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支气管镜介入及手术治疗支气管胸膜瘘一例病例报告并文献复习

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【摘要】目的 总结全肺切除术后并发支气管胸膜瘘的有效治疗方法。方法 对1例全肺切除术后并发支气管胸膜瘘患者的治疗过程作回顾性分析。结果 患者右侧全肺切除术后1月余突发咳嗽咳痰再次入院,考虑为支气管胸膜瘘,行右侧胸腔引流、消炎(头孢哌酮舒巴坦)、补液等综合治疗,并先后3次在支气管镜下行生物胶封堵术,效果不理想,病程中第2个月在全麻下行右侧支气管胸膜瘘肌瓣填塞术,效果仍不理想,分别在病程中第5个月,第10个月,第12个月在全麻下行全麻下支气管镜下支气管胸膜瘘口周围黏膜下硬化剂注射术,瘘口仍未愈合,于病程中第13个月行全麻下右侧胸腔开窗引流术,术后继续消炎治疗。复查右侧瘘口已愈合,左侧瘘口较前明显减小(直径5mm),出院后定期门诊创面换药。结论 全肺切除术后可并发支气管胸膜瘘,支气管镜下介入治疗联合胸腔开窗引流术对其治疗有效。

【关键词】支气管胸膜瘘;开窗引流;带蒂肌瓣;室间隔封堵器

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Bronchoscopic Intervention and Surgical Treatment of Bronchopleural Fistula: a Case Report and Literature Review

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Abstract: Objective To summarize effective treatment methods for bronchopleural fistula after total pneumonectomy. **Methods** A retrospective analysis was conducted on the treatment process of a patient with bronchopleural fistula after total pneumonectomy. **Results** After more than one month of right total pneumonectomy, the patient suddenly coughed and coughed up phlegm and was readmitted. It was considered to be a bronchopleural fistula, and comprehensive treatment including right chest drainage, anti-inflammatory (cefoperazone sulbactam), and fluid replacement was performed. Three times, biological gel sealing surgery was performed under bronchoscopy, but the effect was not satisfactory. In the second month of the disease, the patient underwent right bronchopleural fistula muscle flap filling surgery under general anesthesia, but the effect was not ideal. In the fifth, tenth, and twelfth months of the disease, the patient underwent bronchoscopy under general anesthesia with submucosal sclerosing agent injection around the bronchopleural fistula opening, but the fistula opening still did not heal. In the thirteenth month of the disease, the patient underwent right chest wall window drainage surgery under general anesthesia. Continue anti-inflammatory treatment afterwards. The right fistula has healed after re examination, and the left fistula has significantly decreased in diameter (5mm) compared to before. After discharge, regular outpatient wound dressing changes are required. **Conclusion** Total pneumonectomy can lead to bronchopleural fistula, and bronchoscopic intervention combined with chest wall window drainage is effective in treating it.

Keywords: Bronchopleural Fistula; Open Window Thoracostomy; Pedicled Muscle Flap; Interventricular Septal Occluder

支气管胸膜瘘是肺泡、各级支气管与胸腔之间相互交通形成的瘘道,是肺切除术相对罕见且严重的并发症之一^[1],严重影响着患者的生活质量和生存,该病全肺切除发生率为4.5%~20%,肺叶切除发生率为0.5%~1.5%,死亡率高达20%~70%^[2-3],BPF通常发生在术后3个月内,根据其发生时间,它们分为早期(1~7天),中期(8~30天)和晚期(大于30天)^[4],有报道称在术后6个月出现^[5]。虽然有各种各样的治疗方案存在,难治性病例与较大的瘘管仍然难以治愈,缺乏相应的共识或者指南。在本研究中,我们报道了1例肺癌切除术后发生支气管胸膜瘘经支气管镜介入及手术综合治疗的病例,这在国内外未见报告。

1 资料

患者,男,58岁,于2008年9月25日因“咳嗽伴胸闷、憋气20余日,痰中带血1周”入院。胸部CT提示:右肺上叶及中

叶有结节(高危)。因患者右肺下叶与右支气管吻合张力过大,且患者身体状况尚可,能耐受手术,遂于2008年10月1日全麻下行右全肺切除+纵膈淋巴结清除术。术后病理报告为右上肺中心型鳞癌,中叶支气管粘液腺瘤,肺癌分期T3N0M0 II B期。术后一度恢复顺利,切口愈合出院,第1次住院时间25天。出院后未行化疗、放疗等治疗,于2008年11月5日突发咳嗽、咳痰,再次入院,查体:右侧胸廓塌陷,右胸后外侧第5肋间切口长约25cm,无明显红肿、渗出,愈合良好,右肺呼吸音消失,叩诊实音。入院后行支气管镜检查示:右主支气管手术后残端可见两个瘘口,分别为直径3mm和10mm。诊断为右支气管胸膜瘘。入院行胸水细菌培养考虑为肺炎克雷伯杆菌,根据药敏结果选择相应抗生素治疗,并先后在2008年11月12日、11月19日、12月3日在支气管镜下行生物胶封堵术,效果不理想;于2009年1月10全麻下行取肋间肌行右侧支气管

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胸膜痿肌瓣填塞术,效果不理想;后又分别于2009年4月22日、2009年9月25日、2009年11月4日全麻下支气管镜下支气管胸膜痿口周围粘膜下硬化剂注射术,痿口仍未愈合。因多次内镜下治疗效果不佳,经全科室讨论后,于2009年12月03日在全麻下行右侧胸壁开窗引流术,经过感染控制和总体好转,患者出院。出院后患者未行任何治疗,2010年8月4日因右侧胸壁创面感染再次入院,入院后右胸创面换药,曾转烧伤整形科,痿口凡士林油纱布填塞,外接封闭负压引流装置,持续负压吸引,治疗1月后创面肉芽生长不佳,故转回本科继续换药治疗,于2011年7月1日行右侧支气管痿口周围肉芽电灼术,术后继续创面换药。病情好转出院。患者于2011年12月21日再次入院,继续行每天右前胸壁创口换药治疗,观察创面情况,患者创面仍不愈合,有绿色脓性分泌物,遂于2011年12月25日在软式支气管镜引导下室间隔封堵器封堵2个痿口,患者创面流脓症状明显改善。于2012年1月25日行支气管镜复查,发现右侧痿口已愈合,左侧痿口封堵器已脱落,建议行腹直肌填埋左侧支气管残端,患者不同意此治疗,遂出院继续观察。出院后于2012年2月25日门诊复查胸部CT、血肿瘤标志物、腹部彩超未见明显肿瘤复发、转移征象。气管三位重建可见痿口大小较前无明显变化。

2 讨论

支气管胸膜痿的病因尚不完全清楚,主要见于胸外科肺切除术后^[6],有报道称右侧发生率高于左侧^[7],这可能与支气管残端缺乏纵膈软组织覆盖,残端供血的血管来源于左下行的胸主动脉,纵膈淋巴结清扫时可损害其供血有关^[8],非解剖因素还可见于靶向药使用^[9]、covid^[10]、肺结核^[11]、胸外伤^[12],微波消融^[13]等。

目前治疗支气管胸膜痿方法较多,但是尚未建立共识和指南^[13]。治疗方法取决于痿管的大小,痿口的情况,医疗团队的经验和患者的病情。本文根据以往的研究文献总结如下:

2.1 引流治疗 BPF的首次治疗方式应该是立即行胸腔闭式引流,避免胸腔积液,同时应颠倒特伦德伦伯卧位,即头高脚低位,避免胸水从全肺切除后的间隙溢出到剩余肺的呼吸道^[14]。然后根据微生物学分析进行靶向抗生素治疗。如有必要,对剩余肺组织选择性的插管,以防止痿的发生。这种方法对控制脓毒症至关重要,可以避免吸入性肺炎和剩余肺组织感染引起的呼吸衰竭。

2.2 镜下治疗 该方法具有微创优势,对患者创伤小,状态相对较差的患者可以耐受,安全有效,性价比高,操作方法简单,为后续进行外科治疗处理痿口提供了机会。目前可分为以下几个方面:注射密封剂、纤维蛋白凝胶、硝酸银、弹簧圈和支气管腔内支架置入^[15],甚至还有人提出支气管镜下骨髓间充质干细胞移植^[16]。该方法适应症是痿口直径<8mm^[17]。

支气管镜下弹簧圈(endobronchial watanabe spigot, EWS):该方法首次是由Watanabe等人报道^[18],故因此为命名。该方法主要用于治疗顽固性气胸和BPF,传统做法是操作者需要用抓钳将EWS与目标支气管方向对齐,通过推动EWS

到达支气管壁形成1个角度(脚后跟踢法),该方法操作难度较大,且在插入和移动中,EWS可能从抓钳中脱落。故Nako Date等人使用牵引法轻松稳定地放置EWS^[19]。Yasuyuki Mizumori等人也使用了导鞘和刮匙2分钟内放置了EWS,30名病号中有27名患者肺漏气停止,该方法成功率在98.6%^[20]。该方法易与传统方法比,主要优点是易与置入上支气管,但是值得注意的是,推滑法放置EWS存在并发症的风险,推进导丝需要保持警惕,以避免损伤周围肺组织。虽然对于EWS放置的最安全持续时间没有达成共识,但考虑到风险,以及长期放置期间肉芽组织生长导致取出困难,建议3~6个月取出EWS^[21]。当然,考虑到硅胶具有生物相容性^[22],如果需要维持EWS的效果或者患者健康状况不佳,长期放置是可以接受的。

支气管黏膜下注射药物:Nicholas Beckmann等人报导了使用羧甲基纤维素成功治愈了1例新生儿持续性BPF,并避免了肺段切除^[23]。Toshio Shiotani等人报导了注射N-丁基-2-氰基丙烯酸酯(NBCA)成功治疗右肺中下叶切除的晚期肺癌后并发BPF的患者,术后15.2个月没有复发^[24]。Daniel等人也使用该物质成功治疗因肺转移瘤行射频消融引起的BPF^[25]。

室间隔封堵器封堵(amlplatzer septal occluder device, ASOD):虽然该法主要用于封堵心脏的房间隔缺损,但它们也被用于其他疾病,如支气管胸膜痿,食管-气管痿和肝移植中的血管痿^[26]。Bai等人使用室间隔缺损器治疗10名术后BPF的患者,技术成功率为100%,完全闭合率为70%,并没有并发症^[27]。Fruchter等人描述使用改法11人中有9人成功闭合(82%)位于主支气管和叶支气管的BPF,并无并发症^[28]。虽然有一些长期随访(17个月至5年)的研究证实了它的长期安全性和有效性^[14]。但是仍然需要更长时间的随访以证明该手术的持久性,并排除潜在的长期并发症,包括装置移位、感染和由于装置在邻近纵膈和血管结构中发生医源性痿^[15]。

2.3 手术治疗 该法包括直接手术修复痿管(带蒂肌瓣移植)和更具侵袭性的操作,如开窗引流术(open window thoracostomy, OWS)和胸廓成形术,用于抢救治疗。特别是上述支气管镜下治疗失败的情况下,有必要行开窗引流术。对于该手术适应症标准是痿口直径>8mm,临床情况不稳定,晚期痿^[29]。控制败血症、改善健康状况和消除脓腔是OWT的主要目标。对于OWT的主要细节,Antonio Mazzella等人指出适当选择肋骨切除的范围和数量,有利于痿的闭合。为了充分引流胸腔积液,切口位置应选择在肋下(平第2或者3肋),高于上一次开胸手术。选择这样的位置原因是全肺切除术后横膈抬高和纵膈移位,胸腔体积缩小,也是为了避免损伤到胸大肌和背阔肌。此外,肋骨切除的程度(通常包括第2和第3根肋骨侧弓)应该提供足够大的皮肤开口,以便于填充胸腔^[30]。然而,该法也有缺点,就是关闭支气管残端和胸腔需要很长的时间,在某些情况下甚至长达2年^[31]。Fabio Massera等人提出可以行胸壁肌成形术+OWT来加速这一过程^[32]。只有胸腔内有健康的肉芽组织、支气管残端闭合,临床状况良好,无肿瘤复发时OWT才能闭合^[33]。

闭合BPF痿口,包盖支气管残端:为了降低痿的复发率,人们提出了各种肌瓣来支撑修复部位^[34]。皮瓣的选择取决于

胸既往开胸的位置,所需软组织的数量和肌肉的可获得性^[35]。Jiang等人称应用大网膜瓣被证明处理一些复杂的胸外科问题更有效,特别是合并脓胸的时候,可以补救全肺切除术后高风险裂开的支气管残端,或者加强支气管胸膜瘘修复手段^[36]。Malke Asaad等人对1990至2010年间所有接受胸内肌瓣转位治疗胸腔内瘘的患者进行了回顾分析^[37]。总共确认了198名患者。156名患者(79%)出现了支气管胸膜瘘,48名患者(24%)出现了食管瘘。共使用238个皮瓣,平均每个患者1.2个。术后并发支气管胸膜瘘34例(17%),食管瘘13例(7%)。11个(6%)皮瓣部分丢失,4个(2%)皮瓣全部丢失。中位随访时间为27个月。在最后一次随访中,182名患者(92%)没有瘘复发的证据,175名(89%)患者成功

关闭胸腔,164名患者(83%)成功治疗。他因此得出结论为用带血管的肌瓣加强瘘管的闭合是防止修复部位裂开的一种可行的选择,并且有可能挽救生命。

2.4 其他治疗方法 如静脉ECMO治疗BPF^[38],噬菌体治疗铜绿假单菌引起的术后脓胸相关的BPF^[39]。胸内负压创面治疗(intrathoracic negative-pressure wound therapy, NPWT)合并有支气管胸膜瘘的慢性脓胸^[40]。

综上所述,对于BPF患者,不仅要完全控制感染和封堵瘘管,而且还要彻底清除脓腔。因此对于难治性BPF和较大瘘管患者,多学科联合开窗引流、带蒂肌瓣填塞、支气管镜下室间隔封堵器封堵、注射生物凝胶及硬化剂治疗是一种有用的选择。

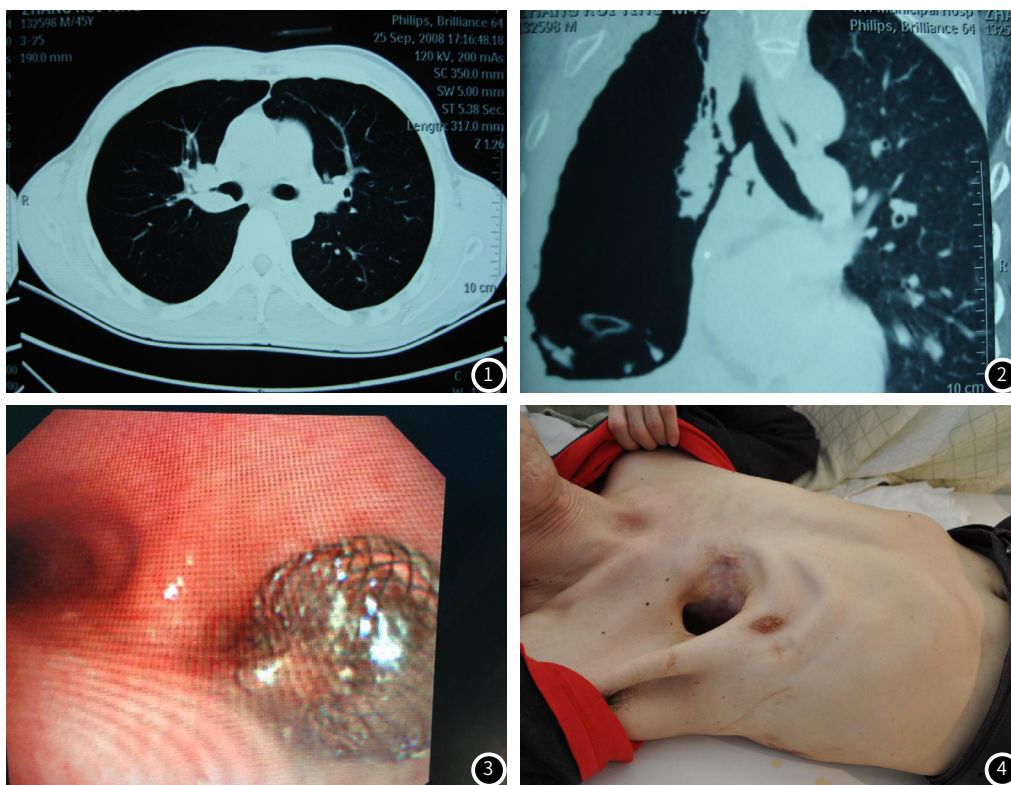


图1 术前支气管胸膜瘘CT表现。图2 支气管残端瘘肌瓣填塞。图3 支气管镜下室间隔封堵器封堵。图4 右侧胸壁开窗引流术后。

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