岁,共有 19 例(7.4%)患者术后发生肺部并发症。

### 2.1 患者的基本临床资料

术后 19 例发生肺部并发症的患者年(73.3)龄高于未发生肺部并发症的患者 (66.7)($P$=0.027)。19 例患者中, 有 10 例(52.6%)患者术前合并有 COPD,其比例高于未发生肺部并发症的患者(27.0%)($P$=0.017),吸烟患者的比例(42.1%)也高于未发生肺部并发症的患者(19.0%)($P$=0.017),见表 1。

### 2.2 患者术后情况

19 例术后发生肺部并发症的患者平均术后住院时间和 ICU 住院时间均显著高于术后未发生肺部并发症的患者 ($P<0.05$)。19 例患者中,有 3 例(15.8%)患者住院期间死亡,未发生肺部并发症的患者住院期间没有死亡事件发生,见表 2。

### 2.3 患者返回普通病房第一天活动和理疗情况

19 例术后发生肺部并发症的患者返回普通病房第一天有 7 例(36.8%)不能下地活动高于未发生并发症组(13.1%),活动距离大于 10 米的比例(63.2%)低于术后未发生肺部并发症的患者($P<0.05$),术后均需要胸外科理疗师干预,见表 3。

### 2.4 术后发生肺部并发症的危险因素分析

将两组患者有差异的因素: 年龄、COPD 和吸烟状态作为自变量,以术后是否肺部并发症为因变量纳入 Logistic 回归分析中,发现吸烟是术后发生肺部并发症的独立危险因素(OR=4.6, $P$=0.001),见表 4。

## 3 讨论

有研究报道 VATS 肺叶切除术后发生肺部并发症的比例为 10%-40%[22-24], 但是这些研究缺乏标准的肺部并发症的定义,肺部并发症有很多,不同的研究中纳入的肺部并发症的种类和定义不同, 有些研究甚至没有给出肺部并发症的定义,不同的研究得出的结果往往差异很大,因此在研究术后肺部并发症时应采用统一的肺部并发症的评价标准, 比较结果更有意义。2015 年欧洲麻醉学会和欧洲重症监护医学会给出标准的术后并发症的定义[20],因此我们采用的该标准定义。本研究中,因 NSCLC 行胸腔镜下肺叶切除发生术后肺部并发症的比例为 7.4%, 尽管该比例比开胸术后肺部并发症发生率低[5,21],VATS 肺叶切除术后肺部并发症仍然增加了患者术后住院时间和 ICU 住院时间,升高了住院期间的死亡率,同时也需要更多的

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表 1 患者的基本资料

Table 1 Basic information of patients

| Parameters | Total(n=256) | Complication occurrence(n=19) | Non- complication(n=237) | t/$x^2$ | *P* value |
|---|---|---|---|---|---|
| Age (Year) | 67.2± 13.7 | 73.3± 12.7 | 66.7± 12.4 | 2.228 | 0.027 |
| Gender: Male (n, %) | 126, 49.2 | 10, 52.6 | 116, 48.9 | 0.096 | 0.757 |
| FEV1% | 87.4± 19.3 | 88.6± 20.6 | 87.3± 20.1 | 0.271 | 0.787 |
| ASA ≥ 3 points (n, %) | 134, 52.3 | 13, 68.4 | 121, 51.5 | 2.127 | 0.145 |
| Walking distance ≤ 400 meters (n,%) | 77, 30.1 | 6, 31.6 | 71, 30.0 | 0.022 | 0.882 |
| BMI≥ 30(n,%) | 51, 19.9 | 4, 21.1 | 47, 19.8 | 0.016 | 0.898 |
| COPD(n,%) | 74, 28.9 | 10, 52.6 | 64, 27.0 | 5.621 | 0.018 |
| Smoking (n,%) | 53, 20.7 | 8, 42.1 | 45, 19.0 | 5.726 | 0.017 |
| NSCLC staging | | | | | |
| Ⅰ A(n,%) | 122, 47.7 | 10, 52.6 | 112, 47.3 | | |
| Ⅰ B(n,%) | 81, 31.6 | 5, 26.3 | 76, 32.1 | | |
| Ⅱ A(n,%) | 40, 15.6 | 3, 15.8 | 37, 15.6 | 1.252 | 0.869 |
| Ⅱ B(n,%) | 6, 2.3 | 0, 0 | 6, 2.5 | | |
| Ⅲ A(n,%) | 7, 2.7 | 1, 5.3 | 6, 2.5 | | |

表 2 两组患者术后情况

Table 2 Postoperative situation of two groups of patients

| Parameters | Complication occurrence(n=19) | Non- complication(n=237) | t/$x^2$ | *P* value |
|---|---|---|---|---|
| Postoperative hospital stay (days) | 8.8± 1.4 | 4.2± 1.1 | 17.170 | ＜0.001 |
| ICU stay time (hours) | 35.3± 6.7 | 15.7± 5.3 | 15.190 | ＜0.001 |
| Hospital death (n,%) | 3, 15.8 | 0, 0 | - | - |

表 3 患者术后第一天活动及术后理疗情况

Table 3Activity of first day after surgery and the postoperative physiotherapy

| Parameters | Total(n=256) | Complication occurrence(n=19) | Non- complication(n=237) | $x^2$ | *P* value |
|---|---|---|---|---|---|
| Unable to move(n,%) | 38, 14.8 | 7, 36.8 | 31, 13.1 | 7.857 | 0.005 |
| Activity distance ≤ 10 meters (n, %) | 5, 2.0 | 0, 0 | 5, 2.1 | - | - |
| Activity distance >10 meters (n,%) | 213, 83.2 | 12, 63.2 | 201, 84.8 | 5.901 | 0.015 |
| Need for physiotherapy(n,%) | 133, 52.0 | 19, 100 | 114, 48.1 | - | - |

表 4 Logistic 回归分析

Table 4 Logistic Regression Analysis

| Parameters | B value | SE | Wals | *P* value | Exp(B) |
|---|---|---|---|---|---|
| Smoking | 1.526 | 0.476 | 10.270 | 0.001 | 4.6 |
| Age | 0.080 | 0.518 | 0.024 | 0.877 | 1.084 |
| COPD | 0.461 | 0.443 | 1.080 | 0.299 | 1.585 |
| Constant | 1.260 | 3.691 | 0.116 | 0.733 | 3.524 |

理疗干涉。

既往有研究探讨了开胸术后发生肺部并发症的危险因素[4-8],但是研究 VATS 术后的危险因素的报道相对较少,且大多数均为回顾性研究[22,23,25]。Yang 回顾分析了 VATS 治疗原发性肺癌病例,发现严重并发症发生率为 7.3%,而其中 90.7%的并发症为肺部并发症，严重并发症的发生危险因素为年龄＞70 岁、延长手术时间和合并症(包括心脑血管疾病、COPD、慢性肾功能不全和糖尿病)，在多因素分析中并未发现吸烟为术后的危险因素[23]。Wang 对 525 例因肺癌行 VATS 的患者进行分析，发现 6.9%的患者发生严重并发症,包括呼吸衰竭、血胸、心梗、

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心衰、支气管痿、脑梗和肺栓塞，年龄＞70 岁、FEV1%＜70%和心血管疾病是上述并发症发生的危险因素[22]，但该研究是一个回顾性研究且不伴有 COPD 的病人比例较高(93.5%)。我们的研究结果显示 FEV1%不是 VATS 术后发生肺部并发症的危险因素，和 Berry 的研究结果吻合[25]，Berry 的研究中显示 VATS 术后发生肺部并发症的比例为 12%。我们之所以在研究中将年龄、ASA 评分、BMI 指数、COPD 和吸烟状态作为可能的危险因素，是因为这些因素是开胸行肺癌切除术后发生肺部并发症的独立危险因素[4]，其他的合并症比如缺血性心脏病、心衰、高血压和糖尿病在之前的研究中证实不是术后发生肺部并发症的危险因素[5]，因此未将这些因素纳入研究。

本研究结果显示术后发生肺部并发症的患者较未发生并发症的患者年龄大、合并 COPD 多、吸烟比例高，但是只有吸烟是 VATS 肺叶切除术后发生肺部并发症的独立危险因素，之前的研究也证实吸烟是胸外科肺切除术后肺部并发症发生的危险因素[4,5]。术前吸烟的患者术后发生肺部并发生的可能性是不吸烟人群的 4.6 倍，有可能是吸烟对呼吸道产生不同程度损害，导致气道黏膜清除能力下降，对术后肺部并发症发生产生影响。最近的研究显示戒烟可降低开胸手术术后肺部并发症[26]。本研究的一个不足就是对吸烟的定义，我们的吸烟定义为患者术前吸烟且在手术之前尚未戒烟，将术前已经成功戒烟的患者排除研究，可能对结果产生一定偏倚，在后续的研究中仍需要将患者的吸烟状态更加细化。另外一个不足是术后镇痛方案的选择，我们的患者术后镇痛方案均是由麻醉医生制定，不同的患者术后镇痛方案可能不同，但是有研究曾报道不同镇痛方案不是患者肺切除术后发生肺部并发症的危险因素[5]。最后，我们研究中纳入的 256 例患者中只有 19 例患者发生术后肺部并发症，在后续研究中应增加纳入人群总数。

总之，虽然 VATS 相对开胸可降低肺叶切除术后肺部并发症的发生率，术后肺部并发症的发生增加了患者术后住院时间和死亡率，吸烟是术后肺部并发症发生的独立危险因素，对于该人群患者，在术前应充分告知患者风险并在术后做好积极预防措施。

## 参 考 文 献(References)


[1] Zhang R, Kyriss T, Dippon J, et al. Impact of comorbidity burden on morbidity following thoracoscopic lobectomy: a propensity-matched analysis[J]. J Thorac Dis, 2018, 10(3): 1806-1814

[2] Long H, Tan Q, Luo Q, et al. Thoracoscopic Surgery Versus Thoracotomy for Lung Cancer: Short-Term Outcomes of a Randomized Trial[J]. Ann Thorac Surg, 2018, 105(2): 386-392

[3] Zhang J, Wu Y, Li H, et al. Retrospective study on video-assisted vs. open mediastinal lymphadenectomy for non-small cell lung cancer: a propensity-matched analysis[J]. J Thorac Dis, 2018, 10(3): 1884-1890

[4] Agostini P, Cieslik H, Rathinam S, et al. Postoperative pulmonary complications following thoracic surgery: are there any modifiable risk factors?[J]. Thorax, 2010, 65(9): 815-818

[5] Lugg ST, Agostini PJ, Tikka T, et al. Long-term impact of developing a postoperative pulmonary complication after lung surgery [J]. Thorax, 2016, 71(2): 171-176

[6] Licker MJ, Widikker I, Robert J, et al. Operative mortality and respiratory complications after lung resection for cancer: impact of chronic obstructive pulmonary disease and time trends [J]. Ann Thorac Surg, 2006, 81(5): 1830-1837

[7] Brunelli A, Al Refai M, Monteverde M, et al. Stair climbing test predicts cardiopulmonary complications after lung resection[J]. Chest, 2002, 121(4): 1106-1110

[8] Stephan F, Boucheseiche S, Hollande J, et al. Pulmonary complications following lung resection: a comprehensive analysis of incidence and possible risk factors[J]. Chest, 2000, 118(5): 1263-1270

[9] Al-Ameri M, Bergman P, Franco-Cereceda A, et al. Video-assisted thoracoscopic versus open thoracotomy lobectomy: a Swedish nationwide cohort study[J]. J Thorac Dis,2018,10(6): 3499-3506

[10] Homma T, Doki Y, Yamamoto Y, et al. Risk factors of neuropathic pain after thoracic surgery[J]. J Thorac Dis, 2018, 10(5): 2898-2907

[11] Upham TC, Onaitis MW. Video-assisted thoracoscopic surgery versus robot-assisted thoracoscopic surgery versus thoracotomy for early-stage lung cancer [J]. J Thorac Cardiovasc Surg, 2018, 156(1): 365-368

[12] Stone PA, Campbell JE, AbuRahma AF. Femoral pseudoaneurysms after percutaneous access[J]. J Vasc Surg, 2014, 60(5): 1359-1366

[13] Agostini P, Lugg S, Adams K, et al. Postoperative pulmonary complications and rehabilitation requirements following lobectomy: a propensity score matched study of patients undergoing video-assisted thoracoscopic surgery versus thoracotomy? [J]. Interact Cardiovasc Thorac Surg, 2017, 24(6): 931-937

[14] Cao C, Manganas C, Ang S, et al. Video-assisted thoracic surgery versus open thoracotomy for non-small cell lung cancer: a meta-analysis of propensity score-matched patients [J]. Interact Cardiovasc Thorac Surg, 2013, 16(3): 244-249

[15] Laursen L, Petersen R, Hansen H, et al. Video-assisted thoracoscopic surgery lobectomy for lung cancer is associated with a lower 30-day morbidity compared with lobectomy by thoracotomy [J]. Eur J Cardiothorac Surg, 2016, 49(3): 870-875

[16] Ezer N, Kale M, Sigel K, et al. Outcomes after Video-assisted Thoracoscopic Lobectomy versus Open Lobectomy for Early-Stage Lung Cancer in Older Adults [J]. Ann Am Thorac Soc, 2018, 15(1): 76-82

[17] Lim E, Baldwin D, Beckles M, et al. Guidelines on the radical management of patients with lung cancer [J]. Thorax, 2010, 65(Suppl 3): iii1-27

[18] Gallart L, Canet J. Post-operative pulmonary complications: Understanding definitions and risk assessment[J]. Best Pract Res Clin Anaesthesiol, 2015, 29(3): 315-330

[19] 周坤, 吴砚铭, 苏建华, 等. 肺癌患者术前呼气峰流速可以预测肺叶切除术后肺部并发症吗?[J]. 中国肺癌杂志, 2017, 20 (9): 603-609

[20] Jammer I, Wickboldt N, Sander M, et al. Standards for definitions and use of outcome measures for clinical effectiveness research in perioperative medicine: European Perioperative Clinical Outcome (EPCO) definitions: a statement from the ESA-ESICM joint taskforce on perioperative outcome measures [J]. Eur J Anaesthesiol, 2015, 32 (2): 88-105


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pressure ulcers[J]. Br J Nurs, 2016, 25(15 Suppl): S14

[22] 刘晓新, 张旦红, 朱伦庆. 聚酯泡沫敷料在骨科医疗器械下方压疮预防中的应用[J]. 护理研究, 2015(33): 4172-4173

[23] 李飞, 严莲, 宋美璇,等. 预防性敷料在医疗器械相关性压疮中的应用研究[J]. 重庆医学, 2018(16)

[24] Forni C, Loro L, Tremosini M, et al. Use of polyurethane foam inside plaster casts to prevent the onset of heel sores in the population at risk. A controlled clinical study[J]. Journal of Clinical Nursing, 2011, 20(5-6): 675-680

[25] Kuo C Y, Wootten C T, Tylor D A, et al. Prevention of pressure ulcers after pediatric tracheotomy using a Mepilex Ag dressing[J]. Laryngoscope, 2013, 123(12): 3201

[26] Acorda D E. Nursing and Respiratory Collaboration Prevents BiPAP-Related Pressure Ulcers[J]. Journal of Pediatric Nursing, 2015, 30(4): 620-623

[27] Swan Joanna. Use of dermal gel pads in preventing and managing pressure ulcers in ICU: an audit[J]. Br J Nurs, 2018, 27: S42-S47

[28] Shikama M, Nakagami G, Noguchi H, et al. Development of Personalized Fitting Device With 3-Dimensional Solution for Prevention of NIV Oronasal Mask-Related Pressure Ulcers [J]. Respiratory Care, 2018: respcare.05691

[29] 冯尘尘,马圆圆,卢亚运, 等.医疗器械相关性压疮的护理研究进展[J].中国护理管理, 2016, (5): 581-584

[30] Hanonu S, Karadag A. A Prospective, Descriptive Study to Determine the Rate and Characteristics of and Risk Factors for the Development of Medical Device-related Pressure Ulcers in Intensive Care Units[J]. Ostomy/wound Management, 2016, 62(2): 12

[31] Murray J S, Noonan C, Quigley S, et al. Medical device-related hospital-acquired pressure ulcers in children: an integrative review. [J]. Journal of Pediatric Nursing-nursing Care of Children & Families, 2013, 28(6): 585-595

[32] Hanonu Seval, Karadag Ayise, A Prospective. Descriptive Study to Determine the Rate and Characteristics of and Risk Factors for the Development of Medical Device-related Pressure Ulcers in Intensive Care Units[J]. Ostomy Wound Manage, 2016, 62: 12-22

[33] Karadag A, Hanönü SC, Eyikara E. A Prospective, Descriptive Study to Assess Nursing Staff Perceptions of and Interventions to Prevent Medical Device-related Pressure Injury [J]. Ostomy/wound Management, 2017, 63(10): 34

[34] Kulik L A, Connor J A, Graham D A, et al. Pressure injury prevention for paediatric cardiac surgical patients using a nurse-driven standardized clinical assessment and management plan[J]. Cardiology in the Young, 2018: 1-12

[35] Monarca M C, Marteka P, Breda K. Decreasing Incidence of Medical Device Related Pressure Injuries in a Small Community Hospital[J]. Journal of Wound, Ostomy and Continence Nursing, 2018, 45(2): 137-140

[36] 刘转巧. NICU 医疗器械相关性压力性损伤的护理干预分析[J].中国现代医药杂志, 2017(09): 62-64

[37] Boyar Vita. Outcomes of a Quality Improvement Program to Reduce Hospital-acquired Pressure Ulcers in Pediatric Patients [J]. Ostomy Wound Manage, 2018, 64: 22-28

[38] 张迪颖, 傅娟, 孙红果, 等. 基于 ICU 管道管理目标驱动的平台高举式固定法应用实践[J]. 齐鲁护理杂志, 2016(10): 7-8

[39] 侯晓敏. 神经外科手术患者医疗器械相关性压疮的发生原因分析及对策[J].中华现代护理杂志, 2017(1): 57-59

[40] William V. Padula, Joyce M. Black. The Standardized Pressure Injury Prevention Protocol (SPIPP) for Improving Nursing Compliance with Best Practice Guidelines[J]. Journal of clinical nursing, 2019, 28(3-4): 367-371

[41] Black J, Alves P, Brindle C T, et al. Use of wound dressings to enhance prevention of pressure ulcers caused by medical devices[J]. International Wound Journal, 2015, 12(3): 322-327

[42] Coyer Fiona M, Stotts Nancy A, Blackman Virginia Schmied. A prospective window into medical device-related pressure ulcers in intensive care[J]. Int Wound J, 2014, 11: 656-64

[43] Chen Lijuan. The risk management of medical device-related pressure ulcers based on the Australian/New Zealand Standard [J]. J. Int. Med. Res., 2018, 46: 4129-4139

(上接第 1090 页)

[21] Agostini P, Lugg ST, Adams K, et al. Postoperative pulmonary complications and rehabilitation requirements following lobectomy: a propensity score matched study of patients undergoing video-assisted thoracoscopic surgery versus thoracotomydagger [J]. Interact Cardiovasc Thorac Surg, 2017, 24(6): 931-937

[22] Wang Z, Zhang J, Cheng Z, et al. Factors affecting major morbidity after video-assisted thoracic surgery for lung cancer [J]. J Surg Res, 2014, 192(2): 628-634

[23] Yang J, Xia Y, Yang Y, et al. Risk factors for major adverse events of video-assisted thoracic surgery lobectomy for lung cancer [J]. Int J Med Sci, 2014, 11(9): 863-869

[24] Paul S, Sedrakyan A, Chiu YL, et al. Outcomes after lobectomy using thoracoscopy vs thoracotomy: a comparative effectiveness analysis utilizing the Nationwide Inpatient Sample database [J]. Eur J Cardiothorac Surg, 2013, 43(4): 813-817

[25] Berry MF, Villamizar-Ortiz NR, Tong BC, et al. Pulmonary function tests do not predict pulmonary complications after thoracoscopic lobectomy[J]. Ann Thorac Surg, 2010, 89(4): 1044-1051; discussion 1051-1042

[26] Zaman M, Bilal H, Mahmood S, et al. Does getting smokers to stop smoking before lung resections reduce their risk? [J]. Interact Cardiovasc Thorac Surg, 2012, 14(3): 320-323

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