

结直肠无蒂锯齿状腺瘤内镜下诊断的进展

邱野, 付祥胜, 彭燕

邱野, 付祥胜, 彭燕, 泸州医学院附属医院消化内科 四川省泸州市 646000

邱野, 硕士研究生, 主要从事结直肠锯齿状腺瘤的研究.

作者贡献分布: 本文综述由邱野完成; 付祥胜与彭燕审核.

通讯作者: 彭燕, 教授, 主任医师, 646000, 四川省泸州市太平街25号, 泸州医学院附属医院消化内科. 1806857826@qq.com
电话: 0380-3165331

收稿日期: 2013-11-29 修回日期: 2013-12-30

接受日期: 2014-01-08 在线出版日期: 2014-02-28

Endoscopic diagnosis of sessile serrated adenoma

Ye Qiu, Xiang-Sheng Fu, Yan Peng

Ye Qiu, Xiang-Sheng Fu, Yan Peng, Department of Gastroenterology, the Affiliated Hospital of Luzhou Medical College, Luzhou 646000, Sichuan Province, China

Correspondence to: Yan Peng, Professor, Chief Physician, Department of Gastroenterology, the Affiliated Hospital of Luzhou Medical College, 25 Taiping Road, Luzhou 646000, Sichuan Province, China. 1806857826@qq.com

Received: 2013-11-29 Revised: 2013-12-30

Accepted: 2014-01-08 Published online: 2014-02-28

Abstract

Sessile serrated adenoma (SSA) is a special type of serrated adenoma, and recent studies have found that SSA has a malignant potential, progresses quickly and is closely related to right-sided colorectal cancer. SSA is usually located in the proximal colon, which is flat and sessile, and for this reason, SSA is difficult to find by conventional endoscopy and has a high rate of missed diagnosis. There is currently an urgent need to develop new endoscopic technologies to raise the diagnosis rate. In this paper, we will review recent progress in the diagnosis of sessile serrated adenoma using new endoscopic technologies.

© 2014 Baishideng Publishing Group Co., Limited. All rights reserved.

Key Words: Serrated adenoma; Sessile serrated adenoma; Colorectal cancer; Magnifying chromoendoscopy; Narrow band imaging; Endocytoscopy; Confocal laser endomicroscopy

Qiu Y, Fu XS, Peng Y. Endoscopic diagnosis of sessile

serrated adenoma. *Shijie Huaren Xiaohua Zazhi* 2014; 22(6): 801-806 URL: <http://www.wjgnet.com/1009-3079/22/801.asp> DOI: <http://dx.doi.org/10.11569/wcjd.v22.i6.801>

摘要

无蒂锯齿状腺瘤(sessile serrated adenoma, SSA)是结直肠锯齿状病变中的特殊类型,近年来研究发现SSA具有恶变潜能,且进展快,与右半结直肠癌的发生密切相关. SSA通常位于近端结肠,扁平无蒂,普通内镜下较难发现,漏诊率高. 因此,临床上迫切需要开展新的内镜检查技术,以提高SSA的诊断率. 本文就近年来内镜新技术对SSA诊断的研究进展作一综述.

© 2014年版权归百世登出版集团有限公司所有.

关键词: 锯齿状息肉; 无蒂锯齿状腺瘤; 结直肠癌; 放大色素内镜; 窄带内镜; 细胞内镜; 共聚焦内镜

核心提示: 结直肠无蒂锯齿状腺瘤(sessile serrated adenoma, SSA)是结直肠锯齿状病变中的特殊类型. 近年来研究认为SSA具有恶变潜能,且进展快,与右半结直肠癌的发生密切相关,目前SSA的诊断率较低. 本文综述新的内镜检查技术对SSA的诊断进展.

邱野, 付祥胜, 彭燕. 结直肠无蒂锯齿状腺瘤内镜下诊断的进展. *世界华人消化杂志* 2014; 22(6): 801-806 URL: <http://www.wjgnet.com/1009-3079/22/801.asp> DOI: <http://dx.doi.org/10.11569/wcjd.v22.i6.801>

0 引言

结直肠锯齿状息肉包括增生性息肉(hyperplastic polyp, HP)、无蒂锯齿状腺瘤(sessile serrated adenoma, SSA)和传统锯齿状腺瘤(traditional serrated adenoma, TSA),上皮呈锯齿状结构是其共同特征^[1]. 近年来发现的SSA是结直肠锯齿状病变中的特殊类型,研究发现,SSA具有恶变潜能、进展快,与右半结直肠癌(colorectal cancer, CRC)的发生密切相关^[2-4]. SSA的早期检出和正确处理是阻止其进展及癌变的重要途径,但SSA

■背景资料

结直肠无蒂锯齿状腺瘤(sessile serrated adenoma, SSA)是结直肠锯齿状病变中的特殊类型. 近年来研究认为SSA具有恶变潜能,且进展快,与右半结直肠癌的发生密切相关,有关SSA的研究逐渐受到重视.

■同行评议者

顾国利, 副主任医师, 空军总医院普通外科

■ 研发前沿

根据SSA的内镜下特点,探讨新内镜技术对SSA的诊断进展,提高SSA诊疗效率。

通常位于近端结肠,扁平无蒂,普通内镜下较难发现,漏诊率高。因此,临床上迫切需要开展新的内镜检查技术,以提高SSA的诊断率。目前学术界对SSA尚缺乏统一的诊断标准和流程,SSA内镜下的早期诊断尚处于探索阶段^[5-7]。

1 SSA早期正确诊断有十分重要的临床意义

结肠镜筛查可有效减少结直肠癌的发生率和死亡率。近年来,越来越多的研究发现这种筛查的有效性在左右半结肠中并非对等^[8-13]。结肠镜筛查后的结直肠癌(colorectal cancer, CRC)大多数位于右半结肠,并且具有微卫星高不稳定性和高甲基化表型的特征,这些特征与锯齿状病变中的SSA非常类似^[8,9,14-16]。SSA通常位于近端结肠,外形隐蔽,普通内镜下很难发现,因此有研究认为发生在结肠镜筛查后的CRC可能系由漏检和未处理的SSA发展而来^[17,18]。大量的研究证实,SSA在右半结肠癌的发展过程中扮演着重要角色,其癌变率比普通腺瘤更高。早期正确诊断SSA,可以有效地降低其癌变率,提高患者的后期生存率,有十分重要的临床意义^[1,18,19]。

2 SSA内镜下特征和病理学特征

SSA通常位于右半结肠,体积较大,直径通常>10 mm,检出率低,约占锯齿状病变的15%-20%,在吸烟者和有结肠癌家族史的人群中更为常见^[19-30]。TSA在内镜下表现极为特别,为双层松树样或者珊瑚样的外形,因而很容易鉴别^[24,31]。与TSA不同,SSA内镜下表现为扁平无蒂,柔软光滑,表面苍白,通常表面覆有黏液与HP极为相似,故极易被误诊为HP^[24]。由于SSA的形态结构和分布特点,使得目前SSA的诊断率十分低,不同内镜医师对SSA的诊断差异性很大^[32-34]。因为SSA的诊断较为困难,推断SSA实际的发病率可能比统计的更高。SSA有特异的组织学特点:包括锯齿状结构的隐窝;隐窝基底部扩张、分支;侧向生长,与TSA不同,SSA很少具有细胞和组织学异型性^[20,22,35]。

3 新的内镜技术蓬勃发展给SSA内镜下早期诊断带来希望

传统的对病变组织的精确诊断主要取决于内镜下病变形态表现,以及病理活检。但是用普通内镜对结直肠黏膜表面进行观察,可能使取材的部位不准确,经常需要反复多次取材,取材错误等情况很常见,活检取材过程中可能出现出

血,穿孔等并发症,并且病理活检的一般需要2-3 d,活检结果回报后需再次准备肠道行肠镜检查或治疗^[36]。一方面增加风险延误病情,另一方面给患者造成经济上和精神上的负担。使得内镜医师更加渴望在内镜检查过程中进行实时的病变分型以及病理检查,从而提高内镜检查的效率,减少病员痛苦^[37]。从而发展出新兴的内镜成像技术包括高分辨率的白光显微镜(high-resolution white-light endoscopy, HR-WLE),放大色素内镜技术(magnifying chromoendoscopy)、自体荧光成像技术(auto fluorescence imaging, AFI)、窄频影像技术(narrow band imaging, NBI)、细胞内镜(endocytoscopy)和共聚焦内镜(confocal laser endomicroscopy, CLE)技术等,这些内镜新技术的发展给普通内镜下检出困难的SSA的早期正确诊断带来了新的希望。

3.1 高分辨率的放大显微镜以及色素内镜辅助对SSA的诊断 放大色素内镜技术是先通过普通内镜观察,根据具体情况在息肉表面喷洒特殊染料对胃肠道黏膜进行染色,增强病变与周围结构对比,再用放大内镜进行观察,这种技术可清晰的观察病变腺管开口的形状,来初步对病变进行组织学分型,这种技术目前已在国内外得到广泛应用。根据Kudo等^[38]的pit分型标准, pit I型(圆形腺管开口)病变和pit II型(星芒状或乳头状腺管开口)病变被归类于非瘤性病变,即正常的腺体或增生性息肉;而pit III型、pit IV型及pit V型被归类为瘤性病变,因SSA和HP都是以上分类中的pit II型,而很难被区分。日本学者Kimura等^[31]发现了一种新的pit分型(type II-O),这种新类型的腺管开口比普通的pit II更宽更圆,并通常被普通的pit II所围绕,他们发现,大部份pit II-O型病变来自右半结肠,直径多大于1 mm,且其病理诊断为SSA, pit II-O型对SSA诊断的特异性高达97.3%,并且推断这种腺管开口扩大的现象与SSA过量分泌黏蛋白有关。但另一项研究发现, pit II-O对SSA的诊断敏感性为83.7%,特异性是85.7%^[39]。利用pit II-O分型对SSA的诊断有较高的特异性无疑是学术界的重大突破,对锯齿状结构的亚型的分类有重要的临床意义,但是大约1/3的SSA不具有此结构, pit分型对SSA的诊断只能作为辅助手段。并且染色内窥镜和高分辨率内窥镜在染料的喷洒量和放大内镜视野控制方面有较大难度,临床上很难得到普及。

3.2 NBI技术对SSA的诊断价值 NBI能够更清晰地显示消化系黏膜表面的细微结构, 能达到与染色内镜类似的显示效果, 对黏膜的微血管形态显示, 更是具备独特的优势. 更重要的是, NBI内镜能够在传统内镜成像和NBI系统之间根据病情需要随意迅速地切换, 并且不用喷洒色素染料. NBI的血管强化功能可增强黏膜表面毛细血管(褐色)和腺窝开口(透明白色)的色调差异, 比普通内镜更容易观察到病变黏膜表面的细微结构(例如腺管开口等). 研究发现NBI对大肠息肉以及大肠的扁平非息肉性病变的诊断率比普通内镜更高^[40-43]. 姜泊等^[44]研究发现NBI对发现特异性黏膜异常征象(98.6%)要高于常规内镜(90.5%), 特别是对一些平坦型病变的发现和鉴别都优于普通白光内镜.

Nakao等^[45]研究发现, 在NBI下, 80%的SSA具有圆形或类圆形扩大的腺管开口结构(II-dilatation pit, pit II-d), 94%的SSA表面存在一层淡红色的黏液层(红色帽标志), NBI对SSA的组织学类型的判断有更高的精确性. Hazewinkel等^[46]发现SSA区别于HP有两个特征: 即边界不显著和云雾状的外形, 而在NBI下除前两个特征外还表现为不规则的形状和类似黑斑的腺管开口, 后两个特征只在NBI下可见. 通过对SSA的以上特征进行评分, 以组织学诊断为判断标准, 发现NBI对SSA的诊断的敏感性、特异性和总精确度分别是89%、96%和93%, 而普通的HR-WLE分别是75%、79%和77%. 可见, NBI对SSA具有重要的诊断意义.

3.3 细胞内镜(endocytoscopy)技术成为最有挑战性的内镜新技术 细胞内镜是在超高倍的放大内镜的基础上发展而来的. 其先采用染色剂对病变部位进行检测, 而后以头端安装有可吸引黏膜的透明帽紧贴病变黏膜, 来观察细胞的细微结构. 应用较广泛的细胞内镜是由Olympus公司生产的, 直径为3.2 mm, 其物镜的放大倍数为450倍(观察范围300 μm \times 300 μm)和1125倍(观察范围120 μm \times 120 μm)^[47]. Mori等^[37]报道细胞内镜和常规活检对结肠瘤性病变的诊断的精确率分别是94.1%和96%. 细胞内镜对结肠瘤性和非瘤性病变的诊断率和病理学检测几乎相同^[37,48,49]. 可见细胞内镜可视化细胞形态和细胞核的程度已接近病理学诊断, 可实现最精确的病理学前评估. Kutsukawa等^[50]发现, SSA的腺管在细胞内镜下表现为卵圆形($P<0.001$), 其敏感性为83.3%, 特异性为97.8%; 而HP的腺管形状

在细胞内镜下表现为类似星芒形($P<0.001$), 其敏感性为77.8%, 特异性为93.5%. 在细胞内镜下, SSA可通过管腔形状与HP相鉴别. 而TSA在细胞内镜下表现为具有绒毛状($P<0.001$)或锯齿状的($P=0.002$)管腔结构(敏感性为100%, 特异性为87.2%), 并且表现为梭形细胞核(敏感性为100%, 特异性为100%). 上述研究可见, 细胞内镜对锯齿状病变亚型的鉴别诊断精确性很高. 但是目前细胞内镜在结直肠锯齿状病变的研究甚少, 具有很大的临床价值和广阔的前景.

3.4 CLE对SSA的诊断价值 CLE是将一微型共聚焦激光扫描显微镜整合于传统电子内窥镜头以获得比普通内镜放大1000倍的内镜图像, 此技术优点是在内镜检查时, 不需做活检可直接观察细胞及亚细胞结构, 对黏膜病变做出即时诊断, 可达到“光活检”或“光学切片”目的^[20,51]. CLE对CRC有极高的诊断价值, 利用CLE在内镜下对特定抗原进行荧光标记, 来诊断CRC有更高的精确性^[52-54]. 有研究通过对不同内镜医师用CLE对结肠病变分类进行研究, 发现其诊断的精确度最高可达95.6%^[55,56]. 理论上CLE对SSA的诊断有更高的价值和广阔的研究前景, 但遗憾的是, CLE对SSA的诊断研究目前还没有文献报道.

4 结论

放大色素内镜能在传统内镜的基础上更加清晰的观察病变的微小特征, 并可精确的判断病变的PIT分型的种类; NBI则以一种操作简单的方法观察病变的显微特征; 细胞内镜和共聚焦内镜的出现使结肠病变的诊断与最终的病理学检测更加接近. 这些新兴的内镜下诊断技术对结肠息肉样病变特别是的传统内镜下很难区分的SSA的诊断和进一步的治疗有着十分重要的临床意义. 但是, 新兴的内镜技术都有各自的缺点和局限性, 染色内窥镜和高分辨率内窥镜在染料的喷洒量和放大内镜视野控制方面有很大难度, 这些技术在包括欧美在内的大多数地区都不常用^[24,57,58]. 很多研究发现, 只有在传统内镜发现可疑病变情况下才切换至NBI模式, 单用NBI技术并不能提高息肉的总体检出率^[59,60]. 而共聚焦内镜和细胞内镜, 尚处在初步研究阶段, 其诊断价值有待大量的临床研究证实. 所以, 越来越多的研究提出, 要联合多种内镜技术实现对息肉的精确诊断, 例如配合放大色素内镜和NBI成像技术, 联合色素内镜、CLE和NBI成像技术^[61,62]. 虽然新兴的内镜技术要实现临床普及还有一定

■ 相关报道

近年来研究发现, SSA具有恶变潜能, 且进展快, 与右半结直肠癌的发生密切相关, SSA的早期检出和正确处理是阻止其进展及癌变的重要途径, 但SSA在普通内镜下较难发现. 因此, 临床上迫切需要开展新的内镜检查技术以提高对SSA的诊断率.

■创新盘点

目前放大色素内镜技术(magnifying chromoendoscopy)、自体荧光成像技术(auto fluorescence imaging, AFI)、窄频影像技术(narrow band imaging, NBI)、细胞内镜(endocytoscopy)和共聚焦内镜(confocal laser endomicroscopy, CLE)技术等新内镜技术蓬勃发展,对结肠直肠各类病变的诊断率有很大的提高,但对SSA诊断价值的报道很少,本文对比描述各种新内镜技术对SSA的诊断的优缺点,有较强的临床适用性。

的距离,特别是在我国以及广大的发展中国家。但是相信随着科技的发展和技术的更新,各种内镜技术的成熟、分子水平的成像实现,SSA的早期诊断率也会得到极大提高,对患者的及时诊断和治疗成为可能。同时高度重视SSA的早期检出和正确诊断,熟悉并掌握SSA的内镜下特征,避免误诊漏诊,是防止其癌变的重要环节。

5 参考文献

- 1 Snover DC. Update on the serrated pathway to colorectal carcinoma. *Hum Pathol* 2011; 42: 1-10 [PMID: 20869746 DOI: 10.1016/j.humpath.2010.06.002]
- 2 De Jesus-Monge WE, Gonzalez-Keelan C, Cruz-Correa M. Serrated adenomas. *Curr Gastroenterol Rep* 2009; 11: 420-427 [PMID: 19765371 DOI: 10.1007/s11894-009-0063-x]
- 3 Groff RJ, Nash R, Ahnen DJ. Significance of serrated polyps of the colon. *Curr Gastroenterol Rep* 2008; 10: 490-498 [PMID: 18799125 DOI: 10.1007/s11894-008-0090-z]
- 4 Bettington M, Walker N, Clouston A, Brown I, Leggett B, Whitehall V. The serrated pathway to colorectal carcinoma: current concepts and challenges. *Histopathology* 2013; 62: 367-386 [PMID: 23339363 DOI: 10.1111/his.12055]
- 5 Boparai KS, van den Broek FJ, van Eeden S, Fockens P, Dekker E. Hyperplastic polyposis syndrome: a pilot study for the differentiation of polyps by using high-resolution endoscopy, autofluorescence imaging, and narrow-band imaging. *Gastrointest Endosc* 2009; 70: 947-955 [PMID: 19595313 DOI: 10.1016/j.gie.2009.03.1172]
- 6 Kashida H, Ikehara N, Hamatani S, Kudo SE, Kudo M. Endoscopic characteristics of colorectal serrated lesions. *Hepatogastroenterology* 2011; 58: 1163-1167 [PMID: 21937375 DOI: 10.5754/hge10093]
- 7 Yamada A, Notohara K, Aoyama I, Miyoshi M, Miyamoto S, Fujii S, Yamamoto H. Endoscopic features of sessile serrated adenoma and other serrated colorectal polyps. *Hepatogastroenterology* 2011; 58: 45-51 [PMID: 21510285]
- 8 Singh H, Nugent Z, Demers AA, Kliewer EV, Mahmud SM, Bernstein CN. The reduction in colorectal cancer mortality after colonoscopy varies by site of the cancer. *Gastroenterology* 2010; 139: 1128-1137 [PMID: 20600026]
- 9 Brenner H, Chang-Claude J, Seiler CM, Rickert A, Hoffmeister M. Protection from colorectal cancer after colonoscopy: a population-based, case-control study. *Ann Intern Med* 2011; 154: 22-30 [PMID: 21200035]
- 10 Brenner H, Hoffmeister M, Arndt V, Stegmaier C, Altenhofen L, Haug U. Protection from right- and left-sided colorectal neoplasms after colonoscopy: population-based study. *J Natl Cancer Inst* 2010; 102: 89-95 [PMID: 20042716 DOI: 10.1093/jnci/djp436]
- 11 Singh H, Nugent Z, Mahmud SM, Demers AA, Bernstein CN. Predictors of colorectal cancer after negative colonoscopy: a population-based study. *Am J Gastroenterol* 2010; 105: 663-673; quiz 674 [PMID: 19904239 DOI: 10.1038/ajg.2009.650]
- 12 Atkin WS, Edwards R, Kralj-Hans I, Wooldrage K, Hart AR, Northover JM, Parkin DM, Wardle J,

Duffy SW, Cuzick J. Once-only flexible sigmoidoscopy screening in prevention of colorectal cancer: a multicentre randomised controlled trial. *Lancet* 2010; 375: 1624-1633 [PMID: 20430429]

- 13 Baxter NN, Warren JL, Barrett MJ, Stukel TA, Doria-Rose VP. Association between colonoscopy and colorectal cancer mortality in a US cohort according to site of cancer and colonoscopist specialty. *J Clin Oncol* 2012; 30: 2664-2669 [PMID: 22689809 DOI: 10.1200/JCO.2011.40.4772]
- 14 Sawhney MS, Farrar WD, Gudiseva S, Nelson DB, Lederle FA, Rector TS, Bond JH. Microsatellite instability in interval colon cancers. *Gastroenterology* 2006; 131: 1700-1705 [PMID: 17087932 DOI: 10.1053/j.gastro.2006.10.022]
- 15 Arain MA, Sawhney M, Sheikh S, Anway R, Thyagarajan B, Bond JH, Shaikat A. CIMP status of interval colon cancers: another piece to the puzzle. *Am J Gastroenterol* 2010; 105: 1189-1195 [PMID: 20010923 DOI: 10.1038/ajg.2009.699]
- 16 Vaughn CP, Wilson AR, Samowitz WS. Quantitative evaluation of CpG island methylation in hyperplastic polyps. *Mod Pathol* 2010; 23: 151-156 [PMID: 19855373 DOI: 10.1038/modpathol.2009.150]
- 17 Lieberman D. Progress and challenges in colorectal cancer screening and surveillance. *Gastroenterology* 2010; 138: 2115-2126 [PMID: 20167216 DOI: 10.1053/j.gastro.2010.02.006]
- 18 Burnett-Hartman AN, Newcomb PA, Phipps AI, Passarelli MN, Grady WM, Upton MP, Zhu LC, Potter JD. Colorectal endoscopy, advanced adenomas, and sessile serrated polyps: implications for proximal colon cancer. *Am J Gastroenterol* 2012; 107: 1213-1219 [PMID: 22688851 DOI: 10.1038/ajg.2012.167]
- 19 Huang CS, Farraye FA, Yang S, O'Brien MJ. The clinical significance of serrated polyps. *Am J Gastroenterol* 2011; 106: 229-240; quiz 241 [PMID: 21045813 DOI: 10.1038/ajg.2010.429]
- 20 Higuchi T, Sugihara K, Jass JR. Demographic and pathological characteristics of serrated polyps of colorectum. *Histopathology* 2005; 47: 32-40 [PMID: 15982321 DOI: 10.1111/j.1365-2559.2005.02180.x]
- 21 Torlakovic E, Skovlund E, Snover DC, Torlakovic G, Nesland JM. Morphologic reappraisal of serrated colorectal polyps. *Am J Surg Pathol* 2003; 27: 65-81 [PMID: 12502929 DOI: 10.1097/0000478-200301000-00008]
- 22 Rex DK, Ahnen DJ, Baron JA, Batts KP, Burke CA, Burt RW, Goldblum JR, Guillem JG, Kahi CJ, Kalady ME, O'Brien MJ, Odze RD, Ogino S, Parry S, Snover DC, Torlakovic EE, Wise PE, Young J, Church J. Serrated lesions of the colorectum: review and recommendations from an expert panel. *Am J Gastroenterol* 2012; 107: 1315-1329; quiz 1314, 1330 [PMID: 22710576 DOI: 10.1038/ajg.2012.161]
- 23 Gurudu SR, Heigh RI, De Petris G, Heigh EG, Leighton JA, Pasha SF, Malagon IB, Das A. Sessile serrated adenomas: demographic, endoscopic and pathological characteristics. *World J Gastroenterol* 2010; 16: 3402-3405 [PMID: 20632442 DOI: 10.3748/wjg.v16.i27.3402]
- 24 Hasegawa S, Mitsuyama K, Kawano H, Arita K, Maeyama Y, Akagi Y, Watanabe Y, Okabe Y, Tsuruta O, Sata M. Endoscopic discrimination of sessile serrated adenomas from other serrated lesions. *Oncol Lett* 2011; 2: 785-789 [PMID: 22866127]

- 25 Rustagi T, Rangasamy P, Myers M, Sanders M, Vaziri H, Wu GY, Birk JW, Protiva P, Anderson JC. Sessile serrated adenomas in the proximal colon are likely to be flat, large and occur in smokers. *World J Gastroenterol* 2013; 19: 5271-5277 [PMID: 23983429 DOI: org/10.3748/wjg.v19.i32.5271]
- 26 Burnett-Hartman AN, Passarelli MN, Adams SV, Upton MP, Zhu LC, Potter JD, Newcomb PA. Differences in epidemiologic risk factors for colorectal adenomas and serrated polyps by lesion severity and anatomical site. *Am J Epidemiol* 2013; 177: 625-637 [PMID: 23459948 DOI: 10.1093/aje/kws282]
- 27 Hassan C, Pickhardt PJ, Marmo R, Choi JR. Impact of lifestyle factors on colorectal polyp detection in the screening setting. *Dis Colon Rectum* 2010; 53: 1328-1333 [PMID: 20706078 DOI: 10.1007/DCR.0b013e3181e10daa]
- 28 Schreiner MA, Weiss DG, Lieberman DA. Proximal and large hyperplastic and nondysplastic serrated polyps detected by colonoscopy are associated with neoplasia. *Gastroenterology* 2010; 139: 1497-1502 [PMID: 20633561 DOI: 10.1053/j.gastro.2010.06.074]
- 29 Anderson JC, Rangasamy P, Rustagi T, Myers M, Sanders M, Vaziri H, Wu G, Birk JW, Protiva P. Risk factors for sessile serrated adenomas. *J Clin Gastroenterol* 2011; 45: 694-699 [PMID: 21325950 DOI: 10.1097/MCG.0b013e318207f3cf]
- 30 Kahi CJ, Li X, Eckert GJ, Rex DK. High colonoscopic prevalence of proximal colon serrated polyps in average-risk men and women. *Gastrointest Endosc* 2012; 75: 515-520 [PMID: 22018551 DOI: 10.1016/j.gie.2011.08.021]
- 31 Kimura T, Yamamoto E, Yamano HO, Suzuki H, Kamimae S, Nojima M, Sawada T, Ashida M, Yoshikawa K, Takagi R, Kato R, Harada T, Suzuki R, Maruyama R, Kai M, Imai K, Shinomura Y, Sugai T, Toyota M. A novel pit pattern identifies the precursor of colorectal cancer derived from sessile serrated adenoma. *Am J Gastroenterol* 2012; 107: 460-469 [PMID: 22233696 DOI: 10.1038/ajg.2011.457]
- 32 Kahi CJ, Hewett DG, Norton DL, Eckert GJ, Rex DK. Prevalence and variable detection of proximal colon serrated polyps during screening colonoscopy. *Clin Gastroenterol Hepatol* 2011; 9: 42-46 [PMID: 20888435 DOI: 10.1016/j.cgh.2010.09.013]
- 33 Liang J, Kalady MF, Appau K, Church J. Serrated polyp detection rate during screening colonoscopy. *Colorectal Dis* 2012; 14: 1323-1327 [PMID: 22390284 DOI: 10.1111/j.1463-1318.2012.03017.x]
- 34 de Wijkerslooth TR, Stoep EM, Bossuyt PM, Tytgat KM, Dees J, Mathus-Vliegen EM, Kuipers EJ, Fockens P, van Leerdam ME, Dekker E. Differences in proximal serrated polyp detection among endoscopists are associated with variability in withdrawal time. *Gastrointest Endosc* 2013; 77: 617-623 [PMID: 23321338 DOI: 10.1016/j.gie.2012.10.018]
- 35 Torlakovic EE, Gomez JD, Driman DK, Parfitt JR, Wang C, Benerjee T, Snover DC. Sessile serrated adenoma (SSA) vs. traditional serrated adenoma (TSA). *Am J Surg Pathol* 2008; 32: 21-29 [PMID: 18162766]
- 36 Minami H, Inoue H, Yokoyama A, Ikeda H, Satodate H, Hamatani S, Haji A, Kudo S. Recent advancement of observing living cells in the esophagus using CM double staining: endocytoscopic atypia classification. *Dis Esophagus* 2012; 25: 235-241 [PMID: 21895852 DOI: 10.1111/j.1442-2050.2011.01241.x]
- 37 Mori Y, Kudo S, Ikehara N, Wakamura K, Wada Y, Kutsukawa M, Misawa M, Kudo T, Kobayashi Y, Miyachi H, Yamamura F, Ohtsuka K, Inoue H, Hamatani S. Comprehensive diagnostic ability of endocytoscopy compared with biopsy for colorectal neoplasms: a prospective randomized noninferiority trial. *Endoscopy* 2013; 45: 98-105 [PMID: 23307149 DOI: 10.1055/s-0032-1325932]
- 38 Kudo S, Tamura S, Nakajima T, Yamano H, Kusaka H, Watanabe H. Diagnosis of colorectal tumorous lesions by magnifying endoscopy. *Gastrointest Endosc* 1996; 44: 8-14 [PMID: 8836710]
- 39 Ishigooka S, Nomoto M, Obinata N, Oishi Y, Sato Y, Nakatsu S, Suzuki M, Ikeda Y, Maehata T, Kimura T, Watanabe Y, Nakajima T, Yamano HO, Yasuda H, Itoh F. Evaluation of magnifying colonoscopy in the diagnosis of serrated polyps. *World J Gastroenterol* 2012; 18: 4308-4316 [PMID: 22969193 DOI: 10.3748/wjg.v18.i32.4308]
- 40 Uraoka T, Saito Y, Matsuda T, Sano Y, Ikehara H, Mashimo Y, Kikuchi T, Saito D, Saito H. Detectability of colorectal neoplastic lesions using a narrow-band imaging system: a pilot study. *J Gastroenterol Hepatol* 2008; 23: 1810-1815 [PMID: 19032454 DOI: 10.1111/j.1440-1746.2008.05635.x]
- 41 Ladabaum U, Fioritto A, Mitani A, Desai M, Kim JP, Rex DK, Imperiale T, Gunaratnam N. Real-time optical biopsy of colon polyps with narrow band imaging in community practice does not yet meet key thresholds for clinical decisions. *Gastroenterology* 2013; 144: 81-91 [PMID: 23041328 DOI: 10.1053/j.gastro.2012.09.054]
- 42 Rex DK. Narrow-band imaging without optical magnification for histologic analysis of colorectal polyps. *Gastroenterology* 2009; 136: 1174-1181 [PMID: 19187781 DOI: 10.1053/j.gastro.2008.12.009]
- 43 Inoue T, Murano M, Murano N, Kuramoto T, Kawakami K, Abe Y, Morita E, Toshina K, Hoshiro H, Egashira Y, Umegaki E, Higuchi K. Comparative study of conventional colonoscopy and pan-colonic narrow-band imaging system in the detection of neoplastic colonic polyps: a randomized, controlled trial. *J Gastroenterol* 2008; 43: 45-50 [PMID: 18297435 DOI: 10.1007/s00535-007-2125-x]
- 44 姜泊, 潘新颜, 张亚历, 刘思德. 内镜窄带成像与染色技术诊断大肠肿瘤的对比研究. *中华消化内镜杂志* 2006; 23: 416-420
- 45 Nakao Y, Saito S, Ohya T, Aihara H, Arihiro S, Kato T, Ikegami M, Tajiri H. Endoscopic features of colorectal serrated lesions using image-enhanced endoscopy with pathological analysis. *Eur J Gastroenterol Hepatol* 2013; 25: 981-988 [PMID: 23820237 DOI: 10.1097/MEG.0b013e3283614b2b]
- 46 Hazewinkel Y, López-Cerón M, East JE, Rastogi A, Pellisé M, Nakajima T, van Eeden S, Tytgat KM, Fockens P, Dekker E. Endoscopic features of sessile serrated adenomas: validation by international experts using high-resolution white-light endoscopy and narrow-band imaging. *Gastrointest Endosc* 2013; 77: 916-924 [PMID: 23433877 DOI: 10.1016/j.gie.2012.12.018]
- 47 Chak A. Endoscopy to endocytoscopy to endopathology: are we ready? *Endoscopy* 2007; 39: 540-541 [PMID: 17554651]
- 48 Rotondano G, Bianco MA, Salerno R, Meucci C, Prisco A, Garofano ML, Sansone S, Cipolletta L.

■应用要点

在大量的文献资料基础上, 探讨新内镜技术对SSA的诊断进展, 对比各种新的内镜技术的优缺点, 有助于提高临床医生对于SSA的认识, 可能会为SSA的临床研究及治疗提供新的认识。

■同行评价

本文对SSA提供了比较充足的有意义的信息,基本包括了内镜领域的新技术在诊断SSA的应用,有新颖性,具有一定的临床指导意义。

- 49 Kudo SE, Wakamura K, Ikehara N, Mori Y, Inoue H, Hamatani S. Diagnosis of colorectal lesions with a novel endocytoscopic classification - a pilot study. *Endoscopy* 2011; 43: 869-875 [PMID: 21837586 DOI: 10.1055/s-0030-1256663]
- 50 Kutsukawa M, Kudo SE, Ikehara N, Ogawa Y, Wakamura K, Mori Y, Ichimasa K, Misawa M, Kudo T, Wada Y, Hayashi T, Miyachi H, Inoue H, Hamatani S. Efficiency of endocytoscopy in differentiating types of serrated polyps. *Gastrointest Endosc* 2013 Oct 8. [Epub ahead of print] [PMID: 24119508 DOI: 10.1016/j.gie.2013.08.029]
- 51 Inoue H, Kudo SE, Shiokawa A. Technology insight: Laser-scanning confocal microscopy and endocytoscopy for cellular observation of the gastrointestinal tract. *Nat Clin Pract Gastroenterol Hepatol* 2005; 2: 31-37 [PMID: 16265098]
- 52 Liu C, Li CQ, Zuo XL, Ji R, Xie XJ, Yang YS, Li YQ. Confocal laser endomicroscopy for the diagnosis of colorectal cancer in vivo. *J Dig Dis* 2013; 14: 259-265 [PMID: 23336610 DOI: 10.1111/1751-2980.12039]
- 53 Cârțână T, Săftoiu A, Gruionu LG, Gheonea DI, Pirici D, Georgescu CV, Ciocâlțeu A, Gruionu G. Confocal laser endomicroscopy for the morphometric evaluation of microvessels in human colorectal cancer using targeted anti-CD31 antibodies. *PLoS One* 2012; 7: e52815 [PMID: 23285192 DOI: 10.1371/journal.pone.0052815]
- 54 Liu J, Zuo X, Li C, Yu T, Gu X, Zhou C, Li Z, Goetz M, Kiesslich R, Li Y. In vivo molecular imaging of epidermal growth factor receptor in patients with colorectal neoplasia using confocal laser endomicroscopy. *Cancer Lett* 2013; 330: 200-207 [PMID: 23220286 DOI: 10.1016/j.canlet.2012.11.044]
- 55 Kuiper T, Kiesslich R, Ponsioen C, Fockens P, Dekker E. The learning curve, accuracy, and interobserver agreement of endoscope-based confocal laser endomicroscopy for the differentiation of colorectal lesions. *Gastrointest Endosc* 2012; 75: 1211-1217 [PMID: 22459661 DOI: 10.1016/j.gie.2012.01.040]
- 56 Xie XJ, Li CQ, Zuo XL, Yu T, Gu XM, Li Z, Ji R, Wang Q, Li YQ. Differentiation of colonic polyps by confocal laser endomicroscopy. *Endoscopy* 2011; 43: 87-93 [PMID: 21038291 DOI: 10.1055/s-0030-1255919]
- 57 Henry ZH, Yeaton P, Shami VM, Kahaleh M, Patrie JT, Cox DG, Peura DA, Emura F, Wang AY. Meshed capillary vessels found on narrow-band imaging without optical magnification effectively identifies colorectal neoplasia: a North American validation of the Japanese experience. *Gastrointest Endosc* 2010; 72: 118-126 [PMID: 20381799 DOI: 10.1016/j.gie.2010.01.048]
- 58 Tischendorf JJ, Wasmuth HE, Koch A, Hecker H, Trautwein C, Winograd R. Value of magnifying chromoendoscopy and narrow band imaging (NBI) in classifying colorectal polyps: a prospective controlled study. *Endoscopy* 2007; 39: 1092-1096 [PMID: 18072061]
- 59 Ikematsu H, Saito Y, Tanaka S, Uraoka T, Sano Y, Horimatsu T, Matsuda T, Oka S, Higashi R, Ishikawa H, Kaneko K. The impact of narrow band imaging for colon polyp detection: a multicenter randomized controlled trial by tandem colonoscopy. *J Gastroenterol* 2012; 47: 1099-1107 [PMID: 22441532 DOI: 10.1007/s00535-012-0575-2]
- 60 Pasha SF, Leighton JA, Das A, Harrison ME, Gurudu SR, Ramirez FC, Fleischer DE, Sharma VK. Comparison of the yield and miss rate of narrow band imaging and white light endoscopy in patients undergoing screening or surveillance colonoscopy: a meta-analysis. *Am J Gastroenterol* 2012; 107: 363-70; quiz 371 [PMID: 22186978 DOI: 10.1038/ajg.2011.436]
- 61 Iwatate M, Ikumoto T, Hattori S, Sano W, Sano Y, Fujimori T. NBI and NBI Combined with Magnifying Colonoscopy. *Diagn Ther Endosc* 2012; 2012: 173269 [PMID: 23304065 DOI: 10.1155/2012/173269]
- 62 Ussui VM, Wallace MB. Confocal endomicroscopy of colorectal polyps. *Gastroenterol Res Pract* 2012; 2012: 545679 [PMID: 22319524 DOI: 10.1155/2012/545679]

编辑 郭鹏 电编 鲁亚静

