蓝激光内镜联合化学染色与白光内镜对上消化道早癌检出情况对比研究

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摘　要:[目的] 探究蓝激光内镜联合化学染色对上消化道早癌及癌前病变的诊断价值。[方法] 回顾性分析2019年1月至2021年12月行胃镜检查的患者6 332例,根据患者所用内镜及检查过程不同分为蓝激光组与白光组,比较两组患者上消化道早癌及高级别上皮内瘤变、低级别上皮内瘤变及癌前状态的检出情况。[结果] 蓝激光组上消化道癌及高级别上皮内瘤变检出率为1.63%(42/2 576),高于白光组的0.85%(32/3 756),差异有统计学意义(χ^2=8.017,P=0.005)。蓝激光组低级别上皮内瘤变及癌前状态检出率为41.15%(1 060/2 576),高于白光组的37.78%(1 419/3 756),差异有统计学意义(χ^2=7.282,P=0.007)。蓝激光组食管、贲门、胃的活检率均高于白光组,差异有统计学意义(χ^2=4.069,P=0.044;χ^2=4.010,P=0.045;χ^2=28.757,P<0.001);蓝激光组对癌性病变及高级别上皮内瘤变早诊率高于白光组,差异有统计学意义(χ^2=5.367,P=0.021)。[结论] 蓝激光内镜联合化学染色可以提高活检率,从而提高上消化道早癌及高级别上皮内瘤变、低级别上皮内瘤变及癌前状态的检出率、早诊率,有利于上消化道癌早诊早治项目的推广。

主题词:蓝激光内镜;化学染色技术;上消化道早癌;检出率;早诊率
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Comparison of Blue Laser Endoscopy Combined with Chemical Staining and White Light Endoscopy in Detection of Early Upper Gastrointestinal Cancer

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Abstract: [Objective] To compare the detection rate of blue laser endoscopy combined with chemical staining and white light endoscopy for early upper gastrointestinal cancer and precancerous lesions. [Methods] The clinical and endoscopic data of 6 332 patients undergoing gastroscopy from January 2019 to December 2021 were retrospectively analyzed, including 2 576 patients receiving blue light endoscopy (blue laser group) and 3 756 receiving white light endoscopy(white light group. The detection rates of early upper gastrointestinal cancer, high grade intraepithelial neoplasia, low grade intraepithelial neoplasia and precancerous lesions were compared between the two groups. [Results] The detection rate of upper gastrointestinal cancer and high grade intraepithelial neoplasia in the blue laser group was 1.63%(42/2 576), which was higher than that of the white light group (0.85%, 32/3 756)(χ^2=8.017, P=0.005). The detection rate of low grade intraepithelial neoplasia and precancerous lesions in blue laser group was 41.15%(1 060/2 576), which was higher than that in white light group (37.78%, 1 419/3 756)(χ^2=7.282, P=0.007). The biopsy rate of esophagus, cardia and stomach in blue laser group was significantly higher than that in white light group (χ^2=4.069, P=0.044; χ^2=4.010, P=0.045; χ^2=28.757, P<0.001), the rate of early diagnosis in the blue laser group was higher than that in the white light group (χ^2=5.367, P=0.021). [Conclusion] Blue laser endoscopy combined with chemical staining can increase the biopsy rate, thus increase the detection rate and early diagnosis rate of upper gastrointestinal cancer and high-grade intraepithelial neoplasia, low-grade intraepithelial neoplasia and precancerous state, which promotes the early diagnois and treatment of upper gastroiutestinal cancer.

Subject words: blue laser endoscopy; chemical staining; early upper gastrointestinal cancer; detection rate; early diagnosis rate

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上消化道癌是消化系统常见的恶性肿瘤之一，据2020年全球癌症统计数据显示，我国上消化道癌的发病和死亡病例数均约占全球的1/2[1]。目前，临床上上消化道癌筛查的主要方法是内镜检查加指示性活检[2]，近年来，日本富士公司研发了一种新型蓝激光内窥镜系统[3]，其包括白光成像模式（white light imaging，WLI）、联动成像模式（linked color imaging，LCI）、蓝激光成像模式（blue laser imaging，BLI）及BLI亮度模式（blue laser imaging-bright，BLI-bright）四种模式[4]。研究表明，蓝激光内镜系统可以提高消化道早癌的易见性[5-6]。本研究对蓝激光内镜联合化学染色和白光内镜对于上消化道早癌的检出及诊断情况进行对比分析，旨在评估蓝激光内镜联合化学染色对于诊断上消化道癌的有效性，为临床工作提供依据。

1 资料与方法

1.1 一般资料

2019年1月至2021年12月期间于承德市中心医院行胃镜检查的患者，根据患者胃镜使用型号不同，分为蓝激光组及白光内镜组，所有患者检查前均签署知情同意书。纳入标准：（1）有完整的内镜图片、病理结果等临床资料；（2）无胃镜检查禁忌，经病情评估或体检需行胃镜检查的患者。排除标准：（1）存在严重心肺脑疾患无法行内镜检查的患者；（2）上消化道癌术后患者；（3）有食管胃底静脉曲张或上消化道出血的患者；（4）存在真菌性食管炎或腐蚀性食管炎以及食管胃潴留等影响观察的患者；（5）内镜图片不清晰或病理资料不全的患者。共纳入6 332例患者，其中蓝激光组2 576例，白光组3 756例。两组年龄、性别差异均无统计学意义（$P>0.05$）。

1.2 器 材

日本富士公司型号为VP-4450HD的图像处理装置，蓝激光内镜（EG-L590ZW），白光内镜（EG-601WR内镜），安瑞医疗器械有限公司一次性使用侧转式活组织取样钳（AMHBFG2.4x1800）。

1.3 活检标准

所有内镜均由经验丰富的内镜医师完成。内镜过程中发现黏膜表面粗糙，色泽异常，边界欠清，质地较脆或硬，触碰易出血的可疑病变[7]，白光内镜组对可疑病变仔细观察后常规活检，蓝激光内镜组对白光发现的可疑病灶行光学染色并放大观察后，对黏膜表面腺管开口或微血管形态改变的部位行化学染色（1.2%~1.5%碘液），针对淡染区及不染区[8]靶向活检。

1.4 病理标准

根据相关专家共识[8-9]，对病理结果的处理和监测方式的不同，将病理诊断分为以下三类：（1）炎性病变（A类）；（2）癌前状态及低级别上皮内瘤变（B类）；（3）高级别上皮内瘤变及癌性病变（C类）。

1.5 结果评价指标

炎性病变（A类）检出率=（食管轻中重度炎症、鳞状上皮增生、炎症性溃疡+贲门轻中重度炎症+胃轻中度非萎缩性性炎症、炎症性溃疡）/检查人数×100%；癌前状态及低级别上皮内瘤变（B类）病变检出率=（食管低级别上皮内瘤变、食管白斑等+贲门低级别上皮内瘤变、贲门黏膜肠化生、贲门萎缩性炎+胃低级别上皮内瘤变、胃萎缩性炎、胃黏膜肠化生）/检查人数×100%；高级别上皮内瘤变及癌性病变（C类）病变检出率=（食管高级别上皮内瘤变、食管癌+贲门高级别上皮内瘤变、贲门癌+胃高级别上皮内瘤变、胃癌）/检查人数×100%；早期病变检出率=（食管高级别上皮内瘤变、早期食管癌+贲门高级别上皮内瘤变、贲门早期癌+胃高级别上皮内瘤变、胃早癌）/检查人数×100%；早诊率=（食管高级别上皮内瘤变、早期食管癌+贲门高级别上皮内瘤变、贲门早期癌+胃高级别上皮内瘤变、胃早癌）/（食管高级别上皮内瘤变+贲门高级别上皮内瘤变+胃高级别上皮内瘤变及其以上病变）×100%；活检率=活检例数/胃镜检查例数×100%。

根据《癌症早诊早治项目技术方案》确定：早期食管癌指癌细胞局限于黏膜层及黏膜下层，不伴有淋巴结转移；早期贲门癌指癌细胞局限于黏膜层及黏膜下层，无论有无淋巴结转移；早期胃癌指癌细胞局限于黏膜层及黏膜下层，无论有无淋巴结转移。

1.6 统计学处理

采用SPSS 19.0统计学软件分析数据。满足正态分布的计量资料以Mean±SD表示，两组间比较采用t检验；非正态分布的计量资料采用Mann-Whitney U检验；计数资料两组间比较行卡方检验或Fisher确切概率法。$P<0.05$为差异有统计学意义。

2 结　果

2.1　上消化道病变检出情况

蓝激光组共活检 2 846 个病灶，白光组共活检 3 868 个病灶，蓝激光组的活检率高于白光组，差异有统计学意义（P<0.05）。蓝激光组对三类病变的检出率均高于白光组，差异有统计学意义（P<0.05）。蓝激光组对 C 类病变早诊率高于白光组，差异有统计学意义（P<0.05）（Table 1）。

2.2　C 类病变检出情况

食管 C 类病变总检出率及早期病变检出率蓝激光组均高于白光组，差异均有统计学意义（χ^2=4.207，P =0.040；χ^2=3.909，P=0.048）。蓝激光对胃 C 类病变总检出率差异无统计学意义（χ^2=3.403，P=0.065），但其早期病变检出率及 C 类病变早诊率均高于白光组，差异有统计学意义（χ^2=7.940，P=0.005；χ^2=5.239，P=0.022）（Table 2）。

2.3　B 类病变检出情况

蓝激光内镜对食管、贲门 B 类病变的检出率均高于白光组，差异有统计学意义（χ^2=6.267，P=0.012；χ^2=6.271，P=0.012）（Table 3）。

2.4　两种内镜不同部位活检情况及活检阳性率

蓝激光组食管共活检 217 例，贲门共活检 292 例，胃共活检 2 337 例。白光组食管共活检 265 例，贲门共活检 367 例，胃共活检 3 236 例。食管、贲门、胃部位的活检率蓝激光组均高于白光组，差异均有统计学意义（χ^2=4.069，P=0.044；χ^2=4.010，P=0.045；χ^2=28.757，P<0.001）。蓝激光组食管、贲门和胃 C 类病变及 B 类病变的活检阳性率与白光组差异无统计学意义（P>0.05），但蓝激光组食管、贲门、胃部位 B 类病变及 C 类病变的活检阳性率均高于白光组（Table 4）。

Table 1　Comparison of the general data between the two groups[n(%)]

Index	BLI(n=2576)	WLI(n=3756)	t/χ^2	P
Age(years old)	52.47±11.57	53.03±12.86	−1.024	0.306
Gender				
Male	1824	1992	0.020	0.888
Female	1626	1764		
Biopsy cases	978(37.97)	1302(34.66)	7.227	0.007
Pathological diagnosis				
The lesion of class A	1744(67.70)	2417(64.35)	7.618	0.006
The lesion of class B	1060(41.15)	1419(37.78)	7.282	0.007
The lesion of class C	42(1.63)	32(0.85)	8.017	0.005
Early lesions	33(1.28)	17(0.45)	13.387	<0.001
Early detection of class C lesions	33(78.57)	17(53.13)	5.367	0.021

Table 2　Comparison of the general situation and the detection of different lesion between the two groups

Group	Number of class C lesions(%)	Class C lesions of esophagus			Class C lesions of cardia			Class C lesions of stomach		
		Total amount(%)	Number of early lesions(%)	Early detection rate	Total amount(%)	Number of early lesions(%)	Early detection rate	Total amount(%)	Number of early lesions(%)	Early detection rate
BLI	42(1.63)	10(0.39)	6(0.23)	60.00%	2(0.08)	2(0.08)	100.00%	30(1.16)	25(0.97)	83.33%
WLI	32(0.85)	5(0.13)	2(0.05)	40.00%	0	–	–	27(0.72)	15(0.40)	55.55%
χ^2	8.017	4.207	3.909	0.536	2.917	–	–	3.403	7.940	5.239
P	0.005	0.040	0.048	0.464	0.165	–	–	0.065	0.005	0.022

3 讨　论

中国和亚洲东部其他国家是上消化道癌高发地区。由于上消化道癌的早期症状不明显，当出现进食哽噎、体重减轻等症状时，往往已处于中晚期，手术机会低，预后差[10]。如果内镜下可以早期发现并及时行内镜下黏膜剥离术（endoscopic submucosal dissection，ESD）或内镜下黏膜切除术（endoscopic mucosal resection，EMR）治疗，则无需外科手术便可达到很好的治疗效果[11-12]。因此，早发现、早诊断、早治疗是改善上消化道癌患者预后的主要方法。但目前我国上消化道癌早诊率远低于日本和韩国等发达国家[13]，这与日韩等发达国家已实施全国范围内的筛查计划[14]，以及我国人口基数大，医疗负担重，内镜筛查范围局限[15]、内镜医师的专业技术能力[16]、卫生经济学评价方式[2]、内镜的清晰程度、筛查流程的规范程度[17]等因素有关。因此，为提高我国上消化道癌检出率，内镜选择及规范化的检查流程至关重要。

蓝激光内镜中的 BLI、BLI-bright、LCI 模式均为图像增强内

Table 3 Comparison of the detection of class B lesions by endoscopy between the two groups[n(%)]

Group	Number of class B lesions	Class B lesions of esophagus	Class B lesions of cardia	Class B lesions of stomach
BLI	1060(41.15)	58(2.25)	80(3.11)	922(35.79)
WLI	1419(37.78)	53(1.41)	79(2.10)	1287(34.27)
χ^2	7.282	6.267	6.271	1.568
P	0.007	0.012	0.012	0.211

镜(image enhanced endoscopy,IEE),可以显著提高内镜图像的亮度和质量，其中 LCI 模式通过增加黏膜色泽对比度,使红色部分更红,白色部分更白,从而更好地识别病变黏膜与正常黏膜的微小色差[18]。BLI 模式可以同时发射 510 nm 的窄带激光和 450 nm 的白光激光,同时对黏膜表面和深层结构进行观察，不仅可以获得黏膜表面信息，还可以获得黏膜深层的构造信息,使获得的图像更具有立体感[19]。BLI-bright 模式可以提高观察亮度，对于中远景及较深病变的发现具有一定的优势[20]。染色内镜是在常规内镜的基础上，喷洒染料来更清晰地观察黏膜表面结构,从而可以快速识别病灶边界、部位及形态,可提高活检准确率[21]。

本研究发现蓝激光内镜宏观发现早期病变的优势与染色内镜精确勾勒病变的能力，可以提高上消化道癌性病变及高级别上皮内瘤变检出率，提高早期癌性病变的检出率，提高癌前状态及低级别上皮内瘤变的活检阳性率，两者结合可显著提高上消化道早癌的检出率。

综上所述，蓝激光内镜结合化学染色内镜可显著提高癌前状态、癌前病变及癌性病变的检出率,可以更好地推动早诊早治项目的开展,改善患者预后,减轻医疗负担。

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Table 4 The biopsies of different sites and the positive rate of biopsy of class B and C lesions between the two groups

Group	Esophagus			Cardia			Stomach		
	Biopsy cases	Positive rate of class C(%)	Positive rate of class B(%)	Biopsy cases	Positive rate of class C(%)	Positive rate of class B(%)	Biopsy cases	Positive rate of class C(%)	Positive rate of class B(%)
BLI	217	10(4.61)	58(26.73)	292	2(0.68)	80(27.39)	2337	30(1.28)	922(39.45)
WLI	265	5(1.89)	53(20.00)	367	0	79(21.53)	3236	27(0.83)	1287(39.77)
χ^2	4.069	2.931	3.047	4.010	2.521	3.063	28.757	2.706	0.058
P	0.044	0.087	0.081	0.045	0.196	0.080	<0.001	0.100	0.810

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