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毛细支气管炎患儿发生医院感染的病原学及危险因素分析

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摘要 目的:探讨毛细支气管炎患儿发生医院感染的病原学特征及相关危险因素,以期临床防治提供依据。**方法:**选择 2013 年 8 月到 2015 年 8 月我院收治的发生医院感染的毛细支气管炎患儿 324 例,检验并分析其病原体分布情况,采用多因素 Logistic 回归方程分析患儿发生医院感染的危险因素。**结果:**324 例患儿中,病毒感染 260 例,占 80.25%,共检出病毒 272 株,其中呼吸道合胞病毒(RSV)构成比最高,占 47.43%,其他依次是柯萨奇病毒(CBV)占 9.93%、鼻病毒(RV)占 4.04%、腺病毒(ADV)占 3.68%及冠状病毒(COV)占 3.31%,其他病毒占 31.62%;细菌感染 64 例,占 19.75%,共检出细菌 73 株,其中大肠埃希菌构成比最高,占 41.10%,其他依次是金黄色葡萄球菌占 31.51%、肺炎克雷伯菌占 17.81%、阴沟肠杆菌占 6.85%及不动杆菌属占 2.74%。多因素分析结果显示,男性、年龄 ≤ 6 个月、早产儿、父母患有呼吸道疾病及家庭经济状况差是毛细支气管炎患儿发生医院感染的危险因素($P<0.05$)。**结论:**毛细支气管炎患儿发生医院感染的感染源复杂,临床应对不同性别、年龄、是否早产儿、父母是否患有呼吸道疾病及不同家庭经济状况的患儿进行差别治疗。

关键词:毛细支气管炎;儿童;医院感染;病原学;危险因素

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Analysis on Etiology and Risk Factors of Nosocomial Infections in Children with Bronchiolitis

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ABSTRACT Objective: To investigate the pathogenic features and risk factors of nosocomial infection in children with bronchiolitis, so as to provide basis for clinical prevention and treatment. **Methods:** A total of 324 children with bronchiolitis, who had nosocomial infections in 174th Hospital of PLA, Xiamen during August 2013 to August 2015, were selected. The distribution of pathogens was examined and analyzed, and the risk factors of children with nosocomial infection were analyzed by multiple factor Logistic regression equation. **Results:** Among the 324 children, 260 cases were infected by virus, accounting for 80.25%. A total of 272 strains of RSV were detected, among which, respiratory syncytial virus (RSV) was the highest, accounting for 47.43%; followed by coxsackie virus (CBV) accounting for 9.93%; rhinovims virus (RV) accounting for 4.04%, adenovirus (ADV) accounting for 3.68%, coronavirus (COV) accounting for 3.31% and others virus accounting for 31.62%. 64 cases had bacterial infection, accounting for 19.75%. A total of 73 strains of bacteria were detected, among which, the proportion of *escherichia coli* was the highest, accounting for 41.10%, followed by *staphylococcus aureus* accounting for 31.51%, *klebsiella pneumoniae* accounting for 17.81%, *enterobacter cloacae* accounting for 6.85%, and *acinetobacter* accounting for 2.74%. Multi-factor analysis results showed that males, age ≤ 6 months, premature, parents with respiratory diseases and poor family economic conditions were the risk factors of nosocomial infections in children with bronchiolitis ($P<0.05$). **Conclusion:** The infection source of nosocomial infection in children with bronchiolitis is complicated, differential treatments should be taken for the children with different gender, age, whether premature, whether parents has respiratory diseases and different family economic conditions in clinical practice.

Key words: Bronchiolitis; Children; Nosocomial infection; Etiology; Risk factors

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前言

毛细支气管炎是一种常见的、好发于 2 岁以下婴幼儿的急性下呼吸道感染性疾病,临床症状如呼吸急促困难、肺部哮鸣音、喘憋、引起代谢性酸中毒等,严重影响婴幼儿身体健康^[1-3]。

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该病的发病机制尚不清楚,临床认为与感染、环境因素、免疫功能、遗传因素等有关,是多种因素相互作用的临床综合征^[4,5]。毛细支气管炎患儿由于机体免疫功能低下,住院期间容易受到多种病原体侵袭而并发感染,出现呼吸暂停过长、代谢性酸中毒或严重脱水等症状,使患儿病情更加复杂,影响临床治疗及预后^[6-8]。因此,明确毛细支气管炎发生医院感染的病原学特征及危险因素,对指导临床采取相应的预防措施具有重要意义。

1 资料与方法

1.1 一般资料

选择 2013 年 8 月到 2015 年 8 月我院收治的毛细支气管炎患儿 500 例,诊断标准依据《诸福棠实用儿科学》^[9],患儿住院期间发生医院感染的为 324 例,诊断标准依据《医院感染诊断标准》^[10]。患儿均为初次发病,排除并发心力衰竭、呼吸衰竭者,排除有先天性心脏病及不配合治疗者。324 例患儿中男 180 例,女 144 例;月龄 4-16 个月,平均月龄(12.13±2.65)个月;年龄≤6 个月者 199 例,年龄>6 个月者 125 例;早产儿 207 例,非早产儿 117 例。

1.2 实验方法

取所有患儿鼻腔分泌物,采用免疫荧光法检测并确定病毒类型,试剂盒购自美国 Merck Millipore 公司,所有操作均严格按照试剂盒说明进行;采用细菌培养实验确定细菌类型,具体操作为:将分泌物接种于麦康凯琼脂平板和血琼脂平板(购自郑州安图绿科生物工程公司),在 35℃ 条件下的 CO₂ 孵箱(购自美国 Fisher scientific 公司)中培养 24 h,获得纯培养菌株。应用 API20NE 全自动微生物鉴定系统(购自法国梅里埃公司)鉴定细菌类型。

制作医院内部问卷调查,调查患儿性别、年龄、是否早产

儿、父母是否患有呼吸道疾病、患儿家庭经济情况及是否母乳喂养等,并分析其与毛细支气管炎患儿发生医院感染的相关性。

1.3 数据处理

使用 SPSS 19.0 软件包处理数据,计数资料用率(%)表示,采用 χ^2 检验,采用非条件 Logistic 回归方程分析患儿发生医院感染的危险因素,以 $P<0.05$ 为差异有统计学意义。

2 结果

2.1 不同病原体感染构成情况

324 例发生医院感染的毛细支气管炎患儿中,病毒感染 260 例,占 80.25%,共检出病毒 272 株,其中呼吸道合胞病毒(Respiratory syncytial virus,RSV)构成比最高,占 47.43%(129/272),其他依次是柯萨奇病毒(Coxsackie virus,CBV)占 9.93%(27/272),鼻病毒(Rhinovims virus,RV)占 4.04%(11/272),腺病毒(Adenovirus,ADV)占 3.68%(10/272),冠状病毒(Coronavirus,COV)占 3.31%(9/272),其他病毒占 31.62%(86/272)。细菌感染 64 例,占 19.75%,共检出细菌 73 株,其中大肠埃希菌构成比最高,占 41.10%(30/73),其他依次是金黄色葡萄球菌占 31.51%(23/73),肺炎克雷伯菌占 17.81%(13/73),阴沟肠杆菌占 6.85%(5/73)及不动杆菌属占 2.74%(2/73)。见表 1、表 2。

表 1 毛细支气管炎患儿病毒感染构成比情况(%)

Table 1 Constituent ratio of virus infection in children with bronchiolitis (%)

Viruses	Numbers of seedling (n=272)	Constituent ratio
RSV	129	47.43
CBV	27	9.93
RV	11	4.04
ADV	10	3.68
COV	9	3.31
Others	86	31.62

表 2 毛细支气管炎患儿细菌感染构成比情况(%)

Table 2 Constituent ratio of bacterial infection in children with bronchiolitis (%)

Bacterias	Numbers of seedling (n=73)	Constituent ratio
<i>Escherichia coli</i>	30	41.10
<i>Staphylococcus aureus</i>	23	31.51
<i>klebsiella pneumoniae</i>	135	17.81
<i>Enterobacter cloacae</i>	5	6.85
<i>Acinetobacter</i>	2	2.74

2.2 患儿发生医院感染的单因素分析

性别、年龄、早产儿、父母患有呼吸道疾病、家庭经济状况与患儿发生医院感染有明显相关性($P<0.05$)。见表 3。

2.3 患儿发生医院感染的多因素分析

多因素非条件 Logistic 回归方程分析结果显示,男性、年龄≤6 个月、早产儿、父母患有呼吸道疾病及家庭经济状况差是毛细支气管炎患儿发生医院感染的危险因素($P<0.05$)。见表 2。

3 讨论

毛细支气管炎是冬春季常见的发生于 2 岁以下婴幼儿的呼吸系统疾病,尤其在 6 个月以下婴儿中发病率更高,研究显示,80%的毛细支气管炎发生在 1 岁以下婴幼儿中,住院毛细支气管炎婴幼儿的病死率达到 1%,严重威胁婴幼儿生命健康^[11-13]。毛细支气管炎患儿发生医院感染与其机体免疫系统尚未发育健全,抵抗力低有关,研究显示^[14-16],病毒感染、细菌感染、

支原体感染、过敏性体质、遗传因素、环境污染、早产、营养不良、呼吸系统发育不良、佝偻病等均是毛细支气管炎患儿发生医院感染的影响因素。而毛细支气管炎发生医院感染患儿具有与哮喘相似的临床症状,往往难以通过症状确诊,因此病原学检测有利于医护人员的正确诊断^[17,18]。

本研究结果显示,所有 324 例发生医院感染的毛细支气管炎患儿中,病毒感染者有 260 例,占 80.25%,检出病毒 272 株,其中 RSV 构成比最高,占 47.43%,依次是 CBV 占 9.93%,RV 占 4.04%,ADV 占 3.68%,COV 占 3.31%、其他病毒占 31.62%;细菌感染者有 64 例,占 19.75%,检出细菌 73 株,其中大肠埃希菌构成比最高,占 41.10%,依次是金黄色葡萄球菌占 31.51%,肺炎克雷伯菌占 17.81%,阴沟肠杆菌占 6.85%及不动杆菌属占 2.74%。提示病毒感染,尤其 RSV 感染是毛细支气管炎患儿发生医院感染的主要病原体,其次包括大肠埃希菌、金黄色葡萄球菌等细菌的感染,患儿存在两种以上病原体感染的

表 3 患儿发生医院感染的影响因素分析[n(%)]

Table 3 Influencing factors of nosocomial infection in children [n(%)]

Factors		Total number of cases	Number of infections	χ^2	P
Genders	Male	180	100(55.56)	4.000	0.046
	Female	144	64(44.44)		
Age	≤ 6 months	199	122(61.31)	16.901	0.000
	>6 months	125	48(38.40)		
Premature infant	Yes	207	132(63.77)	25.000	0.000
	No	117	42(35.90)		
Parents with respiratory diseases	Yes	191	113(59.16)	10.383	0.001
	No	133	55(41.35)		
Family economic status	Poor	181	101(55.80)	4.457	0.035
	Good	143	63(44.06)		
Breast-feeding	Yes	196	96(48.98)	0.089	0.766
	No	128	63(49.22)		

表 4 患儿发生医院感染的多因素分析

Table 4 Multivariate analysis of nosocomial infection in children

Factors	Wald	OR	95% CI	P
Male	6.003	11.110	3.222-53.707	0.003
Age ≤ 6 months	7.310	8.263	2.792-35.914	0.005
Premature infant	5.681	5.364	1.904-21.158	0.037
Parents with respiratory diseases	7.471	14.847	4.015-64.722	0.001
Poor family economy	9.736	17.269	4.034-97.415	0.000

情况。以 RSV 为代表的病原体能够侵犯患儿呼吸道上皮细胞,激活气道管壁的胆碱能神经,扰乱植物神经系统功能,增加刺激物接触的几率,引起呼吸道腺体分泌增加、气管痉挛水肿,致使毛细支气管进一步收缩变窄,最终引起患儿呼吸困难、憋喘等症状^[19-21]。因此临床应根据病原学检测结果进行抗感染治疗,外加纠正呼吸障碍的措施,包括调整房间适宜的温度湿度、保证新鲜空气的畅通、及时纠正患儿体内缺氧或代谢性酸中毒等^[22-24]。此外,本研究结果显示,男性、年龄≤ 6 个月、早产儿、父母患有呼吸道疾病及家庭经济状况较差是毛细支气管炎患儿发生医院感染的危险因素。分析原因可能有以下几点:由于男性患儿相比于女性患儿肺发育相对迟缓,易于受到病原体侵入,引起医院感染^[25-27]。而年龄越小,患儿各器官系统的发育越不成熟,机体对医院病原体感染的抵抗力越差;而这种情况在早产儿中表现更加明显;患有呼吸道疾病的父母容易与婴幼儿发生交叉感染,且不排除遗传因素的影响;家庭经济情况较差的患儿,往往家庭卫生条件较差或者缺乏营养,导致患儿体质较差,易于感染病原体^[28-30]。因此,医护人员在治疗毛细支气管炎患儿发生医院感染时应充分考虑患儿的发病原因,采取针对性的防治措施。

综上所述,毛细支气管炎患儿发生医院感染的感染源复杂,受性别、年龄、是否早产儿、父母是否患有呼吸道疾病及家

庭经济状况等多种因素影响,临床应针对性地采取合理的预防措施和相应的抗病毒治疗,以降低医院感染发生率,对毛细支气管炎患儿疾病控制有重要作用。

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