

doi: 10.13241/j.cnki.pmb.2019.23.036

普外科患者术后切口感染病原菌分布情况及影响因素 logistic 回归分析*

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摘要 目的:探讨普外科患者术后切口感染的病原菌分布情况及影响因素。**方法:**回顾性分析 2017 年 9 月-2019 年 1 月河北省秦皇岛市第一医院普通外科一病区接受手术治疗的 150 例患者的临床资料,术后发生切口感染的 75 例患者作为感染组,术后未发生切口感染的 75 例患者作为对照组,分析术后切口感染的病原菌分布情况,并比较两组患者的临床资料,对普外科患者术后切口感染的影响因素进行多因素 Logistic 回归分析。**结果:**感染组分离出病原菌 75 株,包括 43 株革兰阴性菌(57.33%)、28 株革兰阳性菌(27.33%)、4 株真菌(5.33%),经单因素分析显示,年龄、手术时间、有无合并糖尿病、有无植入性器械、住院时间与普外科患者术后切口感染有关($P<0.05$);经多因素 Logistic 分析显示,年龄 ≥ 60 岁、合并糖尿病、手术时间 ≥ 2 h、有植入性器械、住院时间 ≥ 1 月为普外科患者术后切口感染的独立危险因素($P<0.05$)。**结论:**普外科患者术后切口感染病原菌株以革兰阴性菌和革兰阳性菌为主,针对术后切口感染的危险因素实施干预措施,可以降低术后切口感染率,保证患者手术效果和改善预后。

关键词:普外科;切口感染;病原菌;影响因素**中图分类号:**R656;R619 **文献标识码:**A **文章编号:**1673-6273(2019)23-4553-05

Logistic Regression Analysis of Pathogen Distribution and Influencing Factors of Postoperative Incision Infection in General Surgery Patients*

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ABSTRACT Objective: To investigate the distribution and influencing factors of pathogens in postoperative incision infection in general surgery patients. **Methods:** A retrospective analysis was made of the clinical data of 150 patients treated by general surgery in First Ward of Department of General Surgery, Qinhuangdao First Hospital of Hebei Province. 75 patients with incision infection after operation were treated as infection group, and 75 patients without incision infection after operation were treated as control group. The distribution of pathogenic bacteria in postoperative incision infection was analyzed, and the clinical data of the two groups were compared. The influencing factors of postoperative incision infection in general surgery patients were analyzed by multivariate logistic regression analysis. **Results:** The 75 strains of pathogenic bacteria were isolated from the incision infection, including 43 Gram-negative bacteria (57.33%), 28 Gram-positive bacteria (27.33%), and 4 fungi (5.33%). Univariate analysis showed that age, operative time, with or without diabetes mellitus, with or without implantable instruments, and hospitalization time were independent risk factors for postoperative incision infection in general surgery patients ($P<0.05$). Multivariate logistic analysis showed that age ≥ 60 years old, with diabetes mellitus, operation time ≥ 2 h, with implantable instruments and hospitalization time ≥ 11 month were independent risk factors for incision infection after general surgery ($P<0.05$). **Conclusion:** The pathogens of postoperative incision infection in general surgery patients are mainly Gram-positive bacteria and Gram-negative bacteria, and implement interventions for risk factors for postoperative incision infection can reduce the postoperative incision infection rate, it can ensure the patient's surgical effect and improve the prognosis.

Key words: General surgery; Incision infection; Pathogenic bacteria; Influencing factors**Chinese Library Classification(CLC):** R656; R619 **Document code:** A**Article ID:** 1673-6273(2019)23-4553-05

前言

普外科患者术后出现切口感染,可引起伤口愈合延迟,愈

合效果较差,更有甚者发生肺部感染、血液感染等并发症,出现多脏器功能障碍,诱发全身感染,影响患者的预后、生存以及后续治疗的进行。此外,切口感染可延长患者住院时间,给患者带

* 基金项目:河北省科学技术厅科技支撑项目(20161621)

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(收稿日期:2019-06-06 接受日期:2019-06-30)

来身体痛苦和经济负担^[1-3]。文献报道,在普外科成年患者中术后切口感染的发生率为 2-5%,儿童为 2.5-5.4%,新生儿和婴儿可达到 17%^[4]。随着外科技术的发展,普外科手术中有创性诊断、治疗操作的不断增加,抗生素耐药性的增多,术后切口感染率逐渐上升。研究普外科患者切口感染病原菌分布情况及危险因素,对于降低术后切口感染,提高手术效果,改善患者预后,缩短治疗周期具有重要意义。本文通过分析普外科手术切口感染的病原菌分布及相关危险因素,旨在为合理选用抗菌药物、控制细菌耐药性的发展以及有效预防、控制术后切口感染提供参考。

1 资料与方法

1.1 临床资料

回顾性分析河北省秦皇岛市第一医院普通外科一病区收治的 150 例患者的临床资料,术后发生切口感染的 75 例患者作为感染组,术后未发生切口感染的 75 例患者作为对照组。纳入标准:①符合切口感染的诊断标准,均在普外科进行手术治疗者;②年龄≥18 岁,患者的临床资料完整;③其他各项生命体征平稳;④患者认知和表达能力正常;⑤属于普外科 I、II 类切口感染。排除标准:①术前已使用抗菌药物治疗;②患者术前已存在感染征象;③机体出现其他部位感染性病变者。本研究经本院伦理委员会审核批准,所有患者知情同意且签署同意书。

1.2 切口感染诊断标准

切口感染诊断标准^[5]:①患者体温持续升高, >38℃;②经临床诊断切口感染;③患者切口部位存在急性炎症症状或脓性渗出;④切口处分泌物细菌培养结果阳性;⑤经引流或穿刺出现脓液。

1.3 方法

病原菌培养:采集患者切口感染位置的渗液及分泌物进行细菌培养,严格按照细菌学规范技术进行病原菌分离操作。选用法国梅里埃公司全自动细菌鉴定药敏系统 VITEK-COM-PACT 对分泌物内的细菌进行菌种鉴定分型。

1.4 统计学分析

应用 SPSS20.0 统计软件进行数据分析。计数资料以率表示,应用 χ^2 检验。计量资料以 $(\bar{x} \pm s)$ 表示,采用 t 检验;采用多因素 Logistic 回归分析普外科患者术后切口感染的影响因素。 $P < 0.05$ 为差异有统计学意义。

2 结果

2.1 术后切口感染的病原菌分布

感染组 75 例患者共检出 75 株病原菌,革兰阴性菌 43 例,占 57.33%,革兰阳性菌 28 例,占 27.33%,真菌 4 例,占 5.33%。见表 1。

表 1 术后切口感染的病原菌分布

Table 1 Distribution of pathogenic bacteria in incision infection after operation

Pathogenic bacteria	Number of plants (n=75)	Constituent ratio(%)
Gram-negative bacteria	43	57.33
<i>Pseudomonas aeruginosa</i>	16	21.33
<i>Acinetobacter baumannii</i>	11	14.67
<i>Escherichia coli</i>	7	9.33
Others	9	12.00
Gram-positive bacteria	28	37.33
<i>Staphylococcus aureus</i>	10	13.33
<i>Enterococcus</i>	6	8.00
<i>Staphylococcus epidermidis</i>	5	6.67
Others	7	9.93
Fungus	4	5.33
<i>Candida albicans</i>	4	5.33

2.2 普外科患者术后切口感染单因素分析

经单因素分析显示,普外科患者术后切口感染与年龄、有无合并糖尿病、手术时间、有无植入性器械、住院时间有关,差异有统计学意义($P < 0.05$),而与性别、切口长度、手术类型无关($P > 0.05$)。见表 2。

2.3 普外科患者术后切口感染的多因素 Logistic 回归分析

将年龄、手术时间、有无合并糖尿病、有无植入性器械、住院时间作为自变量,以普外科患者术后是否发生切口感染作为因变量,纳入多因素 Logistic 回归分析,结果表明,年龄≥60 岁、手术时间≥2h、合并糖尿病、有植入性器械、住院时间≥1 月是影响患者术后切口感染发生的独立危险因素,差异有统计

学意义($P < 0.05$)。见表 3。

3 讨论

手术是普外科患者治疗的重要手段,具有稳定的效果和确切的疗效,但也会引起机体内环境的紊乱及诱发各种并发症,致使患者术后免疫功能降低,手术会打破人体自身免疫屏障,损伤机体组织,并可导致机体内环境受外界病原菌侵入,引发普外科患者切口感染,严重影响患者的手术治疗效果和预后,给患者带来身体痛苦和经济负担^[6,7]。随着植入类器械手术的增多,抗生素的广泛使用,术后感染逐渐增多,而良好的微生物学的证据可避免滥用抗菌药物^[8]。本研究对术后切口感染的病原

菌分布及其危险因素进行分析,针对危险因素加以管理,尽可能降低切口感染的发生率,确保患者的安全。

表 2 普外科患者术后切口感染单因素分析 [n(%)]

Table 2 Univariate analysis of postoperative incision infection in general surgery patients

Factors	Infection group(n=75)		Control group(n=75)		χ^2	<i>P</i>
	n	Constituent ratio(%)	n	Constituent ratio(%)		
Gender					0.244	0.621
Male	41	54.67	44	58.67		
Female	34	45.33	31	41.33		
Age					9.654	0.002
≥ 60 years	49	65.33	30	40.00		
<60 years	26	34.67	45	60.00		
Diabetes mellitus					16.034	0.000
Yes	36	48.00	13	17.33		
No	39	52.00	62	82.67		
Operation time					9.000	0.003
≥ 2 h	39	52.00	21	28.00		
<2 h	36	48.00	54	72.00		
Implantable instruments					10.823	0.001
Yes	43	57.33	23	30.67		
No	32	42.67	52	69.33		
Hospitalization time					15.187	0.000
≥ 1 months	39	52.00	16	21.33		
<1 month	36	48.00	59	78.67		
Notch length					1.310	0.252
≥ 10 cm	43	57.33	36	48.00		
<10 cm	32	42.67	39	52.00		
Operative types					1.431	0.245
Cholecystectomy	16	13.33	17	22.67		
Gastroduodenum	22	29.33	23	30.67		
Thyroidectomy	9	12.00	15	20.00		
Colorectal surgery	23	30.67	16	21.33		
Pancreatic surgery	5	6.67	4	5.33		

表 3 普外科患者术后切口感染的多因素 Logistic 回归分析

Table 3 Logistic multivariate logistic regression analysis of postoperative incisional infection in general surgery patients

Variable	β	SE	Wald χ^2	<i>P</i>	OR	95%CI
Age≥ 60 years	1.623	0.769	4.834	0.026	3.819	2.426-5.064
Operation time≥ 2 h	1.254	1.682	5.383	0.017	6.428	4.302-16.689
Diabetes mellitus	1.487	0.572	5.239	0.012	7.523	5.381-19.327
Implantable instruments	0.896	1.387	5.785	0.009	6.384	3.658-10.983
Hospitalization time≥ 1 month	1.853	0.549	5.892	0.019	5.391	2.579-11.472

本研究发现,术后切口感染患者主要感染病原菌类型为革兰阴性菌,其中居多的为铜绿假单胞菌,其次为鲍曼不动杆菌和大肠埃希菌,与以往研究结果一致^[9]。革兰阴性菌作为普外科患者切口感染的主要病原菌,耐药问题日益严重^[10]。作为医院

感染最常见的条件致病菌之一,铜绿假单胞菌在腹腔内正常定植的数量较多,当患者病情危重,免疫能力大幅度降低,侵入性诊疗操作增多时,该菌群就出现增殖和感染的机会^[11,12]。近年来,随着抗菌药物应用的增多和各种侵入性诊疗技术的不断开

展,外科手术后检出鲍曼不动杆菌报道逐渐增多^[13]。由鲍曼不动杆菌引起的血流感染死亡率高达 83.7%^[14]。许蓓妮^[15]等人的研究指出,年龄、术前有无基础疾病、有无入住 ICU、呼吸机的应用时间、有无气管切开以及有无应用碳青霉烯类抗菌药物与外科术后鲍曼不动杆菌感染的发生有关,缩短 ICU 治疗时间、合理使用医疗器械和优化抗菌方案可以减少鲍曼不动杆菌感染^[16]。大肠埃希菌主要定植于宿主肠道,腹部手术能将管腔内寄居的条件致病菌带入机体腹腔及切口部位,造成感染^[17]。

术后切口感染患者的革兰阳性菌以金黄色葡萄球菌为主,占 13.33%,其次为肠球菌属和表皮葡萄球菌。金黄色葡萄球菌是医院感染的重要病原菌,主要引起创面伤口等部位的化脓性感染和血流感染,可导致相关并发症及死亡发生^[18]。表皮葡萄球菌是条件致病菌,可以附着在外来设备表面,它导致 20%骨科器械相关感染,在后期发展中可到 50%^[19]。近年来,由肠球菌属引起的医院内感染呈逐年增加的趋势,增加患者和社会的医疗负担^[20]。

本研究结果表明,患者年龄 ≥ 60 岁、合并糖尿病、住院时间、手术时间 ≥ 2 h、有植入性器械是影响普外科患者切口感染发生的因素,与既往的研究结果一致^[21]。患者手术时间延长时,人体内脏器官、组织暴露在外界环境的时间延长,加速细胞失活凋亡,同时长时间的手术多伴有创伤面扩大、出血,会对机体组织构成不可避免的损伤,进一步导致局部血供的变化,造成患者免疫系统受损,增加机体术后感染的风险^[22]。医院是各种病原菌的主要聚集场所,住院时间的延长增加了院内接触各种致病菌的机会^[23]。老年患者各脏器功能衰退及抵抗力逐步下降,同时老年人多合并基础疾病,手术耐受性差,自身抗菌能力下降,切口恢复慢,增加手术后发生感染的风险^[24]。合并糖尿病的患者由于机体长期处于内分泌紊乱状态,减弱机体内的白细胞吞噬能力或杀菌能力,进而引起机体代谢机能异常和免疫功能失调,防御机能显著下降,血糖浓度的升高为细菌滋生提供了良好条件,有利于病原菌定植进行扩散和繁殖,增加感染的风险^[25-27]。有效的外植入性器械的使用可明显提高手术的成功率和效果,但侵入性操作可破坏正常的防御屏障,同时将病原微生物随器械带入手术切口,导致感染发生,如疼痛、肿胀、引流手术切口开裂,降低手术效果^[28,29]。

因此,针对其高危因素,可采取如下干预措施:(1)强化临床医生手术操作技能,缩短手术时间,尽量避免或减少各种管道的置管时间,减少污染机会,降低术后感染率;(2)根据细菌流行情况,及时确诊分析术后切口感染病原菌,有针对性地选用合适的抗菌药,有效预防控制患者术后切口感染,改善手术患者预后。(3)术中及术后严格执行无菌操作^[30],减少病原菌与切口接触机会;(4)对患有糖尿病的患者术前积极治疗。

综上所述,普外科患者术后切口感染病原菌株以革兰阴性菌、革兰阳性菌为主,其中手术时间 ≥ 2 h、合并糖尿病、有植入性器械、住院时间 ≥ 1 月、年龄 ≥ 60 岁是普外科患者术后切口感染的独立危险因素,可通过对其危险因素实施干预措施,从而降低术后切口感染率。

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