

Fs-LASIK术中中央角膜上皮剥脱处理一例

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摘要

飞秒辅助准分子激光原位角膜磨镶术(femosecond laser *in situ* keratomileusis, Fs-LASIK)术中角膜中央上皮剥脱是较少发生的一类并发症, 它会增加感染性角膜炎、弥漫性层间角膜炎(diffuse lamellar keratitis, DLK)和复发性角膜上皮糜烂的发生风险。本文报告一例单眼Fs-LASIK术中出现中央角膜上皮大片剥脱的患者, 戴绷带镜治疗后角膜上皮出现缺氧、弥漫上皮缺损的情况, 停绷带镜后上皮修复又合并DLK, 抗炎治疗后再次出现上皮剥脱的治疗经过。本病例通过分析LASIK术中出现的中央角膜上皮剥脱用药及绷带镜使用的要点, 提示临床医生对于Fs-LASIK术中出现的中央角膜上皮剥脱应谨慎对待, 注意绷带镜使用后的反应, 密切随访及时调整用药, 确保上皮的及时修复, 避免感染、炎症和复发造成的视力损害。

关键词

飞秒辅助准分子激光原位角膜磨镶术, 角膜, 绷带镜, 治疗

A Case of Central Corneal Epithelial Defect Management during Fs-LASIK

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Abstract

Femtosecond laser-assisted *in situ* keratomileusis (Fs-LASIK) is a type of corneal refractive surgery. Central corneal epithelial defect during Fs-LASIK is an uncommon complication that can increase the risk of infectious keratitis, diffuse lamellar keratitis (DLK), and recurrent corneal epithelial erosion. This article reports a case of a patient who experienced large-scale central corneal epithelial defect during unilateral Fs-LASIK. After bandage contact lens treatment, the corneal epithelium exhibited hypoxia and diffuse epithelial defects. Subsequent removal of the bandage contact lens resulted in epithelial repair but accompanied by DLK. The treatment course included addressing epithelial exfoliation after anti-inflammatory therapy. Through analysis, this case highlights the importance of medication and proper use of bandage lenses when managing central corneal epithelial exfoliation during Fs-LASIK. Clinical practitioners should exercise caution, closely monitor post-bandage contact lens reactions, adjust medication promptly to ensure timely epithelial repair, and prevent vision impairment caused by infection, inflammation, and recurrence.

Keywords

Femtosecond Laser-Assisted *In Situ* Keratomileusis, Corneal, Bandage Contact Lense, Treatment

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1. 前言

飞秒辅助准分子激光原位角膜磨镶术(femtosecond laser *in situ* keratomileusis, Fs-LASIK)术中的中央角膜上皮剥脱是一种相对少见的角膜瓣并发症。类似角膜瓣缘的上皮缺损,中央角膜上皮剥脱也会导致术后眼部不适,同时它会显著增加感染性角膜炎、弥漫性层间角膜炎(diffuse lamellar keratitis, DLK)和复发性角膜上皮糜烂(recurrent corneal erosion syndrome, RCE)的发生风险[1] [2] [3]。文献报道导致角膜上皮剥脱的危险因素包括:上皮基底膜营养不良(epithelial basement membrane dystrophy, EBMD)、老年人、糖尿病病史、术前眼部频繁使用麻药、干眼症及医源性器械损伤等[3] [4]。润眼药物、自体血清滴眼液、绷带镜与手术等方式都可以较好地促进角膜上皮修复[5],研究报道使用润眼药物或绷带镜,对 RCE 症状的缓解率分别达到 71%、73%,并且绷带镜可更快地缓解症状[6]。本文报告一例 Fs-LASIK 术中角膜中央上皮剥脱的患者术中及术后的处理过程,分析该并发症的处理要点。

2. 病例资料

一位 23 岁的女性患者,因“双眼视远不清 18 年”于 2023 年 5 月 15 日就诊于汕头大学·香港中文大学联合汕头国际眼科中心视光科。患者既往因近视戴框架眼镜 18 年,佩戴隐形眼镜 5~6 年,就诊时停戴隐形眼镜 1 月,否认其他眼部病史,否认全身病史及外伤史。

眼部检查:视力及屈光度:右眼 0.12, OD: -5.25DS/-4.00DC × 175°→1.0, 左眼 0.12, OS: -4.75DS/-4.25DC × 175°→1.0; 眼内压(非接触喷气式眼压计 CT-800, Topcon, 日本):双眼 21 mmHg 双眼结膜无充血,右眼角膜透明, FL(-), BUT 7s; 左眼角膜透明, FL(+), BUT 6s。双眼前房深,晶体透明,眼底未见明显异常。

辅助检查：双眼角膜地形图检查(Pentacam, Oculus, 德国)提示中央角膜厚度为右眼 578 μm 、左眼 577 μm 。角膜生物力学检查(Corvis, Oculus, 德国)提示双眼角膜生物力学指标未见明显异常、眼部像差检测(iTrace, Tracey, 美国)提示双眼角膜高度散光。眼生物参数测量(Lenstar 900, Haag-Streit, 美国)提示眼轴为右眼 25.67 mm、左眼 25.46 mm。综合患者病史、裂隙灯段检查及辅助检查,排除圆锥角膜及其他手术禁忌。接诊医生诊断:双眼复性近视散光,结合患者意愿,拟行双眼 Fs-LASIK 手术。

患者术前三天使用 0.3%盐酸左氧氟沙星滴眼液四次每日预防感染后,于 2023 年 5 月 16 日由经验丰富的手术医生在表面麻醉下(盐酸丙美卡因滴眼液术前滴用三次),使用飞秒激光治疗仪(FEMTO LDV, Ziemer, 瑞士)对右眼制作角膜瓣(110 μm , 上方蒂),翻转角膜瓣后使用准分子激光仪进行角膜消融(Amaris 750S, Schwind, 德国),冲洗角膜瓣复位过程发现中央区约 6 $\times$ 6 mm 范围大片角膜上皮剥脱(参见图 1),轻柔冲洗角膜瓣并仔细对位,右眼戴绷带镜(PureVision, Bausch & Lomb, 英国)、0.3%氧氟沙星滴眼液抗感染、0.1%氟米龙滴眼液抗炎及 0.1%玻璃酸钠眼水治疗两小时一次。为避免类似情况发生,暂停左眼手术。

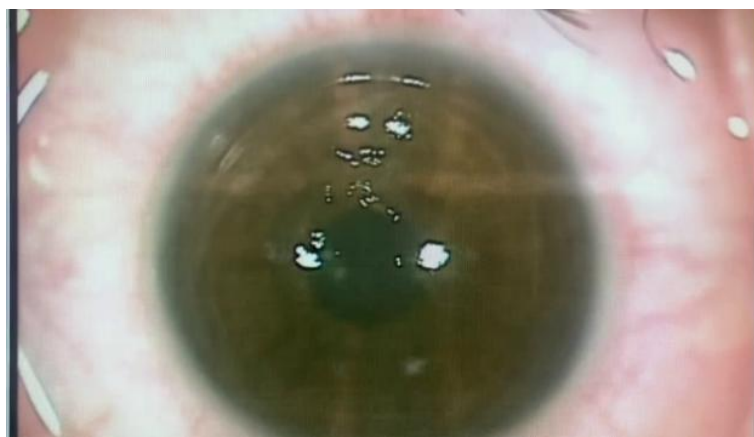


Figure 1. The ocular surface photography of the right eye during Fs-LASIK (An approximate 6 $\times$ 6 mm corneal epithelial defect area in the central cornea of the right eye)

图 1. 右眼 Fs-LASIK 术中眼表照相(右眼角膜中央区约 6 $\times$ 6 mm 范围上皮剥脱)

术后第一天查右眼视力 0.8,角膜上皮中央 1 $\times$ 2 mm 缺损,将所有药物频次改为每日 4 次,继续用药。第五天患者报告眼红眼痛,查右眼视力 0.6,见结膜混合性充血(+),角膜上皮多处缺损及表面白色上皮脱落物附着(见图 2(A)),绷带镜附着,无明显活动度,即刻摘除绷带镜、停用激素,加用小牛血去蛋白提取物滴眼液每日 2 次并改无防腐剂的人工泪液频点,8 小时后见多处上皮缺损基本愈合,仅余中央角膜上皮约 2 $\times$ 2 片状缺损(见图 2(B))。第六天查右眼视力 0.5,角膜上皮中央 1 $\times$ 1 mm 范围缺损,出现 II 级 DLK(见图 2(C)),加用 0.1%醋酸泼尼松龙眼水每日 6 次及妥布霉素地塞米松眼膏每晚 1 次。第九天查右眼视力 0.8,见角膜上皮点状缺损 I 级(见图 2(D)),用药方案同前。

第十天患者再次眼痛,右眼视力为 0.3,查体见角膜上皮中央区缺损约 3 $\times$ 2 mm,角膜水肿(++) (见图 2(E)),给予停用激素,并佩戴绷带镜(ACUVUE, Johnson, 美国),继续抗感染、促上皮修复及润眼治疗。第十一天复查右眼视力 0.5,中央局部角膜上皮粗糙,DLK 消失,加用 0.1%氟米龙眼水每日 4 次,余治疗同前。术后第十四天患者复诊右眼视力为 0.8,角膜上皮光滑,角膜基本透明(见图 2(F)),予更换另一型号的绷带镜,继续抗炎、润眼及促修复等药物治疗。

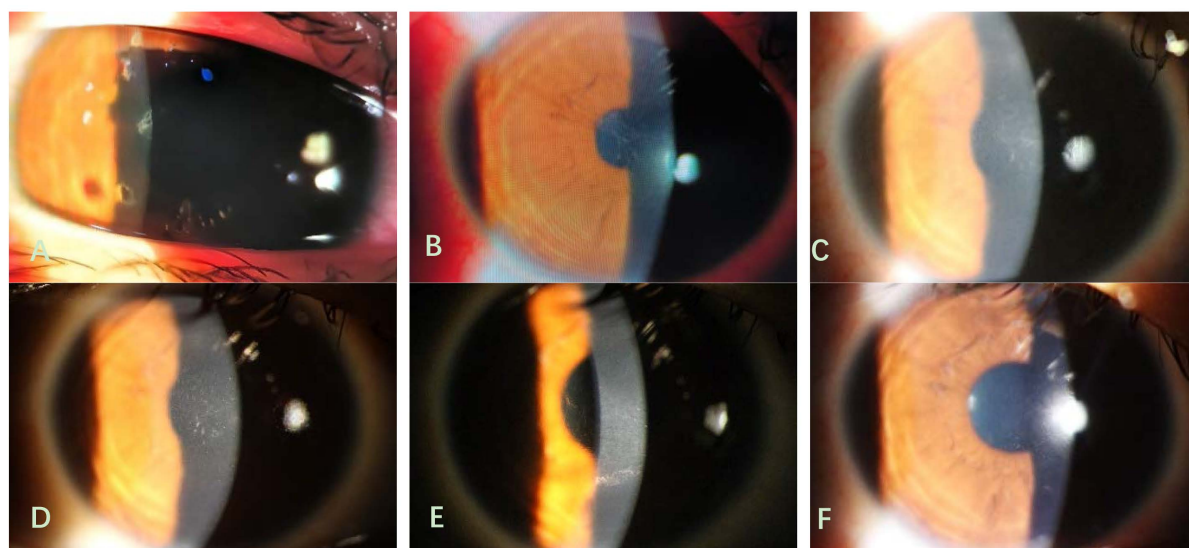


Figure 2. The ocular surface photography of the right eye after Fs-LASIK (A. 5 days postoperative, multiple epithelial defects and adherent white epithelial debris were observed on the corneal surface; B. 5 days postoperative, upon removing the bandage lens for 8 hours, there was significant improvement in the epithelial defect, with a approximately 2×2 mm central defect; C. 6 days postoperative, a central 1×1 mm area of epithelial defect with grade II DLK; D. 9 days postoperative, grade I punctate epithelial defects with grade I DLK were observed on the cornea; E. 10 days postoperative, the central cornea was observed with an approximate 3×2 mm area of epithelial defect; F. 14 days postoperative, the corneal epithelium appeared smooth, and the cornea was mostly transparent)

图 2. 患者右眼 Fs-LASIK 术后的眼前节照相(A.术后 5 天, 角膜多处上皮缺损及表面白色上皮脱落物附着; B.术后 5 天, 摘绷带镜 8 小时后角膜上皮缺损较前明显好转, 中央上皮缺损约 2×2 mm; C.术后 6 天, 角膜上皮中央 1×1 mm 范围缺损合并角膜层间 II 级 DLK; D.术后 9 天, 角膜上皮点状缺损 I 级, DLK I 级; E.术后 10 天, 角膜上皮中央缺损, 范围约 3×2 mm; F.术后 14 天, 角膜上皮光滑, 角膜基本透明)

3. 讨论

对于 LASIK 术中出现角膜上皮缺损的患者, 当角膜缺损直径大于 3 mm 时术后更容易出现角膜上皮过度修复和角膜散光[2] [7]。Moshirfar 等[8]对比发现由于避免了角膜刀对于上皮粘附的影响, Fs-LASIK 术后 RCE 的发生率较角膜刀制瓣的 LASIK 有所降低。不同于准分子激光角膜表面切削术(PhotoRefractive Keratectomy, PRK)直接消融角膜上皮, LASIK 术中的上皮损伤更多见于上皮与基底膜间的松脱, 同时上皮损伤会导致白介素 1 等细胞因子分泌, 可诱发更严重的角膜基质 - 上皮相互作用, 如角膜基质细胞的凋亡与有丝分裂等, 并导致了更显著的角膜基质重塑、角膜层间炎症(如 DLK)与角膜上皮不规则增生[9] [10]。因此, 正确处理 Fs-LASIK 术中出现的角膜上皮缺损, 可帮助提高患者术后的视觉质量。

为避免 LASIK 术中出现角膜上皮剥脱, 需留意患者有无以下危险因素: 糖尿病[11]、干眼症[12] [13]、角膜增厚[14]或年龄较大[14], 术前需仔细询问患者的眼部病史, 查体需留意有无 EBMD 等角膜营养不良的体征[3] [4]。具有上述危险因素的患者术后发生 RCE 的风险较高[15], 因此对于此类患者, 应酌情考虑选择 PRK 手术矫正近视, 同时需避免长时间或高频率使用眼部麻醉药物, 术中避免过度损伤角膜上皮, 尤其是角膜缘处的上皮。对于术中已出现角膜上皮缺损的患者, 首选药物治疗促进上皮修复、预防感染, 同时使用绷带镜保护上皮[16] [17]。

本例患者术前右眼 BUT 7s, 因此考虑患者术中发生上皮剥脱可能的诱因是干眼症。术后当天采用抗感染、抗炎及润眼药物联合绷带镜治疗上皮剥脱, 术后第一天即见角膜上皮有好转, 这与 Smirenniaia 等报告的结论一致[7]。该患者术中使用 PureVision 绷带镜(基弧为 8.6, 中央厚度为 $90 \mu\text{m}$, 透氧量为 101 Dk/t), 然而患者在佩戴绷带镜的第五天出现了角膜上皮多处缺损, 绷带镜附着, 无明显活动度, 考虑角

膜上皮情况与佩戴绷带镜导致的角膜缺氧有关[18]。因此,术后第五天发现患者角膜上皮多处缺损,即刻摘除绷带镜,考虑糖皮质激素可能抑制角膜上皮修复[19],停用激素并改无防腐剂的人工泪液频点,加用促上皮修复药物。第六天复查发现角膜上皮缺损情况明显改善,但出现了 DIK II 级,考虑为停用激素后上皮缺损产生的炎症反应导致的[20]。因此予右眼醋酸泼尼松龙滴眼液及妥布霉素地塞米松眼膏等抗炎处理,随访观察 DLK 较前明显减轻。

患者第九天角膜上皮再次剥脱,考虑角膜中央上皮缺损区未完全修复,上皮细胞之间桥粒附着不紧密,在眨眼过程中眼睑的外力牵拉下造成再次的角膜上皮剥脱,遂停用 0.1%醋酸泼尼松龙眼水及妥布霉素地塞米松眼膏等强效激素并佩戴 ACUVUE 绷带镜(基弧为 8.8,中央厚度为 70 μm ,透氧量为 109 Dk/t),相比首次配戴的绷带镜基弧大、移动度更好,同时镜片较薄、透氧性更好[21][22],隔日角膜上皮基本愈合后加用 0.1%氟米龙滴眼液[23]继续抗炎,随访可见患者角膜上皮逐渐恢复光滑,同时 DIK 逐渐消失。此外既往文献报道,延长佩戴绷带镜的时间至 3 个月有助于促进角膜上皮粘附、预防角膜上皮复发剥脱[24][25],因此目前本例患者在抗炎、抗感染及润眼的基础上,延长绷带镜使用时间以保护角膜上皮,并适当增加随访次数,及时更换镜片以避免接触镜相关不良反应。

由于曾有报道回顾了 6 名患者(11 眼)在 LASIK 术中大范围角膜上皮剥脱病人,在术后均出现了 EBDM 的临床表现,提示 LASIK 术中角膜上皮缺损可能是无症状性 EBDM 的首发体征[26],因此需密切关注本例患者右眼角膜上皮修复情况,左眼若行角膜屈光手术首选 PRK [27],或选择眼内晶体植入手术来矫正近视散光。如右眼保守治疗无效,即出现右眼 RCE 时,可考虑手术治疗,手术方式可选择前基质针刺术、乙醇上皮分离术、金刚石打磨抛光术(diamond burr superficial keratectomy, DBSK)、准分子激光治疗性角膜切削术(phototherapeutic keratectomy, PTK)等[5][15][17][28]。2023 年 Yang 等[29]对比分析了 97 只眼分别接受角膜上皮清创联合前基质针刺术、DBSK、PTK,发现 DBSK 及 PTK 术后的复发率低、上皮愈合快,因此推荐这两种术式为 RCE 患者的优先选择。

本例患者术后的绷带镜和激素调整过程,为临床提供一种 Fs-LASIK 术中角膜中央上皮剥脱的处理参考方案。综上所述,Fs-LASIK 术中出现中央角膜上皮剥脱应谨慎对待,注意绷带镜使用后反应,密切随访及时调整用药,确保上皮的及时修复,避免感染、炎症和复发造成的视力损害。

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