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2017-2019 年某某医院 ICU 患者痰液病原菌分布及耐药性分析 *

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摘要 目的:探究医院 ICU 患者痰液病原菌分布,并就其耐药性进行分析,以期为临床经验性选择抗生素治疗提供必要的细菌学依据。**方法:**选择 2017 年 1 月至 2019 年 12 月于北京中医医院顺义医院入住 ICU 的 84 例患者为研究对象,采集其痰液标本,并实施细菌学培养和药敏学试验。**结果:**(1)84 例患者合计提取菌株 91 种,其中 G⁻ 杆菌 45 种,占比 49.45 %, G⁺ 菌 36 种,占比 39.56 %,真菌 10 种,占比 10.99 %;(2)分析显示亚胺培南对 G⁻ 杆菌的敏感性较好,万古霉素对 G⁺ 菌的敏感性较好,尚未发现耐万古霉素的肠球菌和葡萄球菌出现。**结论:**ICU 患者痰液病原菌类型较多,其中以 G⁻ 杆菌为主,病原菌呈现多重耐药性,亚胺培南对 G⁻ 杆菌敏感性较好,万古霉素对 G⁺ 菌敏感性较好。

关键词:ICU 患者;痰液;病原菌分布;耐药性

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Distribution and Drug Resistance Analysis of Sputum Pathogens in ICU Patients in a Hospital from 2017 to 2019*

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ABSTRACT Objective: To explore the distribution of pathogenic bacteria in sputum of patients with ICU in hospitals and analyze their drug resistance in order to provide the necessary bacteriological basis for clinical empirical antibiotic selection. **Methods:** Eighty-four patients who were admitted to an ICU in a certain hospital from January 2017 to December 2019 were selected as the research subjects, sputum samples were collected, and bacteriological culture and drug sensitivity tests were performed. **Results:** (1) A total of 91 strains were extracted from 84 patients, of which 45 were G⁻ bacteria, accounting for 49.45 %, 36 were G⁺ bacteria, accounting for 39.56 %, and 10 were fungi, accounting for 10.99 %. (2) Analysis showed that Imipenem has better sensitivity to G⁻ bacteria, and vancomycin has better sensitivity to G⁺ bacteria. Vancomycin-resistant *enterococci* and *staphylococci* have not been found. **Conclusion:** There are many types of pathogenic bacteria in sputum of ICU patients. Among them, G⁻ bacteria are the main pathogens. The pathogens show multiple drug resistance. Imipenem has good sensitivity to G⁻ bacteria and vancomycin has good sensitivity to G⁺.

Key words: ICU patients; Sputum; Pathogen distribution; Drug resistance

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前言

重症监护病房 (ICU), 是能够为重症或昏迷患者提供治疗、护理的隔离场所,在挽救危急重症患者生命、改善此类患者预后方面具有重要意义^[1,2]。临床实践发现,由于 ICU 患者多合并慢性基础性疾病,病情较为复杂,同时其免疫功能较低,病理生理情况较为紊乱,加之救治过程中需要采取诸如气管切开、气管插管、机械通气等多种侵入性操作,因而更容易被病原菌感染发生炎症反应^[3-5]。有调研数据显示,住院患者发生全身性感染的几率为 1.3 %,严重感染病死率可达 30 %~50 %,甚至高达 80 %,而 ICU 救治患者约有 51 %在入住时就已出现感染症状,入住 7 天后发生感染的几率更是高达 70 %^[6,7]。感染的出现

会延长患者救治时间,甚至加重患者原有病情,增加患者经济负担,降低病床周转率,导致医疗资源的浪费,对 ICU 患者病原菌类型探究以及耐药性分析能够为后期治疗的开展提供必要理论依据,具有重要意义^[8,9]。本文作者通过研究表明,ICU 患者痰液病原菌类型较多,其中以 G⁻ 杆菌为主,病原菌呈现多重耐药性,亚胺培南对 G⁻ 杆菌敏感性较好,万古霉素对 G⁺ 菌敏感性较好,现详述如下。

1 资料与方法

1.1 一般资料

选择 2017 年 1 月至 2019 年 12 月于北京中医医院顺义医院入住 ICU 的 84 例患者为研究对象,其中男性 51 例,女性 33

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例,年龄 29~78 岁,平均年龄(40.28± 4.21)岁,84 例患者中呼吸系统疾病患者 30 例(分别为肺癌 12 例,支气管扩张 20 例,COPD 8 例),神经系统患者 21 例(分别为脑梗塞 5 例,脑出血 4 例,颅内肿瘤 4 例,重症肌无力 8 例),循环系统患者 19 例(分别为冠心病 10 例,高血压病 9 例),消化系统 14 例(分别为重症肝炎 5 例,重症胰腺炎 5 例,胃肠道肿瘤 4 例)。

纳入标准:(1)入组患者均出现发热、咳嗽、粘痰、肺部湿罗音等呼吸系统感染症状;(2)病历资料齐全;(3)调研报医院伦理学会批准实施;(4)患者家属签署知情同意书;

排除标准:(1)合并精神疾病患者;(2)并发先天性免疫系统疾病患者。

1.2 干预方法

使用一次性无菌吸痰管或纤维支气管气管镜防污染毛刷,由入组患者的人工气道或气管导管中采集痰液样本,将样本置于密闭无菌容器中并送检验科进行细菌培养,在细菌室内对采集的合格痰液样本中病原菌实施分离、培养以及药敏试验。

1.3 观察指标及评测标准

对采集的痰液样本中连续 2 次培养出来的优势菌种可确定为病原菌,病原菌的鉴定及药敏采用美国 BD 公司 phoenix 100 全自动细菌鉴定/药敏系统实施,实验结果参照美国临床实验室标准委员会(NCCLS)(2002 年版)^[10]标准实施判定。

2 结果

2.1 入组对象痰液样本细菌学培养结果分析

经分析发现,84 例患者合计提取菌株 91 种,其中 G- 杆菌 45 种,占比 49.45 %,G⁺ 菌 36 种,占比 39.56 %,真菌 10 种,占比 10.99 %;G- 杆菌中以铜绿假单胞杆菌占比最高,达 G- 杆菌中的 31.11 %,其次为大肠杆菌,占比达 22.22 %,再次为肺炎克雷伯菌,占比 13.33 %;G⁺ 菌中以耐甲氧西林金黄色葡萄球菌占比最高,达 41.67 %,其次为耐甲氧西林表皮葡萄球菌,占比达 27.78 %,再次为肠球菌类,占比达 20.00 %;真菌中白色念珠菌占比最高,达 50.00 %;具体数据如表 1 所示。

表 1 入组对象痰液标本细菌学培养结果
Table 1 Bacterial culture results of sputum specimens

Pathogenic bacteria		Number of strains	Percentage(%)
G ⁻ bacteria	Enterobacter cloacae	3	3.30
	<i>E.coli</i>	10	10.99
	<i>Klebsiella pneumoniae</i>	6	6.59
	<i>Krebs</i>	0	0.00
	<i>Pseudomonas pitii</i>	2	2.20
	<i>Pseudomonas aeruginosa</i>	14	15.38
	<i>Stenotrophomonas maltophilia</i>	4	4.40
	<i>Acinetobacter reesei</i>	0	0.00
	<i>Enterobacter aerogenes</i>	2	2.20
	<i>Acinetobacter baumannii</i>	4	4.40
	<i>Methicillin-resistant</i>	15	16.48
	<i>Staphylococcus aureus</i>	10	10.98
	<i>Methicillin-resistant</i>	6	6.59
	<i>Staphylococcus epidermidis</i>	1	1.10
G ⁺ bacteria	<i>Enterococci</i>	2	2.20
	<i>Streptococcus</i>	2	2.20
	<i>Other Staphylococci</i>	2	2.20
	<i>Group D Non-Enterococcus</i>	2	2.20
	<i>Corynebacterium</i>	0	0.00
	<i>Candida albicans</i>	5	5.49
	<i>Other Candida</i>	4	4.40
	<i>Mucor</i>	1	1.10
	Total	91	100.00

2.2 入组对象痰液样本中 G- 杆菌耐药性分析

经药敏试验分析发现,多数 G- 杆菌存在多重耐药现象,其中铜绿假单胞杆菌对氨苄西林、头孢唑林、环丙沙星等均耐药,

产气肠杆菌对舒普深、复达欣、丁胺卡那、氨苄西林、头孢唑林、环丙沙星、复方新诺明、庆大霉素菌耐药等,具体数据如表 2 所示。

表 2 G⁻ 杆菌耐药情况分析Table 2 Analysis of G⁻ bacteria resistance

Pathogenic bacteria	n	A	B	C	D	E	F	G	H	I
<i>Enterobacter cloacae</i>	2	0	0	0	0	-	1	0	0	1
<i>E.coli</i>	9	3	5	0	0	3	9	6	3	6
<i>Klebsiella pneumoniae</i>	6	3	4	0	0	6	6	4	3	6
<i>Pseudomonas pitii</i>	1	0	1	1	0	1	1	1	1	1
<i>Pseudomonas aeruginosa</i>	14	0	0	0	0	14	14	14	0	10
<i>Stenotrophomonas maltophilia</i>	4	2	2	0	4	4	4	2	2	4
<i>Enterobacter aerogenes</i>	2	2	2	2	0	2	2	2	2	2
<i>Acinetobacter baumannii</i>	4	4	4	0	0	4	4	4	4	4

Note: A Shupushen, B Fudaxin, C Ambuta, D Imipenem, E Ampicillin, F Cefazolin, G Ciprofloxacin, H Compound Xinuomin, I Gentamycin.

2.3 入组对象痰液样本中 G⁺ 菌耐药情况分析

分析显示, G⁺ 菌同样存在明显的多重耐药情况, 其中金黄色葡萄球菌对亚胺培南、特治星、氨苄西林、苯唑青霉素、红霉

素、青霉素等均耐药, 表皮葡萄球菌对亚胺培南、特治星、复方新诺明、氨苄西林、苯唑青霉素、红霉素、青霉素等均耐药, 具体数据如表 3 所示。

表 3 G⁺ 菌耐药情况分析Table 3 Analysis of drug resistance of G⁺ bacteria

Pathogenic bacteria	n	A	B	C	D	E	F	G	H	I
<i>Staphylococcus aureus</i>	15	0	0	15	15	12	15	15	15	15
<i>Staphylococcus epidermidis</i>	10	0	0	10	10	10	10	10	10	10
<i>Enterococci</i>	7	0	0	5	5	6	7	7	7	7
<i>Streptococcus</i>	1	0	0	1	1	1	1	1	1	1
Other <i>Staphylococci</i>	2	0	0	2	2	2	2	2	2	2
Group D Non-Enterococcus	2	0	0	2	2	2	2	2	2	2

Note: A vancomycin, B teicoplanin, C imipenem, D Tezhixing, E compound sinomine, F ampicillin, G oxacillin, H erythromycin, I penicillin.

3 讨论

重症监护病房(ICU)是医院收治和抢救急危重症患者的特殊场所, 其收治的患者一般存在病情危重、病情复杂、病情发展迅速等特点, 随着近些年我国社会老龄化趋势的逐渐显现以及各类交通建筑事故发生率的提高, ICU 已成为医院救治危重症患者重要科室之一^[11,12]。有研究指出, ICU 收治的患者多会合并较多的基础性疾病, 同时受病情影响, 在病理生理紊乱、老龄化、长期卧床、侵入性操作、环境因素等的作用下, 患者发生院内感染的几率明显高于其他科室^[13,14]。感染的出现则延长患者的住院治疗时间, 降低病床周转率, 导致医疗资源的浪费, 重则诱发多系统、多器官的功能衰竭进而危及患者生命健康, 因而建议及早实施治疗^[15]。

临床实践指出, 随着近些年广谱抗生素在临床上的广泛应用以及抗生素滥用事例的不断发生, 各类细菌对抗生素的耐药性情况日趋严重, 目前细菌耐药已经成为全球范围内引起医务工作者高度重视的公共卫生问题之一^[16,17]。近十年来, 院内感染占据感染事件的比例有逐年递增趋势, 目前已成为导致住院患者死亡的主要原因之一, 而 ICU 病房患者感染率和病菌耐药性均明显高于普通病房。世界卫生组织研究指出, 抗生素的不

合理应用是院内感染发生的重要原因, 数据分析抗生素的预防性应用可占总体抗生素应用量的 30%~40%, 另有研究指出西方发达国家抗生素用量约占所有药品的 10% 左右, 而我国则高达 30%^[18]。不合理用药催生了多重耐药菌、泛耐药菌甚至 " 超级细菌 " 的产生, 这大大增加了感染治疗的难度, 同时也明显提高了 ICU 患者感染死亡率^[19,20]。

对 ICU 患者病原菌分布及耐药性的分析是治疗开展的重要前提, 如果在未了解病原菌分布的情况下就开展抗生素治疗, 这无疑会进一步加强病菌的耐药性, 增加治疗难度^[21,22]。本文作者通过对 2017 年至 2019 年间我院 ICU 患者痰液病原菌实施细菌培养并分型发现, 84 例患者合计提取菌株 91 种, 其中 G⁻ 杆菌 45 种, 占比 49.45%, G⁺ 菌 36 种, 占比 39.56%, 真菌 10 种, 占比 10.99%。这提示 G⁻ 杆菌在感染中占比较高, 与学者 Barillova Petra 的调研结果一致, 该学者的研究显示, 铜绿假单胞杆菌、肺炎克雷伯菌感染占比分别达到 22.28% 和 20.30%, 远高于其他菌种, 而诸如产气肠杆菌、奇异变形杆菌等的感染占比就较低^[23]。相关研究通过对 827 株病原菌的分析发现, G⁻ 杆菌为 478 株, 占比为 58.2%, G⁺ 菌 272 株, 占比 33.1%, 真菌 72 株, 占比 8.8%, 与本文研究结果类似^[24,25]。

本研究还就 ICU 患者痰液病原菌的耐药性进行了分析, 结

果显示,ICU 患者痰液病原菌的耐药性较为明显,多数 G⁻ 杆菌存在多重耐药现象,其中铜绿假单胞杆菌对氨苄西林、头孢唑林、环丙沙星等均耐药,产气肠杆菌对舒普深、复达欣、丁胺卡那、氨苄西林、头孢唑林、环丙沙星、复方新诺明、庆大霉素菌耐药等。G⁺ 菌同样存在较为明显的多重耐药情况,其中金黄色葡萄球菌对亚胺培南、特治星、氨苄西林、苯唑青霉素、红霉素、青霉素等均耐药,表皮葡萄球菌对亚胺培南、特治星、复方新诺明、氨苄西林、苯唑青霉素、红霉素、青霉素等均耐药^[26,27]。这与学者 Ajithdoss D K^[28]等的研究结果类似,该学者通过对 227 株病原菌的分析发现,革兰氏阴性菌和阳性菌分别占比 53.74 % 和 40.97 %,而革兰氏阴性菌中的代表菌株对阿米卡星、妥布霉素、呋喃妥因、哌拉西林、头孢哌酮等耐药性较低,革兰氏阳性菌则对呋喃妥因、利福平、利奈唑胺和万古霉素的耐药性较低,有学者^[29,30]的调研则指出,革兰氏阴性菌对于头孢曲松、左氧氟沙星、头孢吡肟、头孢他啶、庆大霉素、氨曲南均具有较高的耐药性,而对阿米卡星、哌拉西林的耐药性较低,革兰氏阳性菌对青霉素、红霉素、头孢唑林、左氧氟沙星、庆大霉素具有较高的耐药性,但对于利福平、万古霉素的耐药性较差。本文作者分析认为,对病原菌耐药性的分析应作为临床抗生素治疗的基础,这样才能够在保证不增加病菌耐药性的同时保证治疗效果。

综上所述,ICU 患者痰液病原菌类型较多,其中以 G⁻ 杆菌为主,病原菌呈现多重耐药性,亚胺培南对 G⁻ 杆菌敏感性较好,万古霉素对 G⁺ 菌敏感性较好

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