

doi: 10.13241/j.cnki.pmb.2017.05.032

胸外科患者术后医院感染的病原菌与危险因素分析

许有忠 田作春 李 才 吴挺洲 苏永超

(海南省第三人民医院心胸外科 海南 三亚 572000)

摘要 目的:分析胸外科患者术后医院感染的病原菌分布及危险因素,为防控医院感染提供数据支持。**方法:**选择2014年1月至2015年5月医院接受胸外科手术治疗的患者284例进行研究。回顾性分析284例患者的临床病历数据资料以及细菌培养与鉴定的结果,分析医院感染的主要部位及病原菌分布,以及产生医院感染的危险因素。**结果:**284例患者共有82例发生医院感染,感染率是28.87%,感染部位以呼吸系统为主,占56.10%;检出病原菌88株,革兰阴性菌71株,占80.68%,以铜绿假单胞菌为主,占30.68%。革兰阳性菌17株,占19.32%,以金葡菌为主,占9.09%。单因素分析发现,胸外科术后医院感染与年龄、手术时间、住院时间及糖尿病史有关,差异有统计学意义($P<0.05$);Logistic回归分析显示,年龄 ≥ 60 岁、手术时间 >2 h、住院时间 >15 d以及有糖尿病史是胸外科术后医院感染的危险因素。**结论:**胸外科患者术后医院感染的病原菌分布以铜绿假单胞菌与金葡菌为主,应重点防范影响感染的危险因素,以降低感染率。

关键词:胸外科术后;医院感染;病原菌;分布;危险因素

中图分类号:R655 文献标识码:A 文章编号:1673-6273(2017)05-923-03

Pathogenic Bacteria and Risk Factors Analysis of Nosocomial Infection in Patients after Thoracic Surgery

XU You-zhong, TIAN Zuo-chun, LI Cai, WU Ting-zhou, SU Yong-chao

(Department of Cardiothoracic Surgery, The Third People's Hospital of Hainan Province, Sanya, Hainan, 572000, China)

ABSTRACT Objective: To study pathogenic distribution and risk factors analysis of nosocomial infection in patients after thoracic surgery, to provide data support for the prevention and control of hospital infection. **Methods:** Selected 284 cases of thoracic surgery treatment of patients from January 2014 to May 2015 in hospital. Retrospective analysis of the clinical data of 284 cases of patients with bacterial culture and identification of the results, analysis of the main part of hospital infection and the distribution of pathogenic, as well as the risk factors of hospital infection. **Results:** A total of 284 patients with 82 cases of nosocomial infection, infection rate was 28.87%, the infection site to respiratory system, accounting for 56.10%; 88 strains of pathogenic, in which gram negative bacteria had 71 strains, accounting for 80.68%, mainly was pseudomonas aeruginosa, accounting for 30.68%. Gram positive bacteria had 17 strains, accounting for 19.32%, mainly was Staphylococcus aureus, accounting for 9.09%. Single factor analysis showed that the infection of hospital infection was related to age, operation time, hospitalization time and history of diabetes, difference was statistically significant ($P<0.05$); Logistic regression analysis showed that age ≥ 60 years, operation time >2 h, hospitalization time >15 days and a history of diabetes were the risk factors in patients with thoracic surgery after produce hospital infection. **Conclusion:** The distribution of pathogenic bacteria of nosocomial infection in patients after thoracic surgery was mainly caused by Pseudomonas aeruginosa and Staphylococcus aureus, we should focus on the prevention of infection risk factors to reduce the infection rate.

Key words: After thoracic surgery; Hospital infection; Pathogenic; Distribution; Risk factors

Chinese Library Classification(CLC): R655 **Document code:** A

Article ID: 1673-6273(2017)05-923-03

前言

胸外科手术在临床上十分常见^[1],其可直接针对有关病灶进行处理,因此通常可获得较好的疗效,但患者病情相对严重,机体免疫功能下降,抵抗力下降,且操作流程多,持续时间旧且手术难度大^[2-4]。因此在围手术期很容易发生院内感染,感染分布部位不一,且并发感染危险因素多。唐中明等人报道,胸外科感染患者高达33.3%,以呼吸道感染为主,以革兰阴性感染为

多,高龄,手术时间及住院时间旧是其感染主要危险因素^[5]。国外有报道指出,胸外科手术由于对患者造成的创伤较大,易并发院内感染,术后感染会在一定程度上影响循环及呼吸等功能,且增加患者的治疗痛苦和治疗时间,对其预后亦具有较大影响^[6,7]。因此,早期掌握医院感染的病原菌分布及易感因素对于防控医院感染并提出相应的改进措施具有十分重要的参考价值。本文通过研究分析胸外科患者术后医院感染的病原菌分布及其危险因素,目的在于有效降低胸外科手术后的医院感染发生率,现报道如下。

1 资料和方法

作者简介:许有忠(1983-),男,本科,副主任医师,从事心胸外科方面的研究,E-mail:13876794258@139.com
(收稿日期:2016-09-27 接受日期:2016-10-23)

1.1 临床资料

随机选择自 2014 年 1 月至 2015 年 5 月在我院接受胸外科手术治疗的患者 284 例进行研究。入选标准:(1)满足手术适应证;(2)年龄>20 岁;(3)病历资料数据齐全。排除标准:(1)有严重的心、肝、肾等脏器的功能障碍;(2)研究期间死亡者;(3)血液系统疾病。其中男 182 例,女 102 例;年龄 24~72 岁,平均(58.4± 1.4)岁。

1.2 研究方法

回顾性分析 284 例患者的临床病历数据资料以及细菌培养与鉴定的结果。主要包含如下方面:性别;年龄;感染部位;手术时间;住院时间;长期吸烟史;长期饮酒史;糖尿病史;高血压史。

1.3 观察指标

分析医院感染的主要部位及病原菌分布,以及产生医院感染的危险因素。其中细菌培养及鉴定的标本选择手术切口的血液或脓液,腹水,鼻咽拭子,痰拭子等标本,采集后立刻送检,按照《全国临床检验操作规程》^[9]实施培养与鉴定,仪器为 BACTEC9000 型全自动培养系统,培养过程中需清除相同患者的重复性病原菌,相关培养基及试剂盒均购于英国的 Oxoid 公司,严格依据试剂盒上的说明书步骤进行操作。

1.4 统计学方法

根据 SPSS20.0 统计软件进行分析,计数数据比较采用 χ^2 检验,多因素分析使用 Logistic 回归分析法进行判定。 $P<0.05$ 为差异有统计学意义。

2 结果

2.1 医院感染部位分布

284 例患者共有 82 例发生医院感染,感染率是 28.87%,感染部位以呼吸系统为主,占 56.10%,见表 1。

2.2 病原菌分布

82 例医院感染患者检出病原菌 88 株,革兰阴性菌 71 株,

表 1 医院感染部位分布及构成比(%)

Infection sites	n	Constituent ratio
Notch region	14	17.07
Respiratory system	46	56.10
Digestive system	18	21.95
Urinary system	4	4.88
Totals	82	10.00

占 80.68%,以铜绿假单胞菌为主,占 30.68%。革兰阳性菌 17 株,占 19.32%,以金葡菌为主,占 9.09%,见表 2。

表 2 医院感染病原菌分布及构成比(%)

Pathogenic bacteria	Strains	Constituent ratio
Gram negative bacteria	71	80.68
<i>Pseudomonas aeruginos</i>	27	30.68
<i>Klebsiella pneumoniae</i>	25	28.41
<i>Acinetobacter Bauman</i>	11	12.50
<i>Escherichia coli</i>	8	9.09
Gram positive bacteria	17	19.32
<i>Staphylococcus aureus</i>	8	9.09
<i>Staphylococcus epidermidis</i>	7	7.96
<i>Staphylococcus haemolyticus</i>	2	2.27

2.3 胸外科术后医院感染的单因素分析

单因素分析发现,胸外科术后医院感染与年龄、手术时间、住院时间及糖尿病史有关,差异有统计学意义($P<0.05$),见表 3。

表 3 胸外科术后医院感染的单因素分析及感染率(%)

Related factors	Investigation number	Infection number	Infection rate	χ^2	P
Age	≥ 60 years	145	56	38.62	13.706
	<60 years	139	26	18.71	
Gender	Male	182	46	25.27	3.195
	Female	102	36	35.29	0.074
Operation time	≤ 2 h	177	24	13.56	53.648
	>2 h	107	58	54.21	0.000
Hospitalization time	≤ 15 d	126	22	17.46	14.365
	>15 d	158	60	37.97	0.000
Long history of smoking	Yes	199	62	31.16	1.687
	No	85	20	23.53	0.194
Long history of drinking	Yes	162	51	31.48	1.249
	No	122	31	25.41	0.264
History of diabetes	Yes	78	39	50.00	23.371
	No	206	43	20.87	0.000
History of hypertension	Yes	81	24	29.63	0.032
	No	203	58	28.57	0.859

2.4 患者在胸外科术后产生医院感染的危险因素

Logistic 回归分析显示,年龄 ≥ 60 岁、手术时间 >2 h、住院

时间 >15 d 以及有糖尿病史是胸外科术后医院感染的危险因素,见表 4。

表 4 患者在胸外科术后产生医院感染的危险因素

Table 4 Risk factors of nosocomial infection in patients after thoracic surgery

Risk factors	Regression coefficient	Standard error	P	OR	95%CI
Age ≥ 60 years	3.823	2.910	0.002	1.256	1.041~11.535
Operation time >2 h	4.019	3.056	0.000	4.904	1.217~9.333
Hospitalization time >15 d	3.237	2.862	0.002	1.123	1.101~10.642
A history of diabetes	4.285	2.694	0.003	2.362	1.136~4.628

3 讨论

医院感染是指患者在医院诊疗是并发的感染,当前医院感染已成为国内外倍受瞩目的公共卫生预防问题,也成为医院疾病防控的重要一部分。胸外科手术是外科手上常见手术之一,虽然其手术疗效明显,但术后感染成为术后常见并发症,感染不仅可能影响到临床治疗效果以及患者的预后,严重时可使患者的病情恶化,甚至死亡^[9,10]。预防控制术后院内感染工作已成重中之重,针对性的感染防控是当前主要手段。国外有相关报道证实,尽早掌握可能引发医院感染的病原菌情况,可将感染发生率降低 10%至 20%以上^[11-13]。本研究回顾性分析我院 284 例患者的临床病历数据资料以及细菌培养与鉴定的结果,旨在分析医院感染的主要部位及病原菌分布,以及产生医院感染的危险因素,为我院胸外科手术防控术后感染提供理论依据。

本文通过对导致胸外科患者手术后医院感染的相关病原菌分布以及危险因素进行分析,结果发现,284 例患者共有 82 例发生医院感染,感染率是 28.87%,感染部位以呼吸系统为主,占 56.10%;检出病原菌 88 株,革兰阴性菌 71 株,占 80.68%,以铜绿假单胞菌为主,占 30.68%。革兰阳性菌 17 株,占 19.32%,以金葡菌为主,占 9.09%。上述结果提示造成胸外科手术后感染的主要部位在呼吸系统,而致病菌则主要是铜绿假单胞菌以及金葡菌。这与国外 Shields RK 等人^[14-16]的报道结果相近,其在报道中指出,外科手术的感染通常主要发生在上、下呼吸道等处,而病原菌则为革兰氏菌。事实上,目前导致其他种类医院感染的病原菌中,铜绿假单胞菌以及金葡菌也占据着较大的比例,因此需引起临床的充分重视。此外,本文经多因素 Logistic 回归分析法进行分析后显示,年龄 ≥ 60 岁、手术时间 >2 h、住院时间 >15 d 以及有糖尿病史均是患者在胸外科术后产生医院感染的危险因素。提示接受胸外科手术的老年患者年龄越大、手术时间及住院时间越长,以及存在糖尿病时更易引发医院感染。此结果也满足等人的有关报道。究其原因,主要是因为年龄越大的老年人,其自身组织器官大都已产生退行性变化,自身免疫力水平下降,机体的防御能力也明显减弱,更易形成医院感染^[17]。手术时间更长,通常造成的暴露时间随之延长,术中操作产生的创伤以及气管置管等侵袭性操作在很大程度上增加了肺部感染的几率^[18,19]。而住院时间长的患者更易感染的主要在于院内病房中致病菌比较集中,加之人员流动大,各类抗菌药物的使用频率较大,增大了细菌耐药性,由此导致各类感染的产生。在糖尿病史方面,若患者合并糖尿病,不仅增加

了治疗难度,而且更易由于血糖含量较高等情况引发切口区域的感染。国外 Ricioli 等人^[20]也报道证实,高龄和手术耗时过长等因素均可能增大医院感染的相关几率。

综上所述,胸外科患者术后医院感染的病原菌分布以铜绿假单胞菌与金葡菌为主,而引发感染的危险因素主要有年龄 ≥ 60 岁、手术时间 >2 h、住院时间 >15 d 以及有糖尿病史,应重点防范影响感染的危险因素,以降低感染率。

参考文献(References)

- [1] Serpa Neto A, Hemmes SN, Barbas CS, et al. Incidence of mortality and morbidity related to postoperative lung injury in patients who have undergone abdominal or thoracic surgery: a systematic review and meta-analysis[J]. Lancet Respir Med, 2014, 2(12): 1007-1015
- [2] Kim KW, Lee JI, Kim JS, et al. Risk factors for urinary retention following minor thoracic surgery [J]. Interact Cardiovasc Thorac Surg, 2015, 20(4): 486-492
- [3] Schirren M, Sponholz S, Oguhzan S, et al. Intraoperative bleeding during thoracic surgery: avoidance strategies and surgical treatment concepts[J]. Chirurg, 2015, 86(5): 453-458
- [4] Rinieri P, Peillon C, Bessou JP, et al. National review of use of extracorporeal membrane oxygenation as respiratory support in thoracic surgery excluding lung transplantation [J]. Eur J Cardiothorac Surg, 2015, 47(1): 87-94
- [5] 唐中明,韦鸣,廖勇.胸外科术后患者医院感染相关因素分析[J].中华医院感染学杂志, 2014, 24(12): 3000-3002
Tang Zhong-ming, Wei Ming, Liao Yong. Related factors for postoperative nosocomial infections in patients of department of thoracic surgery[J]. Chinese Journal of Nosocomiology, 2014, 24(12): 3000-3002
- [6] Hovaguimian F, Lysakowski C, Elia N, et al. Effect of intraoperative high inspired oxygen fraction on surgical site infection, postoperative nausea and vomiting, and pulmonary function: systematic review and meta-analysis of randomized controlled trials [J]. Anesthesiology, 2013, 119(2): 303-316
- [7] Wiseman JT, Fernandes-Taylor S, Barnes ML, et al. Predictors of surgical site infection after hospital discharge in patients undergoing major vascular surgery[J]. J Vasc Surg, 2015, 62(4): 1023-1031.e5
- [8] Fu H, Yan S, Wang Y, et al. Methods Comparison and Bias Estimation of Three Distinct Biochemistry Analytical Systems in One Clinical Laboratory Using Patient Samples[J]. Clin Lab, 2016, 62(1-2): 187-194
- [9] Akata K, Kawanami T, Yatera K, et al. In-hospital airborne tuberculous infection from a lesion of calcified pleural thickening during thoracic surgery in a patient with lung cancer [J]. Intern Med, 2015, 54(20): 2699-2703

(下转第 869 页)

- non-ST-segment elevation myocardial infarction-2002: summary article: a report of the American College of Cardiology/ American Heart Association Task Force on Practice Guidelines [J]. *Circulation*, 2002, 106(14): 1893-1900
- [10] Zhen Youyu. Guiding principles of clinical research on new drugs of traditional Chinese Medicine [M]. Beijing: China Medical Science Press, 2002: 273
- [11] Mohammad Al Mamun, Nahid Rumana, Yoshikuni Kita, et al. Combining the effects of conventional risk factors and environmental triggering factors while studying seasonality in acute myocardial infarction[J]. *Environmental Pollution*, 2014, 189(7): 252-253
- [12] Widimsky P, Coram R, Abouchebl A. Reperfusion therapy of acute ischaemic stroke and acute myocardial infarction: similarities and differences[J]. *European Heart Journal*, 2014, 35(3): 147-155
- [13] Abdallah M S, Kosiborod M, Tang F, et al. Patterns and Predictors of Intensive Statin Therapy Among Patients With Diabetes Mellitus After Acute Myocardial Infarction [J]. *American Journal of Cardiology*, 2014, 113(8): 1267-1272
- [14] Cheng C L, Lee C H, Chen P S, et al. Validation of acute myocardial infarction cases in the national health insurance research database in taiwan[J]. *Journal of Epidemiology*, 2014, 24(6): 500-507
- [15] Zhang Jian. Clinical observation of acute myocardial infarction treated with combination of traditional Chinese medicine and Western Medicine [J]. *Journal of Emergency in Traditional Chinese Medicine*, 2015, 24(5): 877-878
- [16] Yang Chengbai, Su Ling. Combination of traditional Chinese and Western medicine in Treating 30 cases of coronary heart disease with myocardial infarction[J]. *Chinese Medicine Modern Distance Education of China*, 2014, 12(2): 33-34
- [17] Song Z, Bai J, Wang Q, et al. Antagonistic effect and mechanism of Rosuvastatin on myocardial apoptosis in rats with acute myocardial infarction[J]. *Zhonghua Yi Xue Za Zhi*, 2016, 95(45): 3695-3700
- [18] Chitose T, Sugiyama S, Sakamoto K, et al. Effect of a hydrophilic and a hydrophobic statin on cardiac salvage after ST-elevated acute myocardial infarction - A pilot study [J]. *Atherosclerosis*, 2014, 237(1): 251-258
- [19] Xia Jie. Clinical application value of white blood cell count and serum C reactive protein detection in early diagnosis of acute myocardial infarction[J]. *Chinese Journal of Modern Drug Application*, 2014, 8(6): 67-68
- [20] Chen Lingling. The significance of high sensitive C- reactive protein content detection in patients with acute myocardial infarction serum myoglobin, troponin [J]. *Anhui Medical Journal*, 2012, 33(9): 1224-1226

(上接第 925 页)

- [10] Mahale YJ, Aga N. Implant-associated mycobacterium tuberculosis infection following surgical management of fractures: a retrospective observational study[J]. *Bone Joint J*, 2015, 97-B(9): 1279-1283
- [11] Shah DR, Wang H, Bold RJ, et al. Nomograms to predict risk of in-hospital and post-discharge venous thromboembolism after abdominal and thoracic surgery: an American College of Surgeons National Surgical Quality Improvement Program analysis[J]. *J Surg Res*, 2013, 183(1): 462-471
- [12] Ke CC, Lin CS, Yeh CC, et al. Adverse Outcomes after Non-Chest Surgeries in Patients with Pulmonary Tuberculosis: A Nationwide Study[J]. *PLoS One*, 2015, 10(7): e0133064
- [13] Gould MK, Garcia DA, Wren SM, et al. Prevention of VTE in Nonorthopedic Surgical Patients: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines [J]. *Chest*, 2012, 141(2 Suppl): e227S-e277S
- [14] Shields RK, Clancy CJ, Minces LR, et al. Epidemiology and outcomes of deep surgical site infections following lung transplantation [J]. *Am J Transplant*, 2013, 13(8): 2137-2145
- [15] Tsiouris A, Horst HM, Paone G, et al. Preoperative risk stratification for thoracic surgery using the American College of Surgeons National Surgical Quality Improvement Program data set: functional status predicts morbidity and mortality[J]. *J Surg Res*, 2012, 177(1): 1-6
- [16] Cheng K, Li J, Kong Q, et al. Risk factors for surgical site infection in a teaching hospital: a prospective study of 1,138 patients [J]. *Patient Prefer Adherence*, 2015, 14(9): 1171-1177
- [17] Likosky DS, Wallace AS, Prager RL, et al. Sources of Variation in Hospital-Level Infection Rates After Coronary Artery Bypass Grafting: An Analysis of The Society of Thoracic Surgeons Adult Heart Surgery Database[J]. *Ann Thorac Surg*, 2015, 100(5): 1570-1575; discussion 1575-1576
- [18] Peng Z, Li H, Zhang C, et al. A Retrospective Study of Chronic Post-Surgical Pain following Thoracic Surgery: Prevalence, Risk Factors, Incidence of Neuropathic Component, and Impact on Quality of Life[J]. *PLoS One*, 2014, 9(2): e90014
- [19] Singh S, Chakravarthy M, Rosenthal VD, et al. Surgical site infection rates in six cities of India: findings of the International Nosocomial Infection Control Consortium(INICC)[J]. *International health*, 2015, 7(5): 354-359
- [20] Ricioli W Jr, Queiroz MC, Guimarães RP, et al. Prevalence and risk factors for intra-operative periprosthetic fractures in one thousand eight hundred and seventy two patients undergoing total hip arthroplasty: a cross-sectional study[J]. *Int Orthop*, 2015, 39(10): 1939-1943