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不同预防性抗生素用于肿瘤患者围手术期的成本-效果分析*

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摘要 目的:探究不同抗生素用于肿瘤患者围手术期的成本-效果。**方法:**选择于我院接受手术治疗的 93 例肺癌患者,所有患者按照随机数字表法均分为三组,每组 31 例,三组患者实施不同的抗生素预防方案,对比三组患者的一般手术情况(手术时间、术中出血量、术后 7 d 最高体温、术后住院时间)、抗生素应用效果(术后呼吸道感染率、术后 7 d 平均体温、术后 7 d 平均白细胞计数)以及不同抗生素预防方案成本-效果。**结果:**(1)三组患者手术时间、术中出血量、术后 7 d 最高体温、住院时间对比差异均无统计学意义($P>0.05$);(2)三组患者术后呼吸道感染率、术后 7 d 平均体温、术后 7 d 平均白细胞计数对比差异均无统计学意义($P>0.05$);(3)A 组患者具有最高的成本-效果比值,单位效果所花费的成本显著低于 B、C 两组($P<0.05$)。**结论:**术前预防及术后短疗程应用头孢唑林钠能够显著降低肺癌患者术后感染率,减少抗生素用量及花费,提高患者围手术期成本-效果。

关键词: 抗生素;肿瘤;围手术期;成本-效果

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Cost-effectiveness Analysis of Different Prophylactic Antibiotics in Perioperative Period of Cancer Patients*

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ABSTRACT Objective: To explore the cost-effectiveness of different antibiotics for the perioperative period of patients with tumor. **Methods:** 93 patients with lung cancer who underwent surgery in our hospital were selected. All patients were divided into three groups according to the random number table method, with 31 cases in each group. Three groups of patients implemented different antibiotic prophylaxis programs. The general surgery conditions of the three groups were compared (surgery time, intraoperative blood loss, postoperative operation). 7 days maximum body temperature, postoperative hospital stay), antibiotic application effect (postoperative respiratory infection rate, average body temperature at 7 days after surgery, average white blood cell count at 7 days after surgery) and cost-effectiveness of different antibiotic prevention programs. **Results:** (1) There was no significant difference in the operation time, intraoperative blood loss, maximum body temperature and hospitalization time between the three groups ($P>0.05$). (2) There were no significant differences in postoperative respiratory infection rate, mean body temperature at 7 days after surgery, and mean white blood cell count at 7 days after operation ($P>0.05$). (3) Patients in the group A had the highest cost-effectiveness ratio, and the cost per unit effect was significantly lower than those in the groups B and C ($P<0.05$). **Conclusion:** Preoperative prevention and short-term postoperative treatment with cefazolin sodium can significantly reduce postoperative infection rate, reduce antibiotic dosage and cost, and improve perioperative cost-effectiveness.

Key words: Antibiotics; Tumor; Perioperative period; Cost-effectiveness

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前言

外科手术是治疗肿瘤的有效方式之一,及时有效的切除病

灶对改善肿瘤患者预后,提高其生活质量具有重要意义^[1,2]。研究显示预防性应用抗菌药物是降低肿瘤外科手术术后感染的有效途径,虽然《抗菌药物临床应用指导原则》中对抗菌药物应

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用的品种、用药时间^[3,4]、用药疗程等进行了明确的规定,但临床上仍常有不恰当预防性应用抗生素的情况出现,如延长抗生素应用时间、换用更高阶抗生素、无适应症应用抗生素等^[5,6]。抗生素的不合理应用不仅容易引发二重感染和细菌耐药性的产生,同时还会浪费医疗资源、增加药物不良反应发生率、加重患者经济负担^[7,8]。对肿瘤患者围手术期抗生素合理应用的研究有利于筛选最佳疗效、最低医疗成本的用药方案^[9,10],本研究结果表明术前预防及术后短疗程应用头孢唑林钠能够显著降低肺癌患者术后感染率,减少抗生素用量及花费,提高患者围手术期成本-效果,现详述如下。

1 资料与方法

表 1 三组患者一般情况对比

Table 1 Comparison of the general situation of among the three groups of patients

Index	A(n=31)	B(n=31)	C(n=31)	F/ χ^2	P
Male/female	15/16	16/15	15/16	0.865	>0.05
Age	41.36± 2.65	42.05± 1.98	43.02± 1.27	0.891	>0.05
Weight(kg)	65.32± 4.16	64.98± 3.98	64.55± 4.08	0.751	>0.05
Height(cm)	164.85± 16.32	165.33± 15.55	168.53± 14.13	0.755	>0.05
Tumor staging	I-II	21	20	>0.05	>0.05
	III	10	11	>0.05	>0.05
Preoperative body temperature(°C)	36.56± 0.21	36.41± 0.33	36.49± 0.35	0.561	>0.05
Preoperative white blood cell count($\times 10^9/L$)	5.69± 1.65	5.73± 1.55	5.76± 1.51	0.569	>0.05

1.2 方法

三组患者均接受胸腔镜下肺部分切除术,A组患者术前0.5-1 h内静滴头孢唑林钠 2 g+ 甲硝唑 0.5 g,术后静滴头孢唑林钠 2 g,2次/日,12 h一次,持续 48 h;B组患者术前0.5-1 h内静滴头孢唑林钠 2 g+ 甲硝唑 0.5 g,术后静滴头孢唑林钠 2 g,2次/日,12 h一次,持续 72 h;C组患者术前0.5-1 h内静滴头孢唑林钠 2 g+ 甲硝唑 0.5 g,术后使用头孢噻肟钠、氨苄西林等光谱抗生素进行治疗,也可根据患者实际加用左氧氟沙星或阿奇霉素,持续 72 h。

1.3 观察指标及评测标准

1.3.1 手术指标 记录分析三组患者手术时间、术中出血量、术后 7 d 最高体温、术后住院时间等手术指标,并进行对比分析。

1.3.2 抗生素应用效果 记录三组患者术后呼吸道感染率(以术后有无咳脓痰、咳嗽及实验室检查结果为判断依据)、术后 7 d 平均体温、术后 7 d 平均白细胞计数(每日监测,取平均值),并进行对比分析^[15]。

1.3.3 不同抗生素预防方案成本-效果 对比三种抗生素预防方案成本-效果,成本-效果分析采用比值表示^[14,15],成本/效果为每获得一份效果所需成本,成本单位为元,效果单位为%。

1.4 统计学方法

采用 SPSS20.0 统计学软件对本次研究数据进行分析,计

1.1 一般资料

选择在我院治疗的 93 例接受手术治疗的肺癌患者为研究对象,所有患者按照随机数字表法均分为三组,每组 31 例。

纳入标准^[11]:(1)经病理学检查确诊为肺癌且行外科手术治疗者;(2)均为胸腔镜下肺部分切除术患者;(3)基本病历资料完整;(4)患者配合接受治疗和检查;(5)患者及其家属对本研究知情同意。

排除标准^[12,13]:(1)术前合并严重感染者;(2)术前 14 d 内接受抗生素治疗者;(3)术前白细胞计数异常者;(4)术前体温异常者;(5)合并糖尿病、高血压或免疫缺陷性疾病者;(6)术前 14 d 内接受激素治疗者;(7)合并严重肝肾功能障碍者。三组患者的一般资料比较无统计学意义($P>0.05$),见表 1,有可比性。

量数据采用单因素方差分析;计数资料以百分比表示,对比经 χ^2 检验;假设检验水准为 $\alpha=0.05$,以 $P<0.05$ 为存在统计学意义。

2 结果

2.1 三组的手术指标对比

三组患者手术时间、术中出血量、术后 7 d 最高体温、术后住院时间对比差异均无统计学意义($P>0.05$),见表 2。

2.2 三组的抗生素应用效果对比

三组患者术后呼吸道感染率、术后 7 d 平均体温、术后 7 d 平均白细胞计数对比差异无统计学意义($P>0.05$),见表 3。

2.3 不同抗生素预防方案成本-效果对比

经评估对比,A组患者具有最高的成本-效果比值,单位效果所花费的成本低于 B、C 两组($P<0.05$),见表 4。

3 讨论

肿瘤是指有机体在各种致癌因子的影响下,机体内局部组织细胞出现剧烈增殖形成新生物,根据其危害程度和细胞特性通常分为良性和恶性肿瘤两大类,恶性肿瘤即人们常说的癌症^[16,17]。随着近些年环境污染的加剧及居民方式改变^[18,19],肿瘤发病率呈现逐年递增趋势,2000 年全球新发肿瘤病例数为 1010 万,死亡 620 万,20 世纪 90 年代一项调研指出我国每年肿瘤新发病例数约为 160 万,因肿瘤致死的病例数约为 130

万,死因构成占比 17.94 %,居呼吸系统疾病之后^[20,21]。外科手术是治疗肿瘤的重要方式,具有治疗时间短、预后改善迅速等优势,现阶段仍是治疗早期肿瘤的主要手段^[22]。临床实践显示外科手术通常会因为感染而产生一系列并发症,导致患者的住院时间延长,增加了治疗的经济负担,经腹子宫切除术患者术后感染率可达 1 %-5 %,一项针对 400 例患者的调研也显示患者术后感染率高达 2.5 %^[23,24]。预防性抗生素应用在降低术后感染

率中具有积极作用,数据显示,未使用预防性抗生素患者胸外科术后感染率为 14 %,而预防性用药后该几率下降至 0.42 % -4 %^[25]。但抗生素的不合理应用使患者耐药性细菌感染率不断增加,同时也降低了抗生素预防切口感染的效果,破坏了细菌生态平衡,损害患者神经、血液系统,甚至导致手术失败患者死亡^[11],因而寻求最佳的抗生素应用方案是医务工作者研究的重点方向^[26]。

表 2 三组患者手术指标对比

Table 2 Comparison of surgical indexes among the three groups of patients

Index	A(n=31)	B(n=31)	C(n=31)	F/x ²	P
Operation time(min)	131.06± 26.51	126.26± 23.35	123.65± 28.91	0.694	>0.05
Intraoperative bleeding volume(mL)	156.96± 23.05	164.26± 22.15	163.21± 20.98	0.882	>0.05
Maximum body temperature 7 days after operation(℃)	38.21± 0.26	38.16± 0.19	37.98± 0.31	0.871	>0.05
Length of stay(d)	5.36± 1.04	5.28± 1.16	5.34± 1.09	0.967	>0.05

表 3 三组患者抗生素应用效果对比

Table 3 Comparison of antibiotic application effect among the three groups

Index	A(n=31)	B(n=31)	C(n=31)	F/x ²	P
Respiratory tract infection rate (%)	3.23(1/31)	0.00(0/31)	3.23(1/31)	0.596	>0.05
Average body temperature 7 days after operation(℃)	37.61± 0.36	37.56± 0.37	37.29± 0.29	0.815	>0.05
Mean white blood cells 7 days after operation($\times 10^9L^{-1}$)	5.76± 0.61	5.69± 0.59	5.71± 0.61	0.887	>0.05

表 4 三组患者不同抗生素预防方案成本 - 效果对比

Table 4 Cost-effectiveness comparison of different antibiotic prophylaxis schemes among the three groups

Index	Cost of antibiotics (RMB)	7 d postoperative maximum body temperature below 38 ℃ (%)	Uninfected rate(%)	Cost-effectiveness ratio
A	531	26(83.87)	96.77	633.12
B	1065	25(80.65)	100.00	1320.52
C	951	26(83.87)	96.77	1133.89

围手术期抗生素的应用应覆盖整个手术过程,但一般不应超过 24 h,如果患者合并有基础性疾病如糖尿病等可适当延长至 48 h^[27]。一项调研显示受主观经验或他人影响,部分医生认为抗生素使用时间越长,抗菌效果越好,这给细菌产生耐药性提供了条件,学者 Launio C C^[28]等通过回顾性分析的方式,就抗生素使用与细菌耐药性之间的关联进行了探究,结果显示抗生素的用药频率与病原菌对抗生素的耐药性有密切的相关性,有研究^[29]对 3000 份病历的抗生素使用情况调研显示,抗生素单用率为 74.67 %,二联用药率为 21.03 %,三联用药率为 4.30 %,不合理用药比率为 7.50 %,其中无适应症用药使用率最高,提示抗生素使用还存在较为普遍的不合理现象。本文调研设计了 3 种用药方案,分别为短疗程 A 组、长疗程 B 组及联合用药 C 组,结果显示,三组患者一般手术情况如手术时间、术中出血量、术后 7 d 最高体温、住院时间对比差异不具有统计学意义,抗生素应用效果如呼吸道感染率、术后 7 d 平均体温、术后 7 d

平均白细胞计数对比差异也不具有统计学意义,提示 3 种抗生素预防性方案都具有较好的疗效。但成本分析显示 A 组患者抗生素费用最低,B 组最高,虽然 B 组患者术后未感染率为 100%,但 A 组患者成本 - 效果比值最高。本文作者分析认为头孢唑林钠属于一代头孢菌素,抗菌谱较广,对革兰氏阳性球菌具有良好的抗菌活性,肺炎链球菌对本品高度敏感,而甲硝唑为抗厌氧菌的基本药物,联合应用产生了较好的杀菌作用^[30],本研究中纳入患者年龄普遍较高,其机体免疫力下降,术后疼痛、痰液滞留等都会增加感染的风险,联合应用的方式切实降低了患者术后感染风险,同时也降低了用药成本。但要认识到预防性抗生素的选择应根据患者的实际情况进行,本文纳入患者为肺癌患者,术后感染菌群主要为肺炎链球菌、肠杆菌及假单孢菌,对头孢唑林较为敏感,因而预防性效果较好,其他病种抗生素的应用应结合患者易感菌属来进行筛选。

总而言之,术前预防及术后短疗程应用头孢唑林钠能够显

著降低肺癌患者术后感染率,减少抗生素用量及花费,提高患者围手术期成本-效果。

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