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· 论著 ·

埋藏型视盘玻璃疣光学相干断层扫描血管成像的影像特征及其诊断价值

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[摘要] 目的: 观察埋藏型视盘玻璃疣(optic disc drusen, ODD)的光学相干断层扫描血管成像(optical coherence tomography angiography, OCTA)影像特征表现, 探讨其对本疾病的临床诊断价值。方法: 选取2017年1月至2018年12月于南京医科大学附属眼科医院就诊并确诊为埋藏型ODD的患者, 共13例20只眼, 其中7例14只眼为双眼发病, 6例6只眼为单眼发病。分析所有患者的临床资料, 总结本疾病在OCTA中的影像特征。结果: 所有患眼眼底检查可见视盘隆起, 生理性视杯消失, 可伴有视盘血管分支异常、血管粗大、血管增多并扭曲等异常改变, 可伴有视盘旁出血; B型超声检查可见视盘处呈局部高回声隆起, 钙样物质呈强回声; 眼底血管荧光造影(fundus fluorescein angiography, FFA)示玻璃疣晚期呈高荧光着染, 无荧光渗漏。OCTA示视盘境界不清, 神经纤维层较正常显著增厚, 视盘凹陷根据玻璃疣体积大小不同有差异, 联合B扫描断层(B-scan)可见神经上皮层间有类团状高反射, 似有囊膜包裹, 内部无血流信号。当并发缺血性视神经病变时, 视盘缺血区可见相对应的放射状盘周毛细血管(radial peripapillary capillaries, RPC)血流密度降低。OCTA随访观察可见4例并发视盘旁出血的患眼经口服药物(和血明目片)治疗后, 出血逐渐完全吸收, 玻璃疣处局部隆起同前, 无明显变化。结论: OCTA在埋藏型ODD中具有特征性表现, 多模式影像可帮助临床进一步明确诊断与鉴别, 具有一定的临床价值, 无创快捷是其最大优势。

[关键词] 埋藏型视盘玻璃疣; 光学相干断层扫描血管成像; 特征; 诊断

Imaging features and diagnostic value of optical coherence tomography angiography in buried optic disc drusen

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Abstract **Objective:** To observe the imaging features and diagnostic value of optical coherence tomography angiography (OCTA) in buried optic disc drusen (ODD). **Methods:** A total of 13 patients (20 eyes) were diagnosed as buried optic disc drusen at Nanjing Medical University Eye Hospital from January 2017 to December 2018. The

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clinical data and the imaging features of OCTA were analyzed. **Results:** Fundus examination showed that the boundaries of the optic disc was unclear, disappearance of physiological depression, complicated with abnormal optic disc branch blood vessels, dilatation, increase and distortion changes and peripapillary hemorrhage, etc. B-mode ultrasound showed there was a locally hyperechoic bulge at the optic disc, and local calcification was hyperechoic. Fundus fluorescein angiography (FFA) showed that optic disc drusen with hyperfluorescence staining and no leakage. OCTA showed that the retina nerve fiber layer (RNFL) was thicker than normal and the size of the optic disc depression were different. B-scan showed that there was a small round hyperreflexes intraretinal, which appeared to be wrapped in cystic membrane with no blood flow signal inside. The blood flow density of radial peripapillary capillaries (RPC) was decreased in the ischemic region. After corresponding treatment, OCTA during follow-up showed that the hemorrhage was completely absorbed in four cases complicated with peripapillary hemorrhage, and the bulge of optic disc drusen had no change. **Conclusion:** Buried optic disc drusen has characteristic performance in OCTA. Multimode images can help to make a definite and differential diagnosis in clinic. Non-invasiveness and convenience are the greatest advantage.

Keywords buried optic disc drusen; optical coherence tomography angiography; features; diagnosis

埋藏型视盘玻璃疣(optic disc drusen, ODD)是一种单眼或双眼发病的先天性视神经异常,属于常染色体显性遗传^[1]。检眼镜下较难看到深层的ODD,视盘轻微隆起或比较饱满,边界模糊;视盘上血管数量增多、扩张;随着玻璃疣体的增大,其逐渐向视盘表面发展,使视盘边界不清呈隆起状,而且可以直接损伤或者压迫临近的血管,引起血管破裂造成视盘周围浅层或深层的出血^[2]。该病发病隐匿,症状轻微,临床上易漏诊或与视神经炎等疾病相混淆。目前临床关于埋藏型ODD的光学相干断层扫描血管成像(optical coherence tomography angiography, OCTA)的影像特征鲜见报道。本研究旨在了解埋藏型ODD的OCTA影像特征,探讨其对本疾病的临床诊断价值。

1 对象与方法

1.1 对象

回顾2017年1月至2018年12月在南京医科大学附属眼科医院就诊并确诊为埋藏型ODD的患者共13例20只眼。其中7例14只眼为双眼发病,6例6只眼为单眼发病。所有患者中男6例,女7例;年龄25~48(36.5±2.2)岁。患者就诊时最佳矫正视力0.3~1.0。排除标准为因高度近视、屈光介质浑浊严重及配合不佳导致成像不清的患眼。

根据文献[3]标准,根据深浅ODD可分为埋藏

型和表面型。埋藏型ODD患者通常视盘较小,呈饱满隆起状,边界模糊,无充血,表面血管不被遮盖。视盘表面或周围可伴有视网膜出血,可能是由于硬而锐利的疣体压迫或直接损伤视盘上或周围毛细血管引起。本次采集的所有患眼眼底可见视盘水肿,边界不清,生理性视杯消失,均符合埋藏型玻璃疣的诊断标准。其中4例4眼伴有视盘旁视网膜下出血。

1.2 方法

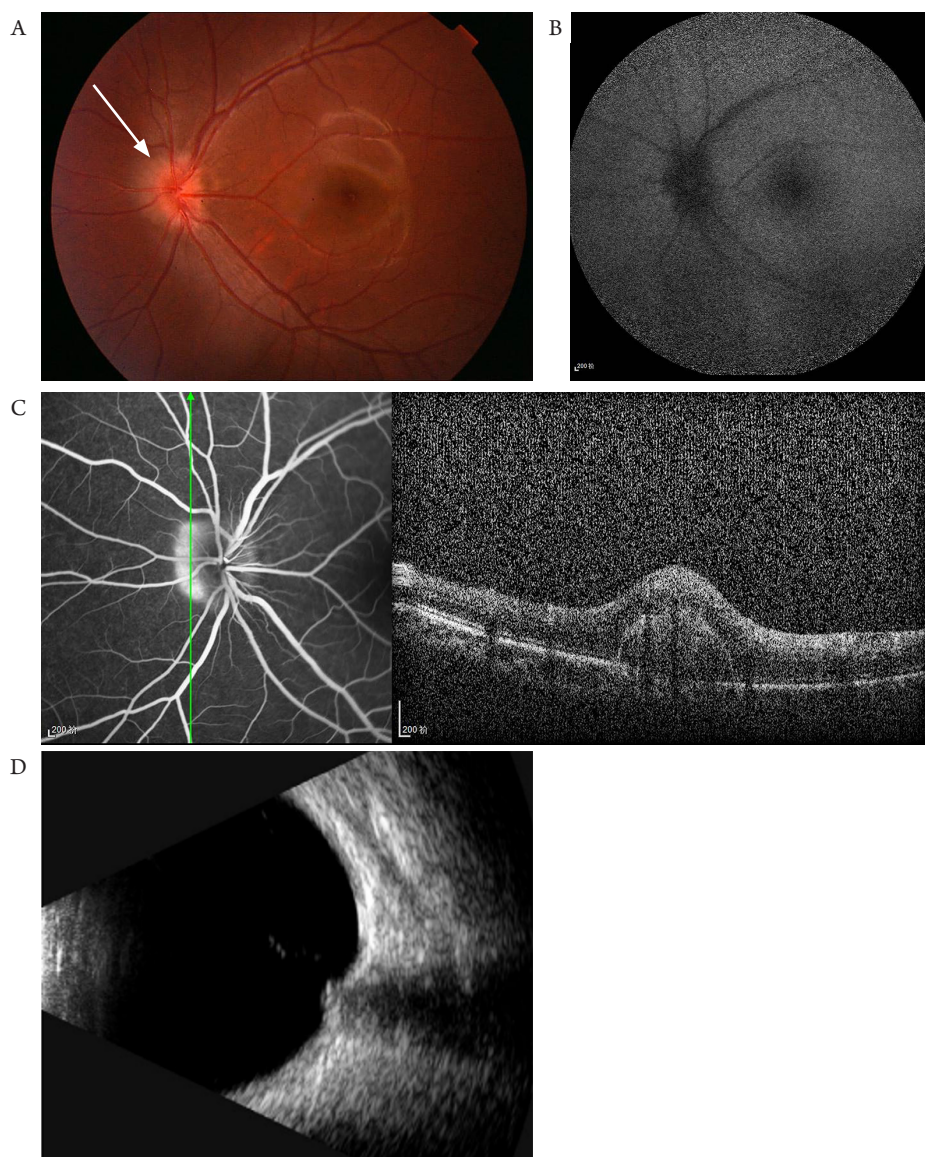
所有患者行眼底照相、B超、眼底自发荧光(fundus autofluorescence, FAF)、眼底血管荧光造影(fundus fluorescein angiography, FFA)及OCTA检查(图1, 2)。眼底彩色照相检查采用日本Topcon眼底照相机进行;B型超声检查采用天津迈达ODM-2100S眼科A/B超声测量仪;FFA检查采用德国海德堡共焦激光扫描眼底血管造影仪进行。眼底照相可见视盘边界不清,可伴视盘旁视网膜下出血(图1A, 图2A, 图2B)。眼底FAF可见视盘边界不清,局部呈高荧光,伴视盘旁网膜下出血呈遮蔽荧光(图1B, 图2C)。FFA造影早期可见视盘呈局限性高荧光,视盘周围视网膜下出血呈遮蔽荧光,晚期视盘呈持续性的结节样强荧光,无荧光素渗漏其形态、大小较早期无明显变化^[4](图1C, 图2D)。B超检查可见视盘处呈局部高回声隆起,钙样物质呈强回声,其周边显示呈暗区,降低增

益后高回声不消失^[5](图1D)。

所有患眼采用美国光视公司的Angio Vue OCT血管成像系统(Avanti RTVue XR, Optovue)行OCTA检查。由同一位医生对患者患眼行视盘4.5 mm×4.5 mm范围扫描,操作中尽量避免抖动严重、泪膜不稳定等影响图像质量的客观因素,系统自动处理图像后,提供视盘血流图及对应结构En face图像和B-scan图像、视盘神经纤维厚度,RPC血流密度等。

2 结果

所有患眼OCTA检查可见视盘境界不清,玻璃疣处神经纤维层较正常者显著增厚,根据玻璃疣体积大小不同视盘凹陷有差异,联合B-scan可见视盘神经纤维层下与神经上皮层间类团状高反射,似有囊膜包裹,内部无血流信号。并发缺血性视神经病变时,视盘缺血区可见相对应的RPC血流密度降低(图1E, F; 图2E~H)。



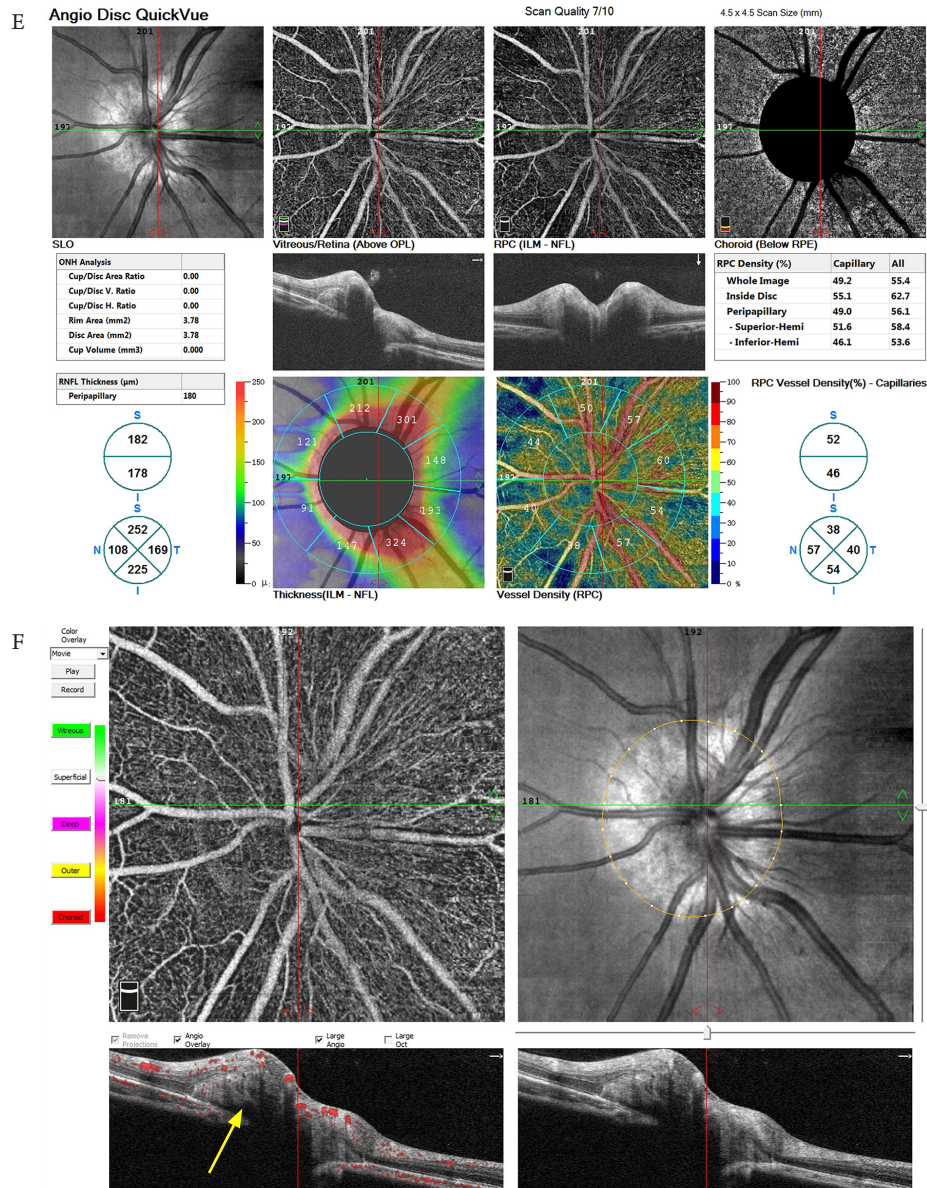
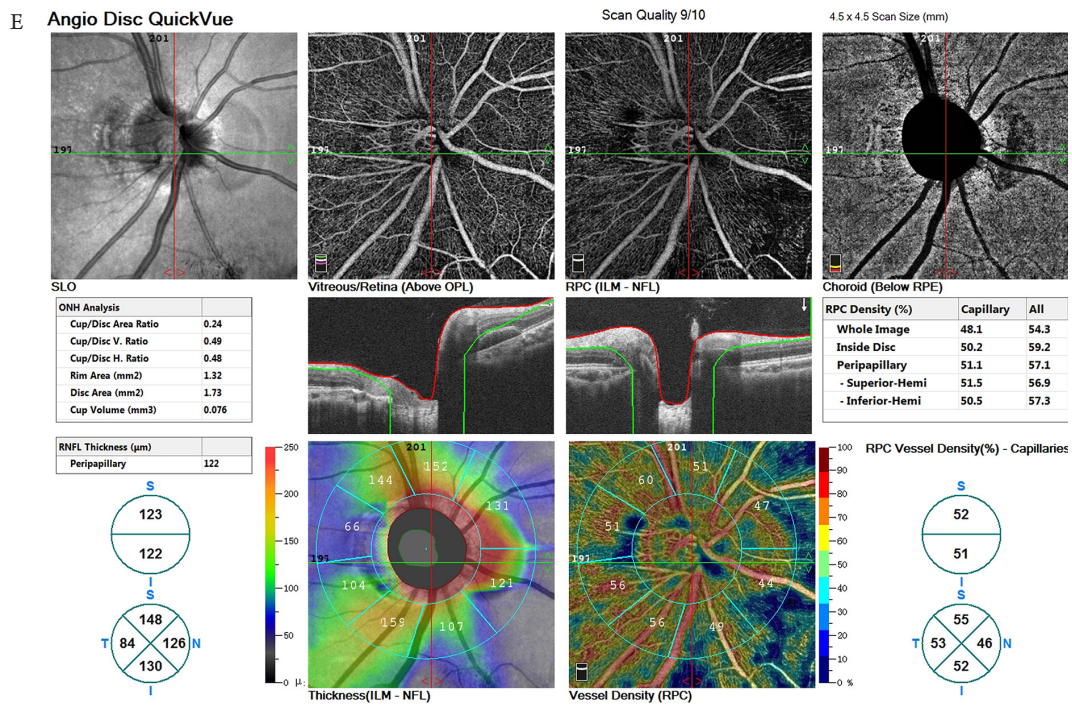
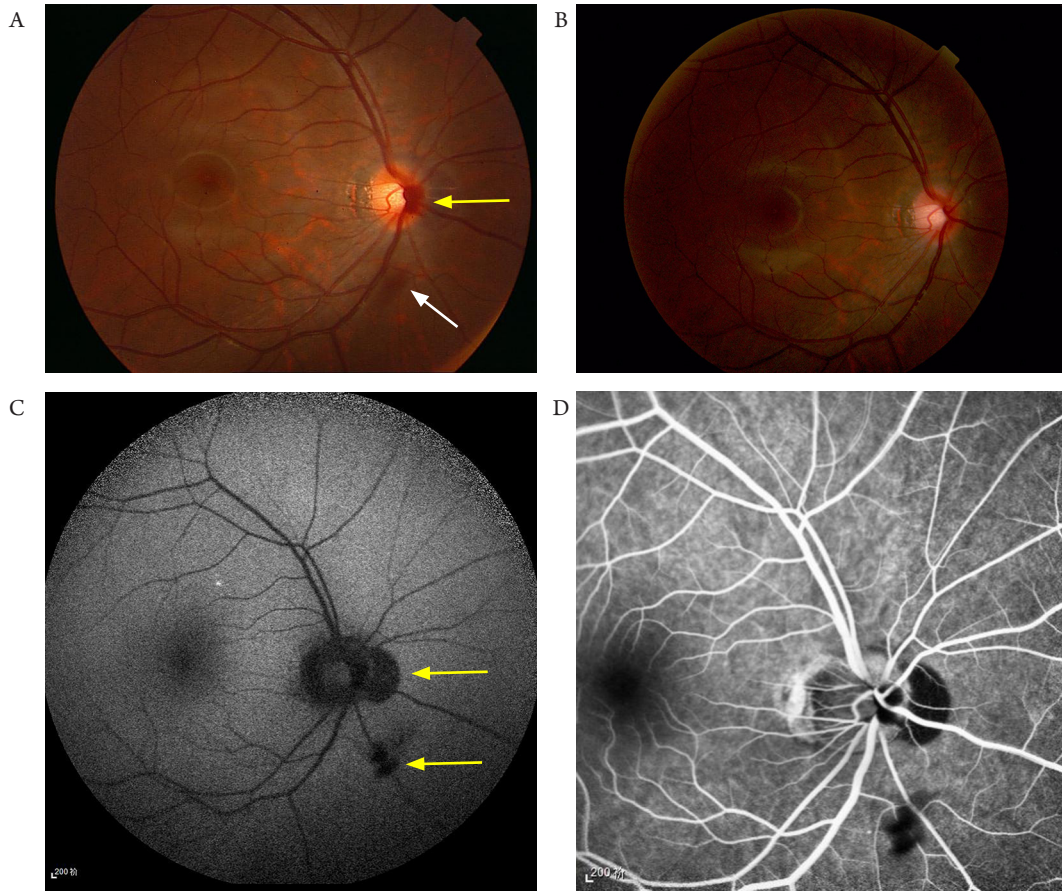


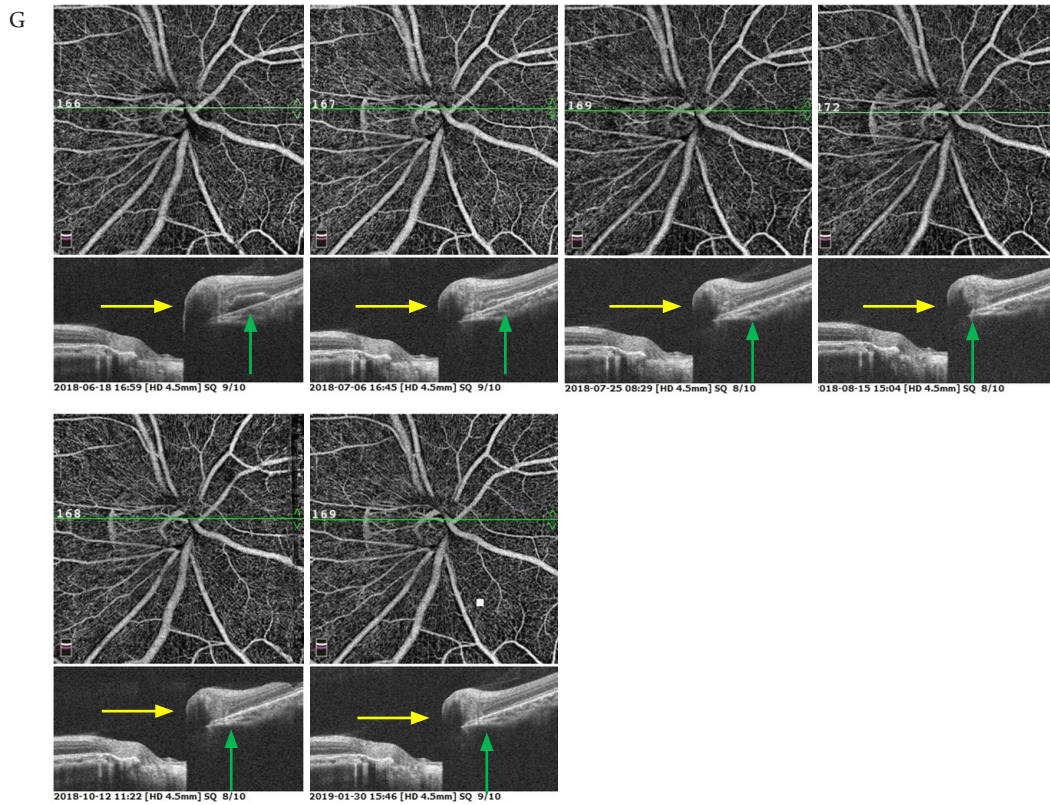
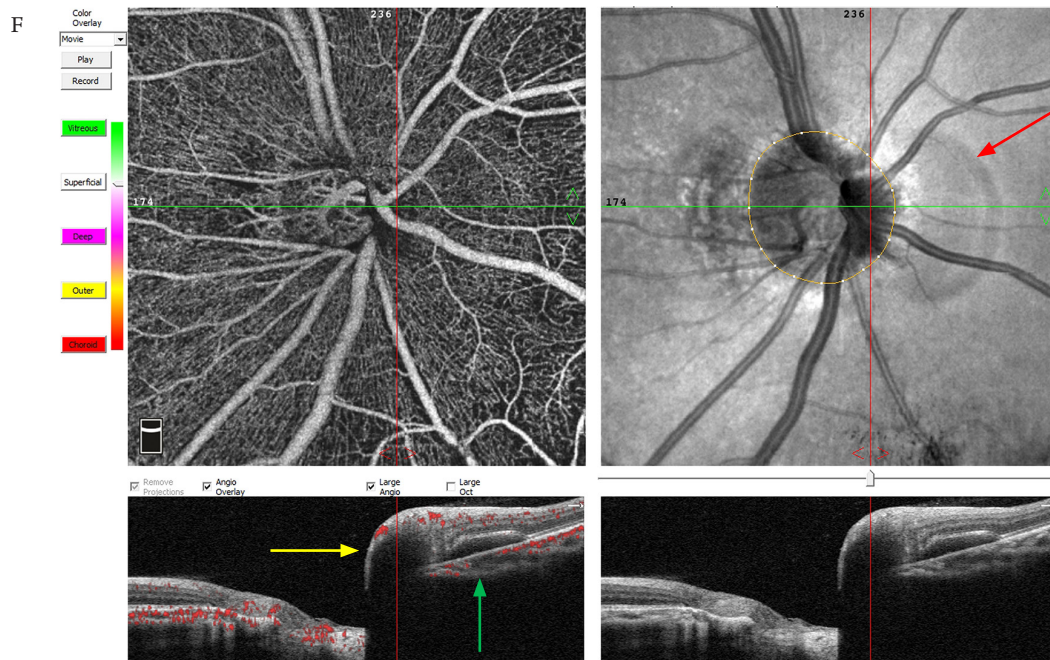
图1 视盘玻璃疣

Figure 1 Optic disc drusen

(A) 左眼眼底彩照示视盘境界不清(白箭); (B) FAF示左眼视盘边缘模糊, 鼻侧局部呈高荧光; (C) FFA示造影晚期视盘境界不清, 鼻侧呈结节状高荧光, 未见荧光渗漏(红箭); 联合频域OCT对应视盘鼻侧可见神经上皮层间类团状高反射(黄箭), 似有囊膜包裹, 视杯凹陷变浅; (D) B超检查可见视盘处呈局部高回声隆起; (E, F) OCTA示视盘境界不清, 神经纤维层显著增厚, 凹陷变浅, 周围浅层视网膜血管结构正常, 联合B扫描断层图可见神经上皮层间类团状高反射, 内部无血流信号(黄箭)。

(A) The left eye fundus photography showed that the boundary of the optic disc was unclear (white arrow); (B) FAF showed that the boundaries of the optic disc was unclear, partially appeared hyperfluorescence; (C) FFA showed that the boundary of the optic disc was unclear, with nodular hyperfluorescence on the nasal side and no leakage (red arrow). OCT showed that there was a small round hyperreflexes intraretinal, which appears to be wrapped in cystic membrane, and the optic disc depression was shallow (yellow arrow). (D) B ultrasound showed a locally hyperechoic bulge at the optic disc. (E, F) OCTA showed that the retina nerve fiber layer (RNFL) is thicker than normal and the optic disc depression was shallow. B-scan showed that there was a small round hyperreflexes intraretinal, which appears to be wrapped in cystic membrane and has no blood flow signal inside (yellow arrow).





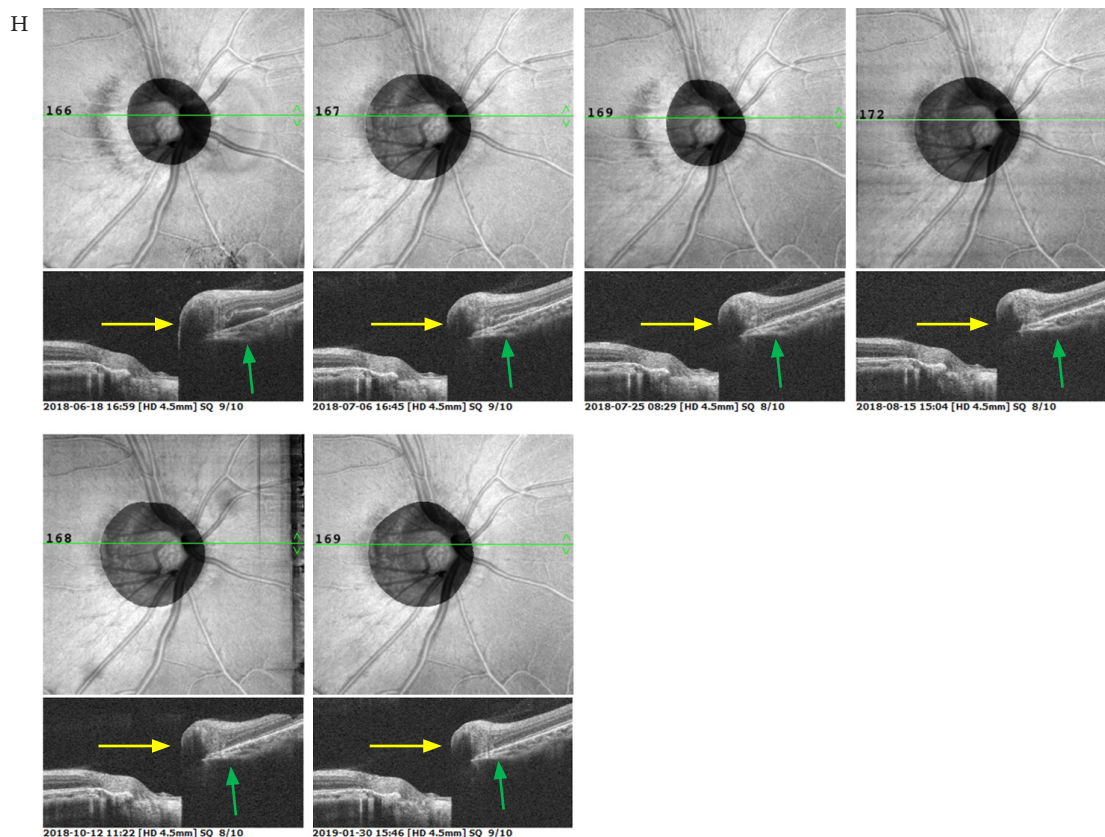


图2 视盘玻璃疣伴出血

Figure 2 Optic disc drusen with parapapillary hemorrhage

(A) 右眼眼底彩照示视盘鼻侧片状视网膜下出血(黄箭), 下方片状视网膜浅层出血(白箭); (B) 右眼眼底彩照示口服药物(和血明目片)治疗后2个月复诊, 出血明显吸收; (C) FAF示视盘边缘界限欠清, 鼻侧及下方出血为遮蔽荧光(黄箭); (D) FFA示晚期视盘境界稍欠清, 鼻侧及下方片状出血呈遮蔽荧光, 未见荧光渗漏; (E, F) OCTA示视盘鼻侧境界不清, 鼻侧神经纤维层明显增厚, 凹陷尚可, 周围神经上皮层下出血性SRD并致血流密度降低, 结构En Face示视盘颞侧新月形出血性SRD(红箭), 联合B扫描断层图可见视盘鼻侧神经上皮层间类团状高反射, 内部无血流信号(黄箭), 颞侧局限性出血性SRD(绿箭); (G, H) OCTA随访图从左到右依次为初诊、2周复诊、1个月复诊、2个月复诊、4个月复诊、6个月复诊, 经过口服药物治疗后, 2个月复诊时出血(绿箭)已完全吸收, 玻璃疣处(黄箭)局部隆起同前无变化。

(A) The right eye fundus photography showed that there was subretinal hemorrhage (yellow arrow, white arrow). (B) The right eye fundus photograph showed that the hemorrhage was obviously absorbed after two months treatment (Hexue Mingmu Pian). (C) FAF showed that the boundary of the optic disc was unclear. The hemorrhage at nasal side and inferior showed hypoautofluorescence (yellow arrow). (D) FFA showed that the boundary of the optic disc was unclear. The hemorrhage at nasal side and inferior was hypoautofluorescence staining and no leakage. (E, F) OCTA showed that the RNFL is thicker than normal and the size of the optic disc depression were different. B-scan showed that there was a small round hyperreflexes intraretinal, which appears to be wrapped in cystic membrane and has no blood flow signal inside (yellow arrow). (G, H) OCTA follow-up mode showed that after two months of treatment the hemorrhage was completely absorbed (green arrow) and the round hyperreflexes intraretinal was unchanged (yellow arrow). The follow-up time was first visit, 2 weeks, 1 month, 2 months, 4 months, 6 months.

3 讨论

埋藏型ODD表现为视盘隆起, 边界不清, 并伴有视盘血管分支异常、血管粗大、血管增多并扭曲等异常改变。随着年龄增长, 玻璃疣体积增大, 可见性增加, 埋藏性可变为可见性。同时由于疣体逐渐向视盘表面发展, 使视盘边界不清, 呈隆起状, 可直接损伤或者压迫临近的血管, 引起血管破裂, 造成视盘周围浅层或深层的出血^[6]。

临床上埋藏型ODD常需与视盘水肿、视神经乳头炎以及前部缺血性视神经病变等鉴别。利用OCTA检查发现, 视盘水肿可见视盘边界不清, 充血水肿显著, 表面毛细血管迂曲扩张, 病灶区血流密度降低, 但是视盘周边局部血流密度增加, 视盘水肿对应B-scan可见神经纤维层增厚隆起, 呈双峰样改变, 且神经纤维层边界不清^[7]; 视神经乳头炎可见视盘边界不清, 生理凹陷消失, 充血水肿, 但隆起度一般不及视盘水肿, 周围视网膜中央静脉扩张迂曲, 动脉正常或略细, 浅层及深层视网膜毛细血管层可见少量出血及硬性渗出; 前部缺血性视神经病变急性期时亦可见视盘充血水肿, 缺血区域毛细血管匮乏, RPC血流密度降低并神经纤维层厚度变薄, 非缺血区域的视盘表面毛细血管代偿性扩张, 神经纤维层厚度显著增厚, RPC血流密度升高。这些不同的OCTA影像有助于与埋藏型ODD相鉴别。

在传统检查手段中, B超是诊断ODD相对最有效的方法^[8], 但只能检测出融合范围较大的玻璃疣。FFA可以通过是否有荧光渗漏而与其他视神经疾病相鉴别, 但当并发缺血性视神经病变时, 也可能伴有视盘荧光渗漏。频域OCT检查只能观察到神经纤维层增厚^[9], 无法判断疾病性质。

本研究结果显示: 在埋藏型ODD检查中, OCTA检查结果与传统影像检查结果相一致。同时进一步对比发现OCTA相比传统检查有以下优势: 1)OCTA扫描后可获得多模式影像结果, 从多角度观察分析, 这是其相较于其他传统影像检查的最大优势。2)由于可以通过调整手动分层线进行分层观察, 且不受少量出血遮蔽或荧光渗漏的影响, OCTA能更清晰地显示视盘边界、视盘血管及毛细血管的形态。3)结合血流信号的B-scan, 可以帮助鉴别断层图像中隆起病灶是否存在血流信号, 从而进一步诊断鉴别; 4)通过软件自设的随

访模式, 可以将疾病前后不同时期图像锁定在同一观察层面观察, 直观了解疾病的变化情况。5)通过软件自设的数据分析, 可客观分析疾病发展不同时期血流密度、神经纤维层(retinal nerve fiber layer, RNFL)、神经节细胞复合体(ganlion cell complex, GCC)的变化情况^[10]。

本研究发现埋藏型ODD在OCTA中的共性特征可提高对本疾病在影像学检查判别中的认识, 具有一定的临床价值。同时本研究结果证实: 对于无法行FFA检查的患者, OCTA可以发挥其快捷无创的优势。但研究也发现: OCTA对患者的固视度要求较高, 对于固视差、屈光介质浑浊等的患者, 往往会影响图像结果的清晰度。此外, 本研究因样本量较小, 还有待于大样本研究和长期结果分析, 有助于评估这种新的成像工具在ODD诊断和随访中的确切作用。因此, 应了解不同检查方法的影像特征, 将多模式影像结果结合, 发挥各自特点的同时, 又相互补充不足之处, 帮助临床更好地对ODD进行鉴别诊断。

参考文献

1. Tso MO. Pathology and pathogenesis of drusen of the optic nervehead[J]. *Ophthalmology*, 1981, 88(10): 1066-1080.
2. 周剑, 韦企平. 视盘玻璃疣[J]. *中国实用眼科杂志*, 2005, 23(9): 881-886.
ZHOU Jian, WEI Qiping. Optic disc drusen[J]. *Chinese Journal of Practical Ophthalmology*, 2005, 23(9): 881-886.
3. 常翠荣, 于建国, 齐世欣. 不同类型玻璃膜疣的影像学表现研究[J]. *医学信息*, 2018, 5(9): 67-69.
CHANG Cuirong, YU Jianguo, QI Shixin. Imaging features of different types of vitreous drusen[J]. *Medical Information*, 2018, 5(9): 67-69.
4. 吕永川, 崔舒红, 尚丽. 双眼埋藏性视盘玻璃膜疣误诊报告[J]. *临床误诊误治*, 2013, 26(3): 35-36.
LÜ Yongchuan, CUI Shuhong, SHANG Li. Misdiagnosis report of buried optic disc drusen[J]. *Clinical Misdiagnosis and Mistreatment*, 2013, 26(3): 35-36.
5. 李娟娟, 张美霞. 埋藏性视盘玻璃膜疣的临床分析[J]. *眼科新进展*, 2009, 29(6): 438-439.
LI Juanjuan, ZHANG Meixia. Clinical analysis of buried optic disc drusen[J]. *Recent Advances in Ophthalmology*, 2009, 29(6): 438-439.
6. Sanders TE, Gay AJ, Newman M. Hemorrhagic complications of

- drusen of the optic disk[J]. Am J Ophthalmol, 1971, 71(1 Pt 2): 204-217.
7. Kim MS, Lee KM, Hwang JM, et al. Morphologic features of buried optic disc drusen on en face optical coherence tomography and optical coherence tomography angiography[J]. Am J Ophthalmol, 2020, 213: 125-133.
 8. Friedman AH, Beckerman B, Gold DH, et al. Drusen of the optic disc[J]. Surv Ophthalmol, 1977, 21(5): 373-390.
 9. 徐伟刚, 潘波, 刘娟. 埋藏性视盘玻璃疣OCT检查的临床表现[J]. 国际眼科杂志, 2013, 11(13): 2340-2342.
XU Weigang, PAN Bo, LIU Juan. Clinical analysis of buried optic nerve drusen with optical coherence tomography examination[J]. International Journal of Ophthalmology, 2013, 11(13): 2340-2342.
 10. Engelke H, Shajari M, Riedel J, et al. OCT angiography in optic disc drusen: comparison with structural and functional parameters[J]. Br J Ophthalmol, 2020, 104(8): 1109-1113.

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