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全身免疫炎症指数对类风湿关节炎的诊断价值

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摘要:**目的** 探讨全身免疫炎症指数(SII)对类风湿关节炎(RA)的诊断价值。**方法** 选取 2021 年 1 月至 2022 年 12 月该院收治的 50 例 RA 患者作为观察组,另选取同期该院 50 例健康体检者作为对照组。采用免疫比浊法检测两组血清类风湿因子(RF)、抗环瓜氨酸肽(CCP)抗体水平。收集白细胞计数(WBC)、中性粒细胞计数(N)、血小板计数(PLT)、淋巴细胞计数(L)、平均血小板体积(MPV)水平,计算 SII($PLT \times N/L$)、PLR(PLT/L)、NLR(N/L)、PNR(PLT/N)和 PWR(PLT/WBC)。比较两组各项指标的差异。采用 Pearson 相关分析血细胞相关指标与 RF、抗 CCP 抗体的相关性。采用受试者工作特征(ROC)曲线分析 SII 对 RA 的诊断价值。**结果** 观察组血清 RF、抗 CCP 抗体水平及 PLR、SII、NLR 均高于对照组,L 低于对照组,差异均有统计学意义($P < 0.05$);两组 WBC、N、PLT、MPV、PNR 及 PWR 比较,差异均无统计学意义($P > 0.05$)。SII 与血清 RF、抗 CCP 抗体水平均呈正相关($r = 0.441, 0.384, P < 0.05$),但相关性均较弱。ROC 曲线分析结果显示,SII 诊断 RA 的最佳截断值为 0.26,曲线下面积为 0.622,灵敏度为 64.0%,特异度为 62.0%。**结论** RA 患者 SII 高于健康者,并且与 RF、抗 CCP 抗体水平均呈正相关,动态监测其变化可为 RA 临床治疗方案的制订提供参考依据。

关键词: 类风湿关节炎; 全身免疫炎症指数; 类风湿因子; 抗环瓜氨酸肽抗体; 相关性

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The diagnostic value of systemic immune inflammation index in rheumatoid arthritis

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Abstract:**Objective** To investigate the diagnostic value of systemic immune-inflammation index (SII) for rheumatoid arthritis (RA). **Methods** A total of 50 RA patients admitted to the hospital from January 2021 to December 2022 were selected as the observation group, and 50 healthy people in the hospital during the same period were selected as the control group. The levels of rheumatoid factor (RF) and anti-cyclic citrullinated peptide (CCP) antibody were detected by immunoturbidimetry. The levels of white blood cell count (WBC), neutrophil count (N), platelet count (PLT), lymphocyte count (L) and mean platelet volume (MPV) were collected, and SII ($PLT \times N/L$), PLR (PLT/L), NLR (N/L), PNR (PLT/N) and PWR (PLT/WBC) were calculated. The differences of each index between the two groups were compared. Pearson correlation analysis was used to analyze the correlation between blood cell related indexes and RF, anti-CCP antibody. The receiver operating characteristic (ROC) curve was used to analyze the diagnostic value of SII for RA. **Results** The levels of serum RF, anti-CCP antibody, PLR, SII and NLR in the observation group were higher than those in the control group, and the L was lower than those in the control group, and the differences were statistically significant ($P < 0.05$). There was no significant difference in WBC, N, PLT, MPV, PNR and PWR between the two groups ($P > 0.05$). SII was positively correlated with serum RF and anti-CCP antibody levels ($r = 0.441, 0.384, P < 0.05$), but the correlations were weak. ROC curve analysis showed that the best cut-off value of SII for the diagnosis of RA was 0.26, the area under the curve was 0.622, the sensitivity was 64.0%, and the specificity was 62.0%. **Conclusion** SII in RA patients is higher than that in healthy people, and is positively correlated with RF and anti-CCP antibody levels. Dynamic monitoring of SII can provide a reference for the formulation of clinical treatment plans for RA.

Key words: rheumatoid arthritis; systemic immune inflammation index; rheumatoid factor; anti-cyclic citrullinated peptide antibody; relevance

类风湿关节炎(RA)属于慢性人体自身免疫性疾病,一般表现为患病关节及周围组织破坏、关节功能障碍等,且好发于中老年人^[1-2]。遗传、感染、性激素均是可能引起 RA 的致病因素^[3-4]。目前,RA 病因尚不十分明确,临床多采用抗风湿药物、非甾类抗炎药物、糖皮质激素、生物制剂等对症治疗。然而,由于 X 线片检查下关节腔变性的 RA 患者病情已处于中晚期,患者未得到及时有效治疗^[5],因此,寻找 RA 病情严重度的早期敏感预测指标仍是当前面临的重要问题。由于中性粒细胞计数(N)、淋巴细胞计数(L)和血小板计数(PLT)对各种生理和病理环境的敏感性较低,因此,血细胞比率作为疾病的诊断和预测指标的研究成为热点^[6]。全身免疫炎症指数(SII)作为一种新的基于免疫炎症的预后指标被提出^[7],其是基于 N、L 和 PLT 构建的,是在 NLR (N/L) 和 PLR (PLT/L)的基础上发展而来的,并显示出比 NLR、PLR 更好的疾病预测能力。有研究表明,SII 与多种疾病的发生和发展密切相关,如癌症、心血管疾病、炎症性疾病、肠易激综合征、卵巢早衰等。较高的 SII 可能意味着这些患者的炎症反应程度较重,预后较差。然而,关于 SII 对 RA 诊断价值的研究较少见,还需要进一步深入探讨。基于此,本研究探讨了 SII 在 RA 中的诊断价值,现报道如下。

1 资料与方法

1.1 一般资料 选取 2021 年 1 月至 2022 年 12 月本院收治的 50 例 RA 患者作为观察组,另选取同期本院 50 例健康体检者作为对照组。纳入标准:(1)符合 RA 的诊断^[8];(2)病情处于活动期,近 1 个月内未进行抗风湿、抗炎、免疫抑制剂等相关治疗。排除标准:(1)合并其他免疫系统、内分泌系统、血液系统病变;(2)存在心、肝、肺、肾等主要组织器官严重功能不全;(3)存在精神、认知、语言障碍;(4)伴有急、慢性感染性疾病;(5)其他病变引起的骨关节病变;(6)合并关

节畸形、骨折、肿瘤等。观察组中男 23 例,女 27 例;年龄 51~79 岁,平均(65.27±4.13)岁;病程 1~10 年,平均(5.45±2.36)年。对照组中男 29 例,女 21 例;年龄 49~78 岁,平均(67.21±7.13)岁。两组性别、年龄等一般资料比较,差异均无统计学意义($P>0.05$),具有可比性。所有研究对象均知情同意并签署知情同意书。本研究经本院医学伦理委员会与学术委员会审核批准(QZYE20240301-094)。

1.2 方法 (1)血清因子水平:采集 RA 患者入院第 1 天、健康体检者体检当天空腹外周静脉血 3 mL,以 3 500 r/min 离心 10 min 后分离上清液,采用免疫比浊法(日立 7600 全自动生化分析仪)检测血清类风湿因子(RF)、抗环瓜氨酸肽(CCP)抗体水平。(2)血细胞相关指标水平:采集 RA 患者入院第 1 天、健康体检者体检当天外周静脉血 3 mL,采用迈瑞 BC6800 血细胞自动分析仪检测白细胞计数(WBC)、N、PLT、L、平均血小板体积(MPV)等,计算 SII($PLT\times N/L$)、PLR(PLT/L)、NLR (N/L)、PNR (PLT/N)、PWR (PLT/WBC)等。

1.3 统计学处理 采用 SPSS22.0 统计软件进行数据分析处理。符合正态分布的计量资料以 $\bar{x}\pm s$ 表示,两组间比较采用独立样本 t 检验。采用 Pearson 相关对血细胞相关指标、SII 与 RF、抗 CCP 抗体的相关性进行分析。采用受试者工作特征(ROC)曲线分析 SII 对 RA 的诊断价值。以 $P<0.05$ 为差异有统计学意义。

2 结 果

2.1 两组 RF、抗 CCP 抗体水平及 SII、血细胞相关指标水平比较 观察组血清 RF、抗 CCP 抗体水平及 PLR、SII、NLR 均高于对照组,L 低于对照组,差异均有统计学意义($P<0.05$);两组 WBC、N、PLT、MPV、PNR 及 PWR 比较,差异均无统计学意义($P>0.05$)。见表 1。

表 1 两组 RF、抗 CCP 抗体水平及 SII、血细胞相关指标水平比较($\bar{x}\pm s$)

组别	<i>n</i>	SII	RF (U/mL)	抗 CCP 抗体(U/mL)	WBC($\times 10^9/L$)	N($\times 10^9/L$)	PLT($\times 10^9/L$)
对照组	50	520.27±340.57	14.97±10.24	21.10±14.91	6.40±1.44	3.84±1.20	245.56±53.86
观察组	50	758.22±634.65	94.38±91.99	141.23±87.90	5.86±2.38	3.82±2.12	238.38±81.40
<i>t</i>		-2.336	-6.066	-9.526	1.376	0.040	0.520
<i>P</i>		0.022	<0.001	<0.001	0.175	0.968	0.604

组别	<i>n</i>	L($\times 10^9/L$)	MPV(fL)	PLR	NLR	PNR	PWR
对照组	50	2.06±0.62	10.11±1.04	131.28±53.92	2.09±1.25	68.11±19.86	39.58±9.49
观察组	50	1.42±0.51	9.97±2.14	182.14±72.65	3.04±2.14	71.86±27.80	43.07±12.85
<i>t</i>		5.615	0.405	-3.975	-2.702	-0.777	-1.548
<i>P</i>		<0.001	0.686	<0.001	0.008	0.439	0.125

2.2 SII 与 RF、抗 CCP 抗体的相关性 Pearson 相关分析结果显示, SII 与血清 RF、抗 CCP 抗体水平均呈正相关($r=0.441, 0.384, P<0.05$), 但相关性均较弱。

2.3 SII 对 RA 的诊断价值 以观察组为阳性样本, 对照组为阴性样本进行 ROC 曲线分析, 结果显示, SII 诊断 RA 的最佳截断值为 0.26, 曲线下面积为 0.622(95%CI: 0.509~0.734), 灵敏度为 64.0%, 特异度为 62.0%。

3 讨 论

RA 具有慢性、多滑膜关节炎、关节外病变及对称性等特点, 病情严重时会导致患者出现关节僵硬、畸形, 甚至是骨骼萎缩, 增加患者的致残风险^[9-10]。因此, 针对 RA 患者的早期诊断一直是临床医生关注的重点。RF 是最早用于 RA 实验室诊断的自身抗体指标^[11-13]。抗 CCP 抗体在 RA 早期即可表现出阳性, 具有较好的灵敏度和特异度, 阳性预测价值高。RF 与抗 CCP 抗体联合检测则具有较高的灵敏度和特异度^[14-16]。有研究表明, RA 患者血清 RF、抗 CCP 抗体水平均呈异常高表达状态^[17]。本研究发现, RA 患者血清 RF、抗 CCP 抗体水平高于对照组。然而, RA 患者的 RF 和抗 CCP 抗体并非有百分之百阳性率, 仍有部分患者, 尤其是疾病早期或某些特殊类型的 RA 患者 RF、抗 CCP 抗体可能为阴性, 导致漏诊。故寻找更为有效的指标指导 RA 早期诊断与早期治疗显得尤为重要。

RA 发病的关键因素为炎症反应, 其主要病理特征是以 L 浸润、渗出为主的血管炎症反应性滑膜炎, 临床表现为关节肿痛、变形、晨僵等, 多伴有体质量减轻、食欲不振、乏力等。基于血常规检测结果的炎症评估指标, 如 WBC、N、NLR、PLR 等被广泛用于评估炎症相关疾病的严重程度或临床结局^[18-21]。NLR、PLR 能提高对 RA 疾病活动度评估的特异度, 有利于临床医生更精确地掌握 RA 患者的病情^[22]。本研究也证实, RA 患者 PLR、NLR 均升高, L 降低。

众所周知, PLT、N、L 作为炎症细胞均参与了炎症反应, 以其为基础开发的综合指数(SII)可以全面评估炎症反应和免疫反应之间的平衡^[23-24]。SII 可作为评估炎症程度的有效指标, 如 SII 能有效鉴别急性胰腺炎的严重程度, 优于 NLR 和 PLR^[25]; 与轻度新型冠状病毒感染患者比较, 重度患者 SII 更高^[26]; SII 升高通常提示炎症反应加重和临床预后不佳, 具有相当高的灵敏度和特异度, 有助于临床诊断^[27]。有研究表明, SII 可成为评估肿瘤坏死因子- α 抑制剂治疗 RA 的临床疗效的重要指标^[28]。SII 在预测 RA 疾病活动度方面具有重要意义^[29], 本研究也证实, RA 患者 SII 处于高水平, 并且 SII 与 RF、抗 CCP 抗体水平均呈正

相关, 预测 SII 可能提高 RA 早期诊断的灵敏度。本研究 ROC 曲线分析结果显示, SII 是较好的 RA 诊断指标, 其灵敏度和特异度均为中等。由于 SII 具有简便、快速、无创等优点, 且能够全面反映机体的免疫炎症反应状态, 通过检测 SII 水平, 医生可以更好地了解 RA 患者的病情严重程度和疗效, 为患者制订更为精准的治疗方案, 其具有广泛的应用前景。

综上所述, RA 患者 SII 高于健康者, 并且与 RF、抗 CCP 抗体水平均呈正相关, 动态监测其变化有助于 RA 早期评估病情, 为临床准确诊治 RA 提供新思路和方法。然而, 本研究为单中心研究, 患者数量较少, 还需收集大量临床病例进行多中心研究加以验证。

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