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· 临床研究 ·

胃癌根治术后小肠梗阻伴发腹水的临床特征及血性腹水的诊断指标分析

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摘要

背景与目的: 肠梗阻作为临床常见急腹症, 其早期诊断与手术时机的选择直接影响患者预后。胃癌根治术后因消化道重建异常、肠系膜间隙形成及腹膜损伤等因素, 肠梗阻发生率较高, 且常伴随不同性状腹水。血性腹水多提示肠壁缺血性坏死, 但现有指标对血性腹水的早期识别效能有限。本研究探讨胃癌根治术后小肠梗阻伴发不同性状腹水患者的临床特征, 并重点分析对血性腹水有诊断价值的指标。

方法: 回顾性分析2010年1月—2021年12月江苏省江阴市人民医院胃肠外科收治的65例胃癌根治术后肠梗阻伴腹水患者的临床资料。按腹水性状分为浆液性腹水组($n=42$)、乳糜性腹水组($n=9$)和血性腹水组($n=14$)。比较三组患者相关临床指标以及术前白细胞(WBC)、中性粒细胞(NEU)、淋巴细胞和中性粒细胞/淋巴细胞比值(NLR)的差异, 并通过受试者工作特征(ROC)曲线分析炎症指标对小肠梗阻伴发血性腹水的临床诊断价值。

结果: 浆液性腹水组发病至入院时间明显高于乳糜性腹水组和血性腹水组($P<0.05$); 血性腹水组患者术后住院时间明显长于浆液性腹水组和乳糜性腹水组($P<0.05$); 血性腹水组中小肠切除的比例(6/14)明显高于乳糜性腹水组(0/9)和浆液性腹水组(7/42)($P<0.05$); 血性腹水组中复发比例(3/14)高于乳糜性腹水组(1/9)和浆液性腹水组(2/42), 但差异无统计学意义($P>0.05$)。在浆液性腹水组、乳糜性腹水组和血性腹水组中, WBC、NEU、NLR水平依次升高, 差异有统计学意义($P<0.05$)。ROC曲线结果显示, 与WBC和NEU比较, NLR预测肠梗阻伴血性腹水能力更高(曲线下面积: 0.84; 敏感度: 75%; 特异度: 85%)。

结论: NLR水平与胃癌根治术后肠梗阻伴发腹水的性状密切相关, 尤其在血性腹水患者中显著升高。相比传统炎症指标WBC和NEU, NLR在识别血性腹水方面具有更高的敏感度和特异度, 可作为预测肠壁缺血性坏死的有效辅助诊断指标, 为临床决策提供重要参考。此外, 血性腹水患者小肠切除率高、住院时间延长, 提示其临床预后较差。

关键词

胃肿瘤; 胃切除术; 小肠梗阻; 腹水; 中性粒细胞/淋巴细胞比值

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Clinical characteristics of small bowel obstruction with ascites after radical gastrectomy for gastric cancer and diagnostic markers for bloody ascites

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Abstract

Background and Aims: Intestinal obstruction is a common acute abdominal condition, and early diagnosis and timely surgical intervention are critical to patient prognosis. After radical gastrectomy for gastric cancer, due to abnormal digestive tract reconstruction, mesenteric space formation, and peritoneal injury, the incidence of intestinal obstruction is relatively high, often accompanied by ascites of varying characteristics. Bloody ascites usually suggest intestinal wall ischemia and necrosis; however, current clinical indicators have limited effectiveness in the early identification of this condition. This study was performed to investigate the clinical characteristics of postoperative small bowel obstruction with different types, with a particular focus on identifying markers with diagnostic values for bloody ascites.

Methods: The clinical data of 65 patients with small bowel obstruction and ascites after radical gastrectomy for gastric cancer admitted to the Department of Gastrointestinal Surgery of Jiangyin People's Hospital between January 2010 and December 2021 were retrospectively analyzed. Based on the ascites characteristics, patients were divided into serous ascites group ($n=42$), chylous ascites group ($n=9$), and bloody ascites group ($n=14$). Clinical parameters and preoperative white blood cell count (WBC), neutrophil count (NEU), lymphocyte count, and neutrophil-to-lymphocyte ratio (NLR) were compared among the groups. Receiver operating characteristic (ROC) curve analysis was used to evaluate the diagnostic value of inflammatory markers for bloody ascites.

Results: The time from onset to hospital admission was significantly longer in the serous ascites group compared to the chylous and bloody ascites groups ($P<0.05$). Postoperative hospital stay was significantly prolonged in the bloody ascites group compared to the other two groups ($P<0.05$). The rate of small bowel resection in the bloody ascites group (6/14) was significantly higher than that in the chylous ascites group (0/9) or serous ascites group (7/42) ($P<0.05$). Although the recurrence rate in the bloody ascites group (3/14) was higher than in the chylous ascites group (1/9) or serous (2/42) ascites group, the difference was not statistically significant ($P>0.05$). WBC, NEU, and NLR levels increased progressively from the serous to chylous to bloody ascites groups, with statistically significant differences ($P<0.05$). ROC curve analysis showed that NLR had superior diagnostic performance in predicting bloody ascites (AUC: 0.84; sensitivity: 75%; specificity: 85%) compared to WBC and NEU.

Conclusion: NLR is closely associated with the characteristics of ascites in patients with small bowel obstruction after radical gastrectomy and is significantly elevated in those with bloody ascites. Compared to traditional inflammatory markers WBC and NEU, NLR demonstrates higher sensitivity and specificity for identifying bloody ascites, making it a valuable adjunct diagnostic tool for predicting intestinal wall ischemia and necrosis. Furthermore, patients with bloody ascites showed higher rates of bowel resection and more extended hospital stays, suggesting a poorer clinical prognosis.

Key words

Stomach Neoplasms; Gastrectomy; Intestinal Obstruction; Ascites; Neutrophil-to-Lymphocyte Ratio

CLC number: R735.2

肠梗阻是腹部外科中常见的急腹症之一,可由多种原因引起,常见病因包括肠粘连、肿瘤、内疝及炎症性肠病等^[1-3]。文献^[4-5]报道,胃癌根治术后肠梗阻的发生率为5%~10%。由于该术式切除范围广泛、术野创面大,往往对腹膜和浆膜造成不同程度损伤,加之术后消化道重建可能形成异常的解剖间隙,因而易发生肠梗阻。若未能及时有效干预,可能进展为肠缺血性坏死、穿孔甚至脓毒症休克,严重威胁患者生命安全。

临床上,此类术后肠梗阻常伴有腹水,腹水多呈淡黄色(浆液性)或血性,而关于肠梗阻伴乳糜性腹水的病例,国内外报道相对较少^[6]。已有研究指出^[7-8],浆液性或乳糜性腹水多见于梗阻早期,若能及时手术解除梗阻,患者通常恢复良好,预后较佳。而血性腹水多与梗阻部位肠腔压力升高、肠道缺血及血管通透性增加有关,若不能早期识别,将延误最佳手术时机,影响患者预后^[9]。

此外,肠梗阻可诱发肠道毒素移位,激活白细胞(WBC)和中性粒细胞(NEU),引起多种炎症因子合成上调,进而引发全身炎症反应^[10-11]。NEU是反映炎症和感染程度的重要指标,淋巴细胞(LYM)则在适应性免疫中发挥关键抗感染作用,而中性粒细胞/淋巴细胞比值(NLR)作为炎症和免疫平衡的复合指标,已被广泛用于评估全身炎症状态^[12-13]。

本研究通过回顾性分析65例胃癌根治术后小肠梗阻患者的临床资料,探讨胃癌根治术后小肠梗阻伴发不同性状腹水患者的临床特征,以及炎症指标在不同颜色腹水中的表现差异,重点评估其对血性腹水的诊断价值,以期为临床术后并发症的早期识别与干预提供参考依据。

1 资料与方法

1.1 一般资料

研究对象回顾性分析2010年1月—2021年12月江苏省江阴市人民医院收治的65例胃癌根治术后肠梗阻伴腹水患者的临床资料。纳入标准:(1)胃癌根治术后;(2)有肠梗阻的症状和体征:患者以腹痛、腹胀、呕吐等为主要症状,查体有压痛,伴有或无反跳痛及肌紧张等体征;(3)影像学检查有典型肠梗阻表现;(4)腹水性状:术中腹水颜色包括淡黄色、乳糜样和血性腹水,非脓性;(5)均

行手术治疗。排除标准:(1)心脑血管、肝肾等主要器官严重功能障碍;(2)合并艾滋病、梅毒等传染病以及其他恶性肿瘤患者。

1.2 研究方法

收集患者性别、年龄、发病至入院时间、入院至术前时间、总住院时间、肠梗阻手术方式、合并基础病以及术后住院时间;所有患者入院后空腹抽取静脉EDTA-K2抗凝血2 mL及时颠倒混匀。采用全自动血液分析仪(Sysmex XN-9000)及配套试剂检测WBC、NEU、LYM等各指标参数;并根据腹水性状分为浆液性腹水组($n=42$)、乳糜性腹水组($n=9$)和血性腹水组($n=14$)。所有患者通过电话、门诊或微信随访,1年内再次发生肠梗阻入院者为复发。

1.3 统计学处理

采用SPSS 21.0对数据进行分析,符合正态分布资料采用均数 $\pm$ 标准差($\bar{x} \pm s$)表示,两组间比较采用 t 检验,多组间比较采用单因素方差分析检验;非正态分布资料采用中位数(四分位间距)[$M(IQR)$]表示,组间比较采用非参数检验;计数资料采用例数(百分比)[$n(\%)$]表示,组间比较采用 χ^2 。绘制受试者工作特征(ROC)曲线,分析WBC、NEU和NLR三者对胃癌术后肠梗阻伴发血性腹水患者的临床诊断价值,所有检验均以双侧 $P<0.05$ 为差异有统计学意义。

2 结果

2.1 一般临床资料比较

浆液性腹水组、乳糜性腹水组和血性腹水组在年龄、性别、发病至入院时间、入院至术前时间、总住院时间、原胃癌手术方式、肠梗阻类型以及合并基础病(如高血压、糖尿病、高脂血症、心脑血管疾病)等方面的差异均无统计学意义(均 $P>0.05$);浆液性腹水组发病至入院时间明显高于乳糜性腹水组和血性腹水组($P<0.05$);血性腹水组患者术后住院时间明显长于浆液性腹水组和乳糜性腹水组($P<0.05$)。此外,血性腹水组中小肠切除的比例(6/14)明显高于乳糜性腹水组(0/9)和浆液性腹水组(7/42),差异有统计学意义($P<0.05$);术后随访结果显示,血性腹水组中复发比例(3/14)高于乳糜性腹水组(1/9)和浆液性腹水组(2/42),但差异无统计学意义($P>0.05$)(表1)。

表 1 患者一般临床资料比较
Table 1 Comparison of the general clinical data of patients

指标	浆液性腹水组(n=42)	乳糜性腹水组(n=9)	血性腹水组(n=14)	$\chi^2/F/Z$	P
男性[n(%)]	35(83.3)	6(66.7)	14(100.0)	4.826	0.083
年龄(岁, $\bar{x}\pm s$)	65.43±10.54	65.44±9.18	65.71±6.71	0.005	0.995
发病至入院时间[h, $M(IQR)$]	24(12~144)	7(4~72)	19(5.5~36)	1.872	0.163
入院至术前时间[h, $M(IQR)$]	54.00(13.75~124.75)	7.00(2.50~39.50)	10.50(3.38~46.25)	10.435	0.005
总住院时间(d, $\bar{x}\pm s$)	15.52±6.76	13.33±6.22	17.50±8.95	0.930	0.400
术后住院时间(d, $\bar{x}\pm s$)	11.50±3.51	11.75±4.93	16.19±8.24	4.595	0.014
合并基础病[n(%)]	15(35.7)	4(44.4)	4(28.6)	0.703	0.748
肠梗阻类型[n(%)]					
粘连	35(83.3)	6(66.7)	10(71.4)	8.466	0.108
内疝	2(4.8)	1(11.1)	2(14.3)		
扭转	1(2.4)	2(22.2)	2(4.3)		
癌症肠梗阻	4(9.5)	0(0.0)	0(0.0)		
肠切除[n(%)]	7(16.7)	0(0.0)	6(42.9)	6.213	0.030
复发[n(%)]	2(4.8)	1(11.1)	3(21.4)	3.638	0.122
原手术方式[n(%)]					
Billroth I	22(52.4)	3(33.3)	4(28.6)	12.038	0.084
Billroth II	6(14.3)	0(0.0)	3(21.4)		
全胃切除 Roux-en-Y 吻合	12(28.6)	5(55.6)	3(21.4)		
远端胃大部切除 Roux-en-Y 吻合	0(0.0)	0(0.0)	2(14.3)		
不详	2(4.8)	1(11.1)	2(14.3)		

2.2 炎症指标比较

WBC、NEU 计数和 NLR 在浆液性腹水组、乳糜性腹水组和血性腹水组依次升高，且血性腹水组中 WBC、NEU 和 NLR 水平最高，与浆液性腹水组和乳糜性腹水组比较，差异有统计学意义 ($P<0.05$)。但浆液性腹水组和乳糜性腹水组两组之间 WBC、NEU 和 NLR 差异无统计学意义 (均 $P>0.05$) (表 2)。

2.3 炎症指标对胃癌术后肠梗阻伴血性腹水的诊断价值

ROC 曲线分析结果显示，NLR 诊断胃癌术后肠梗阻伴血性腹水患者效率高于 WBC 和 NEU，曲线下面积 (AUC) 分别为 0.84、0.74 和 0.77。NLR 最佳截断值为 8.77，敏感度为 74.51%，特异度为 85.71%。当 NLR、WBC 和 NEU 三者联合检测时，AUC 为 0.85、敏感度为 78.57%，特异度为 78.43% (表 3) (图 1)。

表 2 患者炎症指标比较
Table 2 Comparison of the inflammatory markers of patients

项目	浆液性腹水组(n=42)	乳糜性腹水组(n=9)	血性腹水组(n=14)	F/Z	P
WBC	8.21±3.76	8.51±2.80	12.20±2.55 ^{1),2)}	5.07	0.01
NEU	6.40±3.27	6.78±2.67	10.64±5.15 ^{1),2)}	7.08	0.002
LYM	1.17±0.78	1.25±0.55	0.97±0.71	0.49	0.61
NLR	5.18(3.68~9.52)	6.33(4.51~8.14)	14.44(9.99~19.70) ^{1),2)}	13.84	<0.001

注:1)与浆液性腹水组比较, $P<0.05$;2)与乳糜性腹水组比较, $P<0.05$
Note: 1) $P<0.05$ vs. serous ascites group; 2) $P<0.05$ vs. chylous ascites group

表 3 各项炎症指标对血性腹水的诊断价值分析
Table 3 Diagnostic value analysis of inflammatory markers for bloody ascites

指标	截断值	AUC	敏感度(%)	特异度(%)	95% CI
WBC	10.43	0.74	84.31	64.29	0.58~0.90
NEU	9.58	0.77	90.20	64.29	0.55~0.88
NLR	8.77	0.84	74.51	85.71	0.71~0.97
WBC+NEU+NLR	—	0.85	78.57	78.43	0.74~0.96

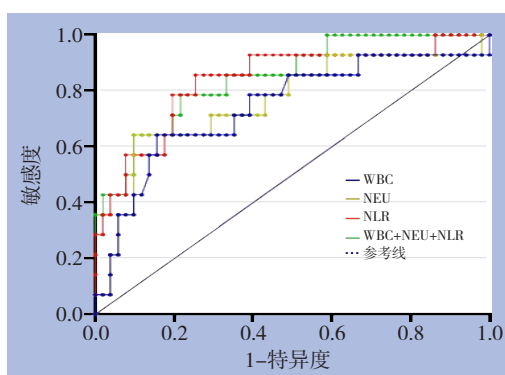


图1 各指标诊断血性腹水ROC曲线

Figure 1 ROC curves of each indicator for the diagnosis of bloody ascites

3 讨论

腹部手术史、腹腔炎症以及腹腔放化疗等是目前导致粘连性肠梗阻最主要的原因^[14],而胃癌根治手术由于消化道重建方式中空肠-空肠吻合处和Petersen型相对多见,肠系膜裂孔疝发生较多且术中出血量多等均易造成肠壁粘连,因而增加肠梗阻风险^[15-17]。本研究结果显示,65例肠梗阻患者,梗阻类型最多的是肠粘连,其次是内疝、扭转以及癌性肠梗阻,与多篇文献^[2,18]报道相符。已有文献^[19-20]报道乳糜性腹水是小肠扭转致腹腔淋巴管回流障碍形成,因小肠扭转时间较短,多发生在疾病早期,往往预示肠管功能良好。本研究结果也证实了该结论,乳糜性腹水组患者及时手术解除梗阻,可在不切除肠管情况下即可获得满意治疗,且术后住院时间明显短于血性腹水组患者。临床实践中还发现,肠梗阻患者术前诊断性腹腔穿刺抽出乳糜样腹水可为急诊手术探查的可靠指征,尽快手术解除梗阻可避免发生严重的肠坏死。本研究结果还显示,浆液性腹水组发病至入院时间明显高于乳糜性腹水组和血性腹水组,由于癌性肠梗阻患者均在浆液性腹水组中,且择期手术一般术前准备时间较长,导致浆液性腹水组患者入院至术前时间中位数增大,故比较三组入院至术前时间意义不大。

NLR是临床新型的炎症检测指标,可动态反映NEU与LYM的平衡状态^[21-22]。此外,还与特定癌症患者的预后密切相关,如胃癌和结直肠癌患者NEU、NLR增高常常提示肿瘤预后不良^[23-24]。有文献^[25-26]报道NLR可作为肝脓肿患者发生感染性休

克、入住重症监护病房和死亡的独立预测因素。Yoon等^[21]指出,高水平NLR可以用来预测因重度胆囊炎手术患者住院时间。此外,Xie等^[27]发现NLR可用于预测嵌顿性肠梗阻坏死结局。而本研究分析结果显示,血性腹水组中NLR明显高于乳糜性腹水组和浆液性腹水组,14例血性腹水组患者中有6例小肠切除,乳糜性腹水组9例均无肠切,提示NLR指标升高与伴有血性腹水肠梗阻中肠系膜缺血性坏死密切相关,可能的原因是肠壁局部炎症诱导大量NEU和LYM积聚、浸润、并释放大炎症因子损伤肠黏膜和肠系膜动脉,加重肠壁缺血程度,肠管发生缺血时间延长并发肠坏死;同时由于肠壁通透性增加,肠系膜缺血性坏死渗出,进而导致血性腹水的产生^[18,28-29]。另一项多因素分析研究^[30]同样发现,绞窄性肠梗阻中,由于肠壁黏膜受损,肠道细菌及各种毒素刺激侵入机体,可致大量NEU被激活,NLR在一定程度上可反映出急性肠梗阻在机体内炎症失控程度,可用来预测肠管缺血性坏死。此外,ROC曲线结果显示,NLR(AUC:0.84)诊断肠梗阻伴血性腹水效能明显高于WBC和NEU(AUC:0.74、0.77),能较早诊断出伴有血性腹水的肠梗阻有利于选择最佳手术时机,降低病死风险。三者联合检测时虽提高诊断效能(AUC:0.85),但与NLR相比,差异无统计学意义。在术后随访中,14例血性腹水组患者中有3例复发,9例乳糜性腹水组患者有1例复发,42例浆液性腹水组患者仅有2例复发,由于乳糜性腹水组病例较少,整体复发比例不大,差异无统计学意义,但也提示,伴发血性腹水肠梗阻患者的预后可能差于早期浆液性腹水组和乳糜性腹水组患者。综上所述,术前NLR检测胃癌术后肠梗阻在伴发不同性状腹水的患者中具有一定诊断价值,且在预测血性腹水患者的诊断准确率、敏感度高于WBC和NEU等指标。

本研究存在一些局限性,由于乳糜性腹水组和血性腹水组的样本量比较少且为单中心回顾性研究,未观察到NLR是胃癌术后肠梗阻复发的独立预测危险因素,且缺乏腹水样本NLR和其他感染指标如C-反应蛋白、降钙素原检测。此外,由于浆液性腹水组和乳糜性腹水组样本量有限,复发病例相对较少,血性腹水是否与肠梗阻术后复发存在相关性,还需要扩大样本量深入研究。总之,肠梗阻患者的临床诊疗工作中须结合症状、

体征等疾病变化趋势、早期炎症感染和不同颜色性状腹水等指标尽早诊断和及时治疗,避免发生肠管坏死、脓毒血症、感染性休克等严重并发症,以降低肠梗阻再发风险。

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