·综　述·

内镜逆行胰胆管造影术后胆道支架移位诊断及防治进展

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摘要：胆道支架移位是一种内镜逆行胰胆管造影术后常见的支架相关的并发症，如果不能早期诊断和治疗，可能会导致严重后果。本文通过归纳近年国内外关于内镜逆行胰胆管造影术后胆道支架移位相关文章，综述内镜逆行胰胆管造影术后胆道支架移位的诊断、危险因素及治疗，从而为指导患者获得较好的预后提供帮助。

关键词：内镜逆行胰胆管造影；胆道支架移位；金属支架；塑料支架；胆管狭窄；十二指肠乳头切开

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Progress in diagnosis and prevention of biliary stent displacement after endoscopic retrograde cholangiopancreatography

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Abstract: Biliary stent displacement is a common stent related complication after endoscopic retrograde cholangiopancreatography. If not diagnosed and treated early, it may lead to serious consequences. This article summarizes recent domestic and international articles on biliary stent displacement after endoscopic retrograde cholangiopancreatography, reviews the diagnosis, risk factors, and treatment of biliary stent displacement after endoscopic retrograde cholangiopancreatography, and provides assistance in guiding patients to achieve better prognosis.

Keywords: Endoscopic retrograde cholangiopancreatography; Biliary stent displacement; Metal bracket; Plastic bracket; Biliary stricture; Incision of duodenal papilla

内镜逆行胰胆管造影(endoscopic retrograde cholangiopancreatography，ERCP)自 1968 年 McCune 等[1]报道以来，随着内镜器械的不断更新及内镜医师操作经验的不断累积，ERCP 具有安全性更高、应用范围更广等优势，目前已成为胰胆系统疾病最重要的诊治手段，其中胆管内支架引流术是恶性或良性疾病继发性胆道梗阻的重要治疗方法[2]。ERCP 术后相关并发症越来越受到重视，与胆道支架相关的并发症发生率在 8%至 10%[3]，其中，支架移位较为常见，如果不能早期诊断和治疗，可能会导致危及生命的并发症(穿孔、腹膜炎、肠梗阻、脓毒症、瘘管形成等)[4]。本文就 ERCP 术后胆道支架移位诊断及防治进展作一概述。

1　ERCP 术后胆道支架移位诊断

Isayama 等[5]建议当再次干预时发现支架完全或部分移位，且支架移位导致复发性胆道梗阻时，可诊断为支架移位。Nakai 等[6]认为支架置入后患者出现腹痛、黄疸或发热等症状，行超声或 CT 扫描后发现先前放置的支架移位，诊断为支架移位。Emara 等[3]则认为仅仅通过仔细病史采集、影像学检查(腹部平片或腹部 CT 扫描)或内镜检查诊断支架移位。文献[3,6-7]根据支架移位程度、时期及方向报道了 3 种分类方式。根据支架移位程度分为部分移位和完全移位。部分移位是指部分支架仍在胆管内，完全移位被认为支架完全脱离胆管。根据支架移位时期分为早期移位和晚期移位。早期移位是指支架置入后 6 个月内发生的移位，超过 6 个月者为晚期移位。根据支架移位方向分为近端移位和远端移位，这是目前常用的支架移位分类方式。近端移位是指当支架在胆总管内向上移动，支架远端未伸出十二指肠乳头。而远端移位则是支架从胆管向下移位，远端位于十二指肠腔内或嵌入十二

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指肠壁,近端仍位于胆总管内,或移位至十二指肠外。

2　支架移位的危险因素

2.1　支架因素

2.1.1　塑料支架　塑料支架由聚乙烯(PE)、聚氨酯(PU)和聚四氟乙烯等组成,直径 5 Fr 至 12 Fr,长度 1 cm 至 18 cm[8-9]。研究表明塑料胆道支架移位率为 5%至 10%,其中近端和远端移位率分别约占 3.1%至 4.9%、3%至 6%[7,10-12]。Yuan 等[11]回顾性分析 248 例 402 次接受胆道塑料支架置入术患者的临床资料,有 40 只移位的胆道支架,支架移位率为 11.2%,近远端分别为 5.0%和 6.2%。为了降低支架移位风险,增加了不同的抗移位结构,包括猪尾、附加皮瓣等[13-14]。Kumar 等[14]认为猪尾支架更能发挥支架固定作用。这可能是支架由于猪尾环结构的锚定而具有较低的移位风险。然而,Paspatis 等[15]一项回顾性研究显示猪尾支架远端移位率较高。Kwon 等[13]一项回顾性研究表明,用附加皮瓣支架移位率低于无附加皮瓣者(3.1% *vs* 16.9%,P=0.04)。

2.1.2　金属支架　自膨胀金属支架由铂、不锈钢和镍钛合金编织构成的网状圆柱体,膨胀后可至最大直径 30 Fr[16]。未覆膜金属支架(UCSEM)是最早使用的支架,植入后由于金属丝网嵌入组织壁,易引起污泥堆积及肿瘤向内生长。为了解决这一问题,在支架表面加入聚合物膜即聚四氟乙烯、聚氨酯、硅树脂等[17]。因此,目前根据有无聚合物膜覆盖,分为未覆膜与覆膜金属支架[18]。

研究表明未覆膜金属支架移位率较低,约占 0%至 8%[19], Diller 等[19]认为随着支架的展开,支架能嵌入到肿瘤中或狭窄两端的正常组织中。黏膜和黏膜下层发生慢性炎症反应,胶原和纤维组织增生,有助于锚定支架。

与未覆膜金属支架相比,覆膜金属支架的优点是通畅性更长,并具有可移除性[20]。然而,覆膜金属支架移位率约占 4.5%至 47%[21-22],高于未覆膜金属支架[2,23-25]。原因是覆盖金属支架的聚合物膜阻止了胆管上皮或肿瘤组织嵌入支架内腔,降低了支架的稳固性[23]。为了降低覆膜金属支架移位风险,添加了不同的抗移位结构如近端皮瓣、扩口端、更大直径、哑铃型支架、双猪尾塑料支架(double-pigtail plastic stent, DPS)等[20,22,26-28]。Bordaçahar 等[22]发现在良性胆管狭窄中,带近端膜瓣的覆膜金属支架移位率明显低于无近端膜瓣者(1.7% *vs* 27.9%,P<0.01)。Park 等[29]一项前瞻性研究,分析了 14 例接受扩口端设计的覆膜金属支架置入术患者的临床资料,发现 1 例支架移位,支架移位率(7%)明显低于无扩口端者(39%)。Park 等[27]报道带近端膜瓣的覆膜金属支架的移位率明显低于有扩口端者(0 *vs* 33%,P<0.01)。还有研究认为更大直径支架可以降低支架移位率,Lee 等[28]一项前瞻性研究表明在恶性胆管狭窄中,直径为 12 mm 覆膜金属支架的支架移位率明显低于直径为 10 mm 者(8.0% *vs* 23.1%,P=0.04)。在良性胆管狭窄中,Moon 等[30]研究发现,哑铃型覆膜金属支架比传统覆膜金属支架更有效地防止支架移位。Paik[26]等研究表明用 7 Fr DPS 锚定覆膜金属支架的支架移位率明显低于无 7 Fr DPS 锚定者(15% *vs* 40%,P=0.02)。然而,Ali 等[20]回顾性研究表明,用 7 Fr 或 10 Fr DPS 锚定覆膜金属支架不能降低支架的移位风险(6% *vs* 10%,P=0.35)。

除此之外,Tringali 等[25]认为覆膜金属支架移位可能与支架的轴向力有关。轴向力被定义为支架弯曲后伸直的矫直力,当支架被轴向力矫直时,支架可能会引起胆管扭结或移位[31]。因此,覆膜金属支架在设计上做了一些改进,比如低轴向力覆膜金属支架、部分覆膜金属支架等[23,32]。Isayama 等[32]研究表明低轴向力的覆膜金属支架比高轴向力者具有更低的支架移位率(2.1% *vs* 17%,P=0.030 4)。部分覆膜金属支架是一种内腔覆盖有聚合物膜,其近端和远端分别有 5 mm 裸露的金属支架。部分覆膜金属支架移位率约占 4%至 12%[33]。因此,为了降低部分覆膜金属支架移位风险,支架端部增加了扩口端[34]等结构。Isayama 等[34]研究发现具有扩口端结构的部分覆膜金属支架移位率低于无扩口端者(8% *vs* 17%,P=0.019)。

2.1.3　支架数量　Dumonceau 等[21]认为与多(≥2)支架相比,单支架更易移位。Arhan 等[10]研究发现在恶性胆管狭窄中,双支架与单支架和多(≥3)支架相比,双支架移位率更高(分别为 10.9%、3.0%、0;P=0.008、P=0.020);在良性胆管狭窄中,多(≥3)支架与单支架和双支架相比,多(≥3)支架移位率更低(分别为 2.7%、19.3%、20.9%;P=0.001、P=0.001)。这可能是由于双支架置入后滑动效应增加了每只支架移位的风险。多(≥3)支架置入后可以降低支架移位的风险[10],这可能是在胆管有限的空间内支架与支架变得更紧密,支架之间的摩擦力会增加,从而防止支架移位。

2.1.4　支架长度及直径　有研究表明支架长度与支架移位率无相关性[3,10,12,35]。然而,苏悦等[35]研究表明支架长度与支架移位方向有关,支架长度<7 cm 的近端移位率高于支架长度≥7 cm 者(4.9% *vs* 1.96%,P<0.001)。Arhan 等[10]研究发现在良性胆管狭窄中,支架长度<13 cm 的近端移位率高于≥13 cm 者(76.9% *vs* 26.6%,P=0.008),支架长度≥13 cm 的远端移位率高于<13 cm 者(73.4% *vs* 23.1%,P=0.008)。较短支架易于向近端移位,较长支架易向远端移位。较长支架大部分固定在胆管中,从而限制了向近端移位。除此之外,较长支架与胆管壁有更大的接触面积,支架移位时需要克服更多的摩擦。Yuan 等[11]研究表明近端狭窄上方的支架长度与支架远端移位有关。如果近端狭窄上方的支架太长(>2 cm),支架可能会被向远端推动。Arhan 等[10]等研究表明支架直径与支架移位率、移位方向无相关性。然而,Johanson 等[7]研究发现,直径>11.5 Fr 胆道塑料支架更易发生近端移位(P<0.05)。较大直径支架近端移位的风险增加,一方面,较大直径支架会对胆管壁产生扩张作用,使支架容易移位。另一方面,较大直径支架的刚度较大即不易变形,增加了支架的移位风险。

2.1.5　支架放置时间　Kawaguchi 等[12]研究显示支架放置时间>1 个月的塑料支架移位率显著高于≤1 个月者(7.52% *vs* 1.52%,P=0.007)。同时,Emara 等[3]研究也发现支架放置时间≤1 个月的支架移位率明显低于>1 个月者(0.57% *vs*

7.88%, P<0.01)。另外,Yuan 等[11]一项回顾性研究认为在良性胆管狭窄中,支架放置时间≥3 个月的支架远端移位率高于<3 个月者(10.8% *vs* 5%, P=0.05)。支架放置时间越长,移位风险越高。

2.2　非支架因素

2.2.1　良性或恶性疾病　胆管狭窄的病因分为良性或恶性疾病。良性疾病包括胆囊切除术后及原位肝移植并发症、慢性胰腺炎、原发性硬化性胆管炎、胆管结石及胆管外伤等[17]。恶性疾病包括胆管癌、胰腺癌、壶腹癌、胆囊癌等[36]。在目前的研究中,支架移位在良性病变中较为常见[3,10-12,21]。Katsinelos 等[37]多中心回顾性研究发现,约 60%的移位支架发生在胆总管结石、胆漏等良性疾病。良性胆管狭窄更易发生远端支架移位[37]。一方面,在支架置入的作用下,胆管会发生扩张,这会使支架松动并增加向远端移位的机会;另一方面,在支架放置后炎症反应消退,支架与胆管壁贴合不紧密,降低了支撑支架的作用导致支架移位[38]。Kawaguchi 等[12]研究发现与良性胆管狭窄相比,恶性胆管狭窄的支架移位率明显更低(P=0.030)。随着恶性肿瘤向腔内生长,支架与胆管壁贴合会更加紧密,增加了支撑支架的作用,从而限制支架在胆管内的移动。Johanson 等[7]研究认为胆管癌会增加支架近端移位风险,而胰腺癌、壶腹部肿瘤与支架近端移位无相关性,这可能与恶性肿瘤的性质有关。由于肿瘤不断向腔内生长,胆管支架被牢固地固定在胆管管腔内,达到一定程度时会出现棘轮现象,导致支架近端移位。

2.2.2　胆总管直径　Kawaguchi 等[12]研究显示胆总管直径>10 mm 的支架移位率明显高于胆总管直径≤10 mm 者(7.14% *vs* 1.48%, P=0.023)。Emara 等[3]研究也表明胆总管直径≤10 mm 的支架移位率显著低于胆总管直径>10 mm 者(2.51% *vs* 5.94%, P<0.01)。当胆总管直径超过 10 mm 时,胆管管腔内空间变得足够大,支架更可能移位。

2.2.3　胆管狭窄位置　Arhan 等[10]研究发现胆管狭窄位置与支架移位率无相关性。然而,Kawaguchi[12]研究认为与肝门部及中部胆总管胆管狭窄相比,下部胆总管狭窄时塑料支架移位率明显更高(P=0.031)。Jang 等[24]一项回顾性队列研究发现,肝门部恶性胆管狭窄与金属支架移位风险增加相关(P<0.001)。Arhan 等[10]研究发现胆管狭窄位置和塑料支架移位方向没有相关性。有研究发现,肝门部良性胆管狭窄时支架多发生远端移位;远端良性胆管狭窄时支架多发生近端移位[10,35]。这可能是肝门部胆管狭窄时多放置较长(≥7 cm)支架,更易发生远端移位,远端胆管狭窄时多放置较短(<7 cm)支架,更易发生近端移位。

2.2.4　十二指肠乳头切开(endoscopic sphincteropapillotomy, EST)　有研究表明,EST 与支架移位无显著相关性[7,12,38]。然而,也有研究认为 EST 与支架移位有关,尤其是远端支架移位[3,20,35]。这可能是因为 EST 术后括约肌功能丧失,支架更易穿过乳头向十二指肠腔内移位。然而,Margulies 等[39]研究认为,接受 EST 的情况下塑料支架具有更低的移位风险。同时,Ding 等[40]研究发现在原位肝移植术后胆管狭窄中,接受 EST 的情况下覆膜金属支架具有更低的移位风险。

2.2.5　其他情况　Johanson 等[7]和 Cheruvu 等[38]报道乳头狭窄与支架远端移位风险增加相关,Emara 等[3]研究发现球囊扩张术与支架移位风险增加有关。这可能是球囊扩张术后会使胆管组织松散,有利于支架移位。

3　治　疗

Diller 等[19]认为不论有没有临床症状,移位的支架都应该采取治疗。Dumonceau 等[21]报道通过内镜操作的支架取出成功率接近 90%。对于近端移位的支架,内镜下支架取出成功率约占 71.4%至 90%[37];对于远端移位的支架,多数情况下支架可自行通过肠道排出体外,少数情况下支架无法自行排出体外时,也可经内镜下取出[7,10-11,37,41-42]。随着内镜器械的不断更新,移位支架的取出成功率可能会增加[43]。取出支架常用的辅助器械包括异物抓取钳、镊子、Dormia 篮、Sohendra 提取器及球囊导管等[37]。在绝大多数情况下,通过选择合适的辅助器械,可以安全、成功地取出移位的支架。如果移位的支架导致进一步的并发症如肠梗阻或肠穿孔,则需要手术干预[44-46]。

4　小　结

胆管内支架引流术目前已发展成为治疗恶性或良性疾病继发性胆道梗阻的重要手段,支架移位是胆管内支架引流术的常见并发症之一。抗移位支架在一定程度上降低了支架移位率,仍需重视对支架移位的早期预防。临床上应根据术前患者的疾病状态、术中胆总管直径、胆管狭窄位置来选择是否行 EST、支架类型、支架数量、支架直径和支架长度,术后定期行影像学检查,必要时移除或更换支架。一旦出现支架移位,临床医生应及时诊断与处理,根据支架移位的情况选择合适的治疗手段,以争取患者获得较好的预后。

利益冲突　无

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