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心内科住院患者压疮感染病原菌分析及纳米银抗菌凝胶的干预效果*

范新明 刘莹 邹明平 熊赖焱 罗细成

(中山大学附属东华医院心血管内科 广东 东莞 523000)

摘要 目的:探讨心内科住院患者压疮感染病原菌分布和耐药情况,并研究纳米银抗菌凝胶的干预效果,为临床治疗提供参考。**方法:**选取2017年3月-2018年3月我院诊治的80例心血管内科住院并发Ⅱ期压疮感染患者,采集患者压疮感染部位样本进行病原菌培养及药敏试验。记录病原菌分布情况,分析主要革兰阴性菌和主要革兰阳性菌的耐药率。采用随机数字表法将患者分为实验组(n=40)和对照组(n=40),对照组采用安普贴治疗,实验组采用纳米银抗菌凝胶联合安普贴治疗,比较两组患者的治疗效果。**结果:**80例心内科住院并发Ⅱ期压疮感染患者中,共分离鉴定出病原菌71株,其中革兰阴性菌54株,占76.06%,革兰阳性菌13株,占18.31%,真菌4株,占5.64%。大肠埃希菌、肺炎克雷伯菌和铜绿假单胞菌均对氨苄西林、亚胺培南和头孢曲松的耐药率较高,分别为100.00%、90.91%、95.45%;93.33%、80.00%、100.00%;100.00%、90.00%、90.00%;而对环丙沙星和庆大霉素的耐药率较低,分别为27.27%、9.09%;0.00%、0.00%;40.00%、20.00%。金黄色葡萄球菌和肠球菌属对氨苄西林、青霉素G和克林霉素的耐药率较高,分别为100.00%、87.50%、62.50%;100.00%、66.67%、66.67%;对万古霉素和替考拉宁的耐药率均为0.00%。实验组治疗总有效率为95.00%,高于对照组的77.50%,差异有统计学意义(P<0.05)。**结论:**心内科住院并发Ⅱ期压疮感染患者病原菌分布比较广泛,主要以革兰阴性菌为主,患者辅以纳米银抗菌凝胶治疗效果较好。

关键词:心内科;压疮;感染;病原菌;纳米银抗菌凝胶;疗效

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Pressure Ulcer Infection in Patients Hospitalized in Cardiovascular Department: Analysis of Pathogenic Bacteria and Intervention Effect of Nano Silver Antibacterial Gel*

FAN Xin-ming, LIU Ying, ZOU Ming-ping, XIONG Lai-yan, LUO Xi-cheng

(Department of Cardiovascular Medicine, The Affiliated Donghua Hospital of Sun Yat-sen University, Dongguan, Guangdong, 523000, China)

ABSTRACT Objective: To investigate the distribution of pathogenic bacteria and drug resistance of patients with pressure ulcer infection hospitalized in cardiovascular department, and study the intervention effect of nano silver antibacterial gel, in order to provide reference for clinical treatment. **Methods:** A total of 80 patients with stage II pressure ulcer infection, who were hospitalized in cardiovascular department of Affiliated Donghua Hospital of Sun Yat-sen University from March 2017 to March 2018, were selected, and the samples from the pressure ulcer infection site were collected for the pathogenic bacteria culture and drug sensitive test. The distribution of pathogenic bacteria was recorded, and the resistance rates of main gram negative bacteria and main gram positive bacteria were analyzed. All the patients were randomly divided into experimental group (n=40) and control group (n=40). The control group was treated with Algoplaque, while the experimental group was treated with nano silver antibacterial gel combined with Algoplaque, then the clinical effect was compared between the two groups. **Results:** 71 strains of pathogenic bacteria were identified from 80 patients, including 54 strains of gram negative bacteria, accounting for 76.06%; 13 strains of gram positive bacteria, accounting for 18.31%, and 4 strains of fungus, accounting for 5.64%. *Escherichia coli*, *pneumonia klebsiella* and *pseudomonas aeruginosa* bacteria were highly resistant to ampicillin, imipenem and ceftriaxone, the resistance rates were 100.00%, 90.91%, 95.45%; 93.33%, 80.00%, 100.00%; 100.00%, 90.00%, 90.00% respectively, but they had low resistant to ciprofloxacin and gentamicin, the resistance rates were 27.27%, 9.09%; 0.00%, 0.00%; 40.00%, 20.00% respectively. And *staphylococcus aureus* and *enterococcus genera* were highly resistant to ampicillin, penicillin G and clindamycin, the resistance rates were 100.00%, 87.50%, 62.50%; 100.00%, 66.67%, 66.67% respectively, but they had low resistance to vancomycin and teicoplanin, the resistance rates were all 0.00%. The total effective rate of experimental group was 95.00%, which was significantly higher than 77.50% of control group(P<0.05). **Conclusion:** The distribution of pathogenic bacteria in the patients with stage II pressure ulcer infection in cardiology department is relatively wide, mainly Gram-negative bacteria, and good therapeutic effect will be obtained by using nano-silver antibacterial gel in the treatment of the patients.

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作者简介:范新明(1974-),男,硕士,主治医师,从事心血管内科方面的研究,E-mail:uyrfv@163.com

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前言

压疮又称之为压力性溃疡,是指局部组织长期受压、血液循环障碍、组织缺乏营养等因素引起皮肤组织发生破损或坏死^[1-3]。相关统计资料显示,每年约 6 万人因压疮合并症致死^[4,5]。压疮创面周围常伴有红肿、高热、局部炎症、疼痛等,若有恶臭、化脓症状,则为感染征象^[6,7]。心内科患者因病情易反复长期卧床,加之患者主要为老年人群,该人群身体机能下降,机体抵抗力弱,若经常侧身卧床身体容易受到压迫而出现压疮,久而久之病原菌侵袭必然引起压疮部位发生感染^[8,9]。压疮感染不仅给患者带来身心痛苦,还将严重影响患者基础疾病的治疗及预后^[10,11]。因此,准确了解心内科住院患者压疮感染的病原菌分布和耐药性,并且进行及时有效的治疗,显得尤为必要。

1 资料与方法

1.1 一般资料

选取 2017 年 3 月 -2018 年 3 月我院诊治的 80 例心血管内科住院并发 II 期压疮感染患者,纳入标准:1)临床症状、体征和辅助检查确诊患有冠心病、心梗、心脏病、高血压等心血管疾病者;2)体格检查存在 II 期压疮感染,即表现为受压处皮肤紫红、发紫,表皮出现水泡无溃疡者。排除标准:1)入院时已存在压疮感染者;2)存在全身感染性疾病者。将患者根据随机数字表法分为实验组和对照组,每组各 40 例,实验组男 24 例,女 16 例,平均年龄 (63.68 ± 3.59) 岁,平均病程 (8.20 ± 4.03) 个月,压疮发病部位:骶尾部 13 例、外踝部 21 例、髌关节外侧骨隆突处 6 例;对照组男 26 例,女 14 例,平均年龄 (64.46 ± 3.98) 岁,平均病程 (8.59 ± 4.67) 个月,压疮发病部位:骶尾部 14 例、外踝部 20 例、髌关节外侧骨隆突处 6 例,两组性别、年龄、病程、发病部位分布情况均衡可比($P>0.05$)。患者及家属对压疮诊疗方案知情同意,且自愿签知情同意书。本研究经我院伦理委员会审核通过。

1.2 方法

1.2.1 病原菌测定及药敏试验 无菌采集患者压疮感染部位标本,2 h 内采用法国生物梅里埃公司 VITEK-2 Compact 自动微生物鉴定系统进行病原菌监测。检出病原菌采用 VITSK 原装药敏检测试剂盒进行药敏测定,相关操作步骤严格遵循说明书。

1.2.2 治疗方法 两组患者均在原发病治疗基础上给予抗生素抗感染治疗,抗生素选择根据病原菌和药敏试验结果,低蛋白血症患者同时给予输注血浆或清蛋白治疗。同时,给予生理盐水进行创面清洗、坏死组织清除以及过氧化氢消毒处理,创面清理后给予干预治疗。其中对照组患者给予安普贴治疗,方法如下:采用生理盐水清创后采用安普贴覆盖治疗,每天换药一次。实验组采用安普贴联合纳米银抗菌凝胶治疗:创面部位涂敷纳米银抗菌凝胶,并采用安普贴进行覆盖,第一周每 1-2 天换药一次,第二周每 3-5 天换药一次。所有患者均治疗 3 个月,治疗期间给予清洁、运动安全、保持环境卫生、病情观察等

措施。

1.3 观察指标

记录病原菌分布情况,分析主要革兰阴性菌和主要革兰阳性菌的耐药率,并于 3 个月后将患者压疮部位进行治疗效果评定。判定标准^[12]:治愈为压疮部位愈合,结痂;有效为压疮部位有新生肉芽组织,创面缩小;未达到以上症状者即判定为无效。总有效率=(治愈+有效)/总例数 $\times 100\%$ 。

1.4 统计学方法

数据采用 SPSS21.0 软件处理,病程、年龄等计量资料实施 t 检验,以 $(\bar{x} \pm s)$ 表示,计数资料实施 χ^2 检验,以率表示,检验水准 $\alpha=0.05$ 。

2 结果

2.1 病原菌分布

本研究入选的 80 例心内科住院并发 II 期压疮感染患者中,共分离鉴定出病原菌 71 株,其中革兰阴性菌 54 株,占 76.06%,革兰阳性菌 13 株,占 18.31%,真菌 4 株,占 5.64%。见表 1。

2.2 主要革兰阴性菌耐药率分析

大肠埃希菌、肺炎克雷伯菌和铜绿假单胞菌均对氨苄西林、亚胺培南和头孢曲松的耐药率较高,分别为 100.00%、90.91%、95.45%;93.33%、80.00%、100.00%;100.00%、90.00%、90.00%,而对环丙沙星和庆大霉素的耐药率较低,分别为 27.27%、9.09%;0.00%、0.00%;40.00%、20.00%。见表 2。

2.3 主要革兰阳性菌耐药率分析

金黄色葡萄球菌和肠球菌属对氨苄西林、青霉素 G 和林霉素的耐药率较高,分别为 100.00%、87.50%、62.50%;100.00%、66.67%、66.67%;对万古霉素和替考拉宁的耐药率均为 0.00%,结果见表 3。

2.4 对比两组患者治疗效果

实验组治疗总有效率为 95.00%,高于对照组的 77.50%,差异有统计学意义($P<0.05$)。见表 4。

3 讨论

压疮是局部组织受压力、剪切力的直接作用,组织长期受压而导致的血液循环障碍引起缺血、坏死等情况,是长期卧床患者最常见的并发症之一^[13-15]。对于压疮严重患者,其组织坏死较多、创面较深、常常合并细菌感染,但是临床中各种抗菌药物、免疫抑制剂的广泛应用,导致压疮感染治疗难度大,创面难以愈合^[16,17]。并且心内科住院患者合并各种基础疾病,营养状况不佳,局部及全身的抵抗力较差,一旦深部组织出现感染情况,较难控制,不仅带给患者较大痛苦,还增加患者的经济负担,病情特别严重者甚至可引起死亡^[18,19]。因此,选择合适的抗感染治疗药物,缓解患者的感染症状,修复感染创面,有利于患者早日康复。

通过对本院 80 例心内科住院并发 II 期压疮感染患者进行病原菌分离培养,共分离出病原菌 71 株,其中革兰阴性菌 54 株,占 76.06%,革兰阳性菌 13 株,占 18.31%,真菌 4 株,占

5.64%，提示心内科住院患者压疮感染病原菌主要是革兰阴性菌，考虑可能与抗生素使用不合理，导致患者发生机会性感染有关。从耐药性分析上来看，不同病原菌的耐药情况均不相同，其中大肠埃希菌、肺炎克雷伯菌和铜绿假单胞菌均对氨苄西林、亚胺培南和头孢曲松的耐药性较高，而对环丙沙星和庆大

霉素的耐药性较低；而金黄色葡萄球菌和肠球菌属则对氨苄西林、青霉素 G 和克林霉素的耐药性较高，对万古霉素和替考拉宁的耐药性较低，临床医师在诊治中可参照该结果在未明确病原菌前给予经验治疗^[20,21]。

表 1 病原菌分布及构成比

Table 1 Distribution and constituent ratio of pathogenic bacteria

Pathogenic bacteria	n	Constituent ratio(%)
Gram negative bacteria	54	76.06
<i>Escherichia coli</i>	22	30.99
<i>Klebsiella pneumoniae</i>	15	21.13
<i>Pseudomonas aeruginosa</i>	10	14.08
<i>Acinetobacter baumannii</i>	4	5.63
<i>Enterobacter cloacae</i>	3	4.23
Gram positive bacteria	13	18.31
<i>Staphylococcus aureus</i>	8	11.26
<i>Enterococcus</i>	3	4.23
<i>Streptococcus pneumoniae</i>	1	1.41
<i>Staphylococcus epidermidis</i>	1	1.41
Fungus	4	5.64
<i>Candida albicans</i>	3	4.23
<i>Candida glabrata</i>	1	1.41
Total	71	100.00

表 2 主要革兰阴性菌耐药率分析

Table 2 Analysis of drug resistance rate of main gram negative bacteria

Antiseptic drugs	<i>Escherichia coli</i> (n=22)		<i>Klebsiella pneumoniae</i> (n=15)		<i>Pseudomonas aeruginosa</i> (n=10)	
	n	Drug resistance rate(%)	n	Drug resistance rate(%)	n	Drug resistance rate(%)
Ampicillin	22	100.00	14	93.33	10	100.00
Imipenem	20	90.91	12	80.00	9	90.00
Meropenem	16	72.73	13	86.67	7	70.00
Aztreonam	13	59.09	12	80.00	6	60.00
Ceftriaxone	21	95.45	15	100.00	9	90.00
Cefepime	10	45.45	9	60.00	8	80.00
Levofloxacin	4	18.18	3	20.00	1	10.00
Ciprofloxacin	6	27.27	0	0.00	4	40.00
Gentamicin	2	9.09	0	0.00	2	20.00

纳米银是一种粒径为 25 纳米左右的银微粒，纳米银抗菌凝胶即是单质银经高科技纳米技术制作成银，后吸附于载体上制备而成^[22-24]。与其他治疗方法相比，纳米银抗菌凝胶具备较强的抗菌活性，可通过与病原菌中的酶蛋白相互作用，致使酶失去活性，可达到杀菌的目的^[25,26]。纳米银抗菌凝胶不仅可以杀灭大部分的革兰阳性、阴性菌，还可收敛渗液、消炎并促进创面愈合^[27,28]。本次研究中，通过对比分析纳米银抗菌凝胶联合安普贴疗法和常规安普贴疗法的疗效，发现实验组治疗总有效率为 95.00%，高于对照组的 77.50%，差异有统计学意义($P<0.05$)，证明纳米银抗菌凝胶可提高 II 期压疮感染治疗效果，促进创面

愈合。除了药物治疗，医务人员还需做好患者的膳食指导，改善其营养状况，根据患者身体恢复的具体状况，补充相应的蛋白质、维生素，嘱咐患者多饮水，稳定新陈代谢。此外，还需指导患者休息时注意变换体位，勤翻身，减轻患者贴床区域承受的压力与摩擦力。同时配合做好床位的清洁处理，保障床铺的整洁、干燥，勤更换床单，适当做抬臂运动^[29,30]。

综上所述，心内科住院并发 II 期压疮感染患者病原菌主要以革兰阴性菌为主，革兰阳性菌对万古霉素和替考拉宁的耐药率较低，患者辅以纳米银抗菌凝胶治疗效果理想，可借鉴应用。

表 3 主要革兰阳性菌耐药率分析

Table 3 Analysis of drug resistance rate of main gram positive bacteria

Antiseptic drugs	Staphylococcus aureus(n=8)		Enterococcus(n=3)	
	n	Drug resistance rate(%)	n	Drug resistance rate(%)
Penicillin G	7	87.50	2	66.67
Ampicillin	8	100.00	3	100.00
Tetracycline	7	87.50	3	100.00
Erythromycin	6	75.00	1	33.33
Clindamycin	5	62.50	2	66.67
Levofloxacin	2	25.00	1	33.33
Ciprofloxacin	4	50.00	2	66.67
Vancomycin	0	0.00	0	0.00
Teicoplanin	0	0.00	0	0.00

表 4 两组治疗效果比较[n(%)]

Table 4 Comparison of therapeutic effect between the two groups[n(%)]

Groups	n	Cure	Effective	Invalid	Total effective rate
Experimental group	40	18(45.00)	20(50.00)	2(5.00)	38(95.00)
Control group	40	10(25.00)	21(52.50)	9(22.50)	31(77.50)
χ^2					5.165
P					0.023

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