

血清 PCT, SOD 水平检测 在腹膜透析相关性腹膜炎中的临床价值*

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摘要:目的 探讨血清降钙素原(PCT)和超氧化物歧化酶(SOD)水平与腹膜透析相关性腹膜炎(peritoneal dialysis, PD)的相关性及其检测的临床价值。方法 ①选取铜川市人民医院2016年1月~2018年12月收治的123例腹膜透析患者作为研究对象,其中发生PD 48例(腹膜炎组),未发生PD 75例(无腹膜炎组),选取同期53例非透析患者人群作为对照组,观察PCT和SOD水平;②将研究对象按PCT和SOD水平分层,观察PCT和SOD水平与PD的相关性。结果 腹膜炎组、无腹膜炎组和对照组的PCT水平分别为 2.249 ± 0.671 , 0.833 ± 0.443 和 0.038 ± 0.004 ng/ml,各组之间差异均有统计学意义($F=475.721$, $P=0.000$);腹膜炎组、无腹膜炎组和对照组的SOD水平分别为 74.6 ± 15.5 , 95.2 ± 20.0 和 136.1 ± 21.8 U/ml,各组之间差异均有统计学意义($F=52.276$, $P=0.000$);腹膜炎发生与PCT水平呈正相关($r^2=0.9721$, $P=0.021$),与SOD水平呈负相关($r^2=-0.8756$, $P=0.037$)。结论 PCT水平越高, SOD水平越低, 则腹膜炎的发生风险越大。PCT和SOD水平能够反映PD的生理病理过程,对PD的诊断和评估具有一定的临床价值。

关键词:腹膜透析相关性腹膜炎;降钙素原;超氧化物歧化酶

中图分类号:R656.41;R446.112 文献标志码:A 文章编号:1671-7414(2019)04-116-04

doi:10.3969/j.issn.1671-7414.2019.04.028

Clinical Value of Serum PCT and SOD in Detection of Peritoneal Dialysis

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Abstract: Objective To investigate the correlation of serum procalcitonin (PCT) and superoxide dismutase (SOD) levels with peritoneal dialysis (PD) and its clinical value. Methods ①123 cases of peritoneal dialysis patients were selected as the research object, the PD 48 patients with peritonitis (peritonitis group), 75 cases without PD is no peritonitis (no peritonitis group), the selection of the 53 patients with non dialysis population for the same period as the blank control group, all patients PCT and SOD testing, observation SOD levels of PCT and its relationship with PD. ②Dialysis patients were stratified according to PCT and SOD levels to observe the correlation between PCT and SOD levels and PD. Results The PCT level of the peritonitis group (2.249 ± 0.671 ng/ml) was higher than that of the peritonitis group (0.833 ± 0.443 ng/ml) and the control group (0.038 ± 0.004 ng/ml), and the difference was statistically significant ($F=475.721$, $P=0.000$). The SOD level of the peritonitis group (74.6 ± 15.5 U/ml) was lower than that of the peritonitis group (95.2 ± 20.0 U/ml) and the control group (136.1 ± 21.8 U/ml), and the difference was statistically significant ($F=52.276$, $P=0.000$). Peritonitis was positively correlated with PCT level ($r^2=0.9721$, $P=0.021$) and negatively correlated with SOD level ($r^2=-0.8756$, $P=0.037$). Conclusion With the increase of PCT level, the risk of peritonitis increased, which was negatively correlated with SOD level. PCT and SOD levels can reflect the physiological and pathological process of PD, and have certain clinical value for the diagnosis and evaluation of PD.

Keywords: peritoneal dialysis; procalcitonin; superoxide dismutase

腹膜透析是治疗终末期肾脏病(end-stage kidney disease, ESRD)的主要肾脏替代方式之一,是利用腹膜作为透析膜的一种透析方式。但这项技术从发明起,就受到腹膜透析相关性腹膜炎(PD)的挑战,有研究表明PD会在一定程度上提高患者拔管及死亡的风险^[1],而PD的发生除与感染有关外,患者个体的氧化应激状态和微炎症因素也发挥了重要作用。降钙素原(PCT)是近年来新发现的细菌感染及病毒感染的早期标志物,在感染性疾病的诊断中敏感度及特异度较高^[2-3],是目前

临床上被广泛使用的炎症指标。超氧化物歧化酶(SOD)是反映人体氧化应激状态的一项指标,近些年来广泛开展。但PCT和SOD在PD人群中的联合应用报道较少。本文观察PCT和SOD在腹膜透析人群中的变化和相关性,分析PCT及SOD在PD诊断中的临床价值,以期临床有效预防PD提供依据。

1 材料与方法

1.1 研究对象 选取铜川市人民医院2016年1月~2018年12月收治的123例腹膜透析患者作

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为研究对象。纳入标准:所有患者均符合2016年国际腹膜透析协会《腹膜炎预防和治疗指南》^[4]中的诊断标准;排除标准:①乙型肝炎病毒、丙型肝炎病毒等其他病毒感染;②腹膜外其他部位感染;③其他严重慢性消耗性疾病及恶性肿瘤;④入选前3个月内有重大手术或创伤史、输血史等。将研究对象分为腹膜炎组48例,其中男性29例,女性19例,年龄21~63岁,平均年龄 45 ± 9.6 岁;无腹膜炎组75例,其中男性44例,女性31例,年龄20~65岁,平均年龄 46 ± 8.8 岁;选取同期非透析患者人群53例作为正常对照组,其中男性32例,女性21例,年龄18~67岁,平均年龄 44 ± 9.2 岁。腹膜炎组、无腹膜炎组与对照组的基线资料比较,差异均无统计学意义($P > 0.05$),具有可比性。

1.2 试剂与仪器 PCT采用德国罗氏E601全自动电化学发光免疫分析仪配套试剂检测;SOD采用日立7180全自动生化分析仪,福建福缘公司SOD试剂检测。

1.3 研究方法 每例患者于当次透析前空腹采集

静脉血3 ml于促凝剂负压管中,静置30 min后,3 000 r/min离心5 min分离血清,检测PCT水平和SOD水平,4 h内完成检测。均严格按照仪器和试剂SOP文件进行操作。比较三组患者血清PCT和SOD水平;将研究对象按照PCT和SOD水平分层,观察其与PD的相关性。

1.4 统计学分析 采用SPSS19.0软件进行。组间差异检验先进行方差齐性检验,再采用 t 检验比较,正态分布的数据用均数 \pm 标准差($\bar{x} \pm s$)表示,非正态分布的数据采用秩和检验,两个变量间相关性分析采用pearson相关分析。以 $P < 0.05$ 为差异有统计学意义。

2 结果

1.1 腹膜炎组、无腹膜炎组与对照组血清PCT、SOD水平比较 见表1。腹膜炎组的PCT水平高于无腹膜炎组和对照组,差异有统计学意义($F = 475.721, P = 0.000$);腹膜炎组的SOD水平低于无腹膜炎组和对照组,差异有统计学意义($F = 52.276, P = 0.000$)。

表1 三组人群血清PCT和SOD水平比较($\bar{x} \pm s$)

项 目	腹膜炎组 ($n=48$)	无腹膜炎组 ($n=75$)	对照组 ($n=53$)	F	P	腹膜炎组 vs 无腹膜炎组		无腹膜炎组 vs 对照组	
						t	P	t	P
PCT(ng/ml)	2.249 ± 0.671	0.833 ± 0.143	0.038 ± 0.004	475.721	0.000	17.696	0.000	24.000	0.000
SOD(U/ml)	74.6 ± 15.5	95.2 ± 20.0	116.1 ± 21.8	52.276	0.000	6.062	0.022	5.610	0.035

2.2 PCT和SOD水平与腹膜炎的相关性分析

见表2。在腹膜透析人群中,PCT水平与腹膜炎的发生呈正相关($r^2 = 0.9721, P = 0.027$),PCT水平越高,腹膜炎的发生率越高;SOD水平与腹膜炎的发生呈负相关($r^2 = -0.8756, P = 0.037$),SOD水平越低,腹膜炎的发生率越高。

表2 血清PCT、SOD水平与PD的相关性分析

项 目	水平	腹膜炎组 ($n=48$)	无腹膜炎组 ($n=75$)	r^2	P
PCT(ng/ml)	<0.5	1	4	0.9721	0.027
	$0.5 \sim 2$	12	55		
	$2 \sim 5$	32	16		
	>5	3	0		
SOD(U/ml)	<90	25	2	-0.8756	0.031
	$90 \sim 110$	13	29		
	$110 \sim 130$	8	32		
	>130	2	12		

3 讨论 目前对ESRD患者的一体化治疗,提倡首选腹膜透析,但PD仍是腹膜透析最常见最严重的并发症,尤其是在置管后的前3~6个月,患者有

很高风险发生PD^[5]。发生PD的主要机制为透析交换过程中细菌被带入腹腔所导致。革兰阴性菌导致的PD病情更为严重,预后更差^[6-8]。因此对PD进行早期诊断,尽早采取预防措施,是改善腹膜透析结局的重要措施。近年来有研究表明,腹透液中的白细胞、血清CRP、血清PCT、清蛋白、细胞因子、致病菌等可以对PD的预后进行预测^[9]。谢平等^[10]研究发现,随着腹膜透析时间延长,机体内环境稳态受到破坏,逐步出现全身炎症反应、氧化应激反应等,腹膜透析期间内环境稳态发生的变化与PD的发生具有直接关系。因此本文选择判断细菌感染的最佳指标之一的PCT及能够有效反映腹膜透析人群的氧化应激状态的SOD,观察其在不同人群中的水平变化,分析其与PD发生的相关性,以期对PD的诊断与预防提供支持。

当机体存在严重细菌感染时血清中PCT水平升高,在革兰阴性菌感染时,PCT升高尤为显著。陶瑾等^[11]对60例腹膜透析患者进行研究,感染组的血清PCT水平显著高于未感染组及健康对照组,差异有统计学意义($P < 0.05$),华云旗等^[12]也有类似的报道。本文的研究显示,在腹膜透析人群

中,当PCT水平在2~5 ng/ml之间时,PD的发生率为66.7%;当PCT水平大于5 ng/ml时,PD的发生率为100%。PCT在感染后6 h左右即可开始升高,因此临床可在此时以后动态监测PCT水平,以评估PD的发生风险。尤其是当PCT水平在2~5 ng/ml之间时,仍有33.3%的腹膜透析人群未发生PD,因此,对于这部分患者,动态监测尤为重要。而本文的研究结果中,无PD的腹膜透析人群,其PCT水平也高于正常对照组,提示腹膜透析人群可能存在微炎症状态。血清PCT水平的动态变化可以预测PD发生的风险,可作为该病的早期特异性指标。

微炎症状态由HOSHINO等^[13-14]提出,并逐渐被广大学者认可。目前认为微炎症状态是单核-巨噬细胞系统持续活化所导致,是机体内环境紊乱的重要标志。腹膜炎的发生除与感染有关外,患者个体的氧化应激状态也发挥了重要作用。而SOD是生物体内氧自由基的天然清除剂,是机体主要的抗氧化酶,具有清除氧自由基、保护生物膜、维持细胞正常生理功能,起到抗氧化毒性的作用。一项在血液透析患者中的研究显示,SOD在血液透析3个月即开始下降,6个月与3个月时比较进一步下降^[15]。本研究显示,在腹膜透析人群中,当SOD水平在90~110 U/ml之间时,PD的发生率为31.0%;当SOD水平小于90 U/ml时,PD的发生率可达92.6%。SOD也可作为预测PD的早期标志物之一。

综上所述,PD患者存在一定程度的微炎症和氧化应激增强。微炎症、氧化应激均参与并促进机体内环境稳态的恶化,在PD的发生和发展中发挥重要作用,是多种病理损伤的共同途径。研究腹膜透析患者血清中PCT和SOD水平的变化,有助于对腹膜透析患者的微炎症状态和氧化应激状态进行早期准确评价,对临床积极采取措施,有效预防PD的发生具有重要的临床价值。在后续研究中应绘制受试者工作特征曲线(ROC曲线),计算不同水平PCT和SOD对PD诊断的敏感度和特异度,筛选出最佳诊断临界点。同时还可以增加其他炎症指标和氧化应激指标,进行多指标研究探讨。

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- 收稿日期: 2019-03-13
修回日期: 2019-04-21
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- 收稿日期: 2019-04-03
修回日期: 2019-04-28