·病例报告·

双杯技术在全髋关节翻修术中应用 1 例

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Application of double-socket technique in revision total hip arthroplasty: a case report　*WU Wei-qian, WANG Chong-yang, ZHAO Xing-yu, and LI Dong-song. Department of Bone Joint Surgery, the First Hospital of Jilin University, Changchun* 130021, *Jilin, China*

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患者,女,45 岁,4 个月前在当地医院行左侧初次人工全髋关节置换术,术后骨盆正位 X 线片(图 1a)示假体未脱位,坐骨支线性骨折。部分负重状态下行功能锻炼,术后 2 个月内出现多次脱位,曾在当地医院手法复位,但仍出现反复脱位的情况,最后一次脱位时骨盆 X 线片(图 1b)示假体中心性脱位,坐骨支骨折线变模糊。为进一步治疗入我科。查体:左下肢肌力Ⅲ级,左小腿外侧放射性麻木,左髋关节活动范围为伸直 0°-屈曲 30°,内外旋受限。髋关节 CT(图 1c)示髋臼假体内壁部分突入盆腔,髋臼骨储备量少。患者髋关节反复脱位考虑和坐骨骨折所导致的髋臼假体松动及股骨假体偏心距过小有关。治疗上准备 3 种方案:第一,髋臼侧或股骨侧假体松动行髋臼侧或股骨侧假体翻修;第二,同时行髋臼侧和股骨侧假体翻修;第三,行单纯内衬翻修。完善术前检查,排除手术相关禁忌证后,于全麻下行左侧人工全髋关节翻修术。取原手术切口后外侧入路,术中见假体周围软组织纤维化严重,弹性差,切断外旋肌群,屈曲内旋髋关节脱位股骨假体。骨刀插入假体和骨之间的间隙,多次测试见股骨侧假体固定良好,未见松动迹象。清除髋臼假体周围纤维化的软组织,完全显露髋臼杯全部边缘,未见臼杯周围骨溶解,用弧形骨刀插入内衬周围拔出内衬,去除松动的螺钉,咬骨钳夹住臼杯,测试臼杯各个象限的稳定性,证实臼杯未见松动迹象,固定良好。术前髋关节 CT 显示髋臼前后柱骨储备量少,去除 1 个骨长入的稳定臼杯会造成大量的骨丢失,同时未能获得匹配的内衬型号,术中决定行单纯内衬翻修。将小于原臼杯内直径 4 mm(获得 2 mm 厚的水泥层)的水泥型聚乙烯臼杯作为内衬用骨水泥固定到金属臼杯上(双杯技术,也称内衬骨水泥技术)。假体周围软组织铺垫纱布,用磨钻打磨金属臼杯内表面,打磨出多个浅约 1 mm,宽约 2 mm 的"十"字形凹槽,去除纱布反复冲洗,防止金属碎屑残留。用同样的方法打磨聚乙烯内衬的外表面,待水泥成团块状时将内衬以外展 45°固定于臼杯的中心(图 1d)。更换配套的金属股骨头(患者因经济原因自行选择),直至增加至 28 mm+10 mm(增加了股骨头里面的厚度)的股骨头后各方向活动髋关节见假体保持稳定,无脱位迹象,因此选用此大小的金属股骨头。术后 2 周在床上行肢体功能锻炼,左髋关节活动范围:伸直 0°-屈曲 90°,左小腿外侧麻木消失,住院期间患者未出现并发症。出院前复查骨盆正位 X 线片(图 1e)见髋关节假体位置良好,术后随访髋关节未出现再次脱位。

讨论

人工全髋关节置换术已经成为治疗髋关节疾病有效的方法。随着逐渐增加的预期寿命和期待更好的生活质量,导致了全髋关节置换术的增加,这也导致了翻修手术的增加。靠骨长入提供稳定性的生物型髋臼假体已经成为首选[1]。脱位是全髋关节置换术后最常见的并发症之一[2]。目前大多文献报道初次全髋关节置换术后脱位率为 0.5%~10%,而髋关节翻修之后高达 28%[3]。本例患者术前骨盆正位 X 线片提示髋臼假体外展角为 55°,虽然此患者的外展角略大,但仍在安全区内[4]。因本例患者髋关节脱位至少 3 次以上,全髋关节翻修可能是最佳的治疗选择。然而患者术前髋关节 CT 提示髋臼假体内壁部分突入盆腔,髋臼的前后柱骨储备量少,术中检查髋臼侧和股骨侧假体固定良好,未见松动,去除 1 个骨

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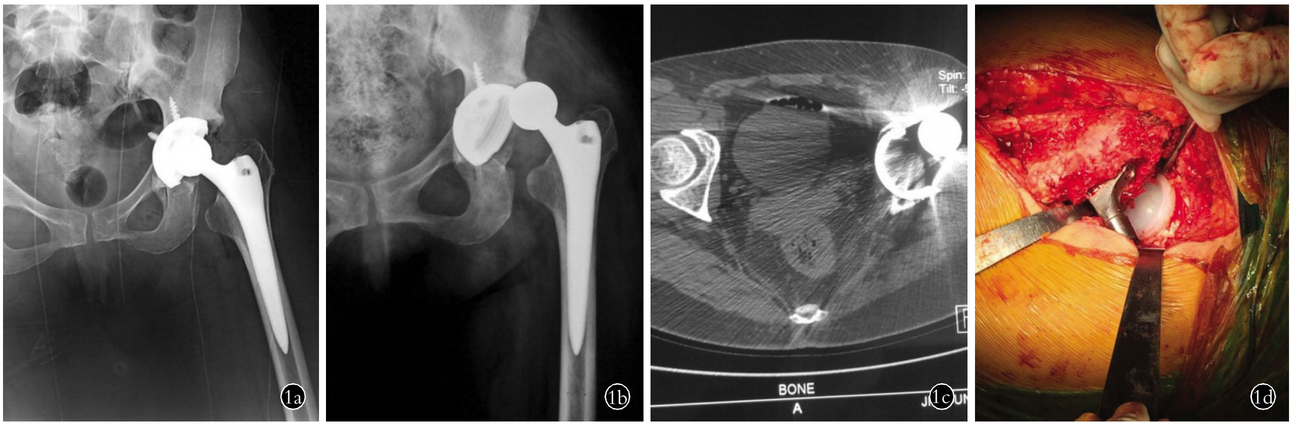

图 1　患者,女,45 岁,行全髋关节翻修术　**1a.** 初次全髋关节置换术后骨盆正位 X 线片示假体未脱位,坐骨支线性骨折　**1b.** 初次全髋关节置换术后 2 个月骨盆正位 X 线片示假体中心性脱位,骨折线变模糊　**1c.** 髋关节 CT 示左侧髋臼臼底已漏,髋臼骨储备量少　**1d.** 全髋关节翻修术中内衬位置　**1e.** 翻修术后骨盆正位 X 线片

Fig.1　Female, 45-year-old, treatment with revision total hip arthroplasty　**1a.** AP X-ray of pelvis after primary total hip arthroplasty showed no dislocation of the prosthesis and a linear fracture in sciatic　**1b.** AP X-ray of pelvis at 2 months after primary total hip arthroplasty showed the central dislocation of prosthesis and that the fracture line became vague　**1c.** CT of hip joints showed the medial wall of the prosthesis partly located in the pelvic cavity and the bone reserve of acetabulum became less　**1d.** Intraoperative position of liner in revision total hip arthroplasty　**1e.** AP X-ray of pelvis after revision total hip arthroplasty showed that the position of prosthesis was well

长入的稳定的生物型髋臼杯会造成大量的骨丢失、大量失血、延长手术时间、骨折等等。这些并发症将术者放在选择的困境，骨水泥固定新的内衬到一个稳定的臼杯(双杯技术,也称骨水泥内衬技术)是一种简单、安全、有效的翻修方法[5-6]。这种技术将损伤最小化,提供多界面选择,调整假体角度,对髋关节翻修来说也是一个极度的吸引。

生物力学研究表明，金属-水泥-内衬结构的固定强度相当于或优于标准内衬锁定装置[7-11]。Kurtz 等[12]对金属臼杯外翻 60°时对水泥层和内衬之间的应力负荷进行有限元分析发现尽管 60°外展角可增加水泥层的压强，但仍远远小于骨水泥可承受的最小压强。双杯技术在提供良好的固定强度的同时也表现出持久的稳定的临床效果[5,13-20]。

双环技术适应证:(1)稳定的髋臼假体是必要前提;(2)臼杯锁定机制损坏或不充分;(3)缺乏匹配的内衬或合适的材料和尺寸;(4)有意义的内衬磨损伴有髋臼周围骨溶解;(5)限制性内衬或非组配型内衬的使用;(6) 通过内衬调整髋臼杯的外展角和前倾角。禁忌证:感染;髋臼假体松动;臼杯的角度超出安全区域；臼杯内径太小以致不能获得足够的骨水泥厚度。

生物力学试验表明如果金属内表面已经存在螺钉孔等纹理，无须打磨就能够提供足够的初始固定强度[10]。对光滑内衬表面做纹理化处理,使骨水泥和内衬之间形成咬合，会额外增加金属-骨水泥-内衬结构的固定强度。本例患者虽然臼杯和内衬都存在纹理，但在手术过程中用磨钻对原臼杯内面和内衬外表面进行进一步打磨,打磨出多个“十”字形浅凹槽,更进一步加强了水泥的固定强度。骨水泥技术在金属臼杯各不相同，最适宜的骨水泥层厚度并没有被决定。一些作者建议 2 mm 厚的水泥层能提供优越的固定效果[10-11,20-22]。同时过大内衬的失败出现在一些临床报道中[19-20]。因此,本例患者的治疗过程中选择小于臼杯内直径 4 mm 的内衬，术中将内衬以外展 45°、前倾 15°固定在臼杯上,应用加长颈股骨头。在调整臼杯外翻和前倾角同时增加了假体的偏心距,而水泥臼杯的外移相对地使旋转中心外移,更进一步减少了脱位的风险[23]。

虽然这种结构临床随访结果令人满意，但聚乙烯内衬并不都能用骨水泥固定到所有稳定的臼杯上。Park 等[13]对 45 髋最少随访 7 年的结果分析中发现羟基磷灰石涂层的假体松动率要高于钛涂层,直径小于 54 mm 的臼杯 10 年假体生存率低于直径大于 54 mm 的臼杯，外展角大于 45°的臼杯的生存率低于外展角小于 45°的臼杯。羟基磷灰石涂层的臼杯在一些机构中因为不好的临床结果被常规去除,尽管假体稳定[24]。对于双杯技术(内衬骨水泥技术)的

先决条件是有一个稳定的臼杯，术前及术中全面评估臼杯是否松动是手术成功的关键。臼杯松动定义为以下任何 1 个：任何透亮线(大于 2 mm)的进展，臼杯螺丝的断裂，臼杯移位大于 2 mm，臼杯外展角度改变大于 4°[25]。

总之，当严格的指征出现时，双杯技术是一个简单、有效的翻修方法。

参考文献

[1] Troelsen A,Malchau E,Sillesen N,et al. A review of current fixation use and registry outcomes in total hip arthroplasty:the uncemented paradox[J]. Clin Orthop Relat Res,2013,471(7):2052-2059.

[2] 徐利明,朱炳斌,蒋毅,等. 全髋关节置换术后早期后脱位的原因分析[J]. 中国骨伤,2010,23(3):187-188.
Xu LM,Zhu BB,Jiang Y,et al. Causes of early posterior dislocation after total hip replacement[J]. Zhongguo Gu Shang/China J Orthop Trauma,2010,23(3):187-188. Chinese with abstract in English.

[3] Masonis JL,Bourne RB. Surgical approach,abductor function,and total hip arthroplasty dislocation[J]. Clin Orthop Relat Res,2002,(405):46-53.

[4] Ezquerra-Herrando L,Seral-García B,Quilez MP,et al. Instability of total hip replacement:a clinical study and determination of its risk factors[J]. Rev Esp Cir Ortop Traumatol,2015,59(4):287-294.

[5] Rivkin G,Kandel L,Qutteineh B,et al. Long term results of liner polyethylene cementation technique in revision for peri-acetabular osteolysis[J]. J Arthroplasty,2015, 30(6):1041-1043.

[6] Khanuja HS,Aggarwal A,Hungerford MW,et al. Cementing polyethylene liners into non-modular acetabular components in revision total hip arthroplasty[J]. J Orthop Surg(Hong Kong),2010,18(2):184-188.

[7] Wegrzyn J,Thoreson AR,Guyen O,et al. Cementation of a dual-mobility acetabular component into a well-fixed metal shell during revision total hip arthroplasty:a biomechanical validation[J]. J Orthop Res,2013, 31(6): 991-997.

[8] 卢伟杰,金大地,李之琛. 骨水泥聚乙烯内衬技术在全髋内衬翻修中的生物力学研究[J]. 中国修复重建外科杂志,2012,26(4): 437-440.
Lu WJ,Jin DD,Li ZC. Biomechanical study on polyethylene liner cementing into a fixed acetabular shell in revision total hip arthroplasty[J]. Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi,2012, 26(4): 437-440. Chinese.

[9] Hofmann AA,Prince EJ,Drake FT,et al. Cementation of a polyethylene liner into a metal acetabular shell:a biomechanical study[J]. J Arthroplasty,2009,24(5):775-782.

[10] Haft GF,Heiner AD,Dorr LD,et al. A biomechanical analysis of polyethylene liner cementation into a fixed metal acetabular shell[J]. J Bone Joint Surg Am,2003,85(6):1100-1110.

[11] Bonner KF,Delanois RE,Harbach G,et al. Cementation of a polyethylene liner into a metal shell. Factors related to mechanical stability[J]. J Bone Joint Surg Am,2002,84(9):1587-1593.

[12] Kurtz SM,Gawel HA,Patel JD. History and systematic review of wear and osteolysis outcomes for first-generation highly crosslinked polyethylene[J]. Clin Orthop Relat Res,2011,469(8):2262-2277.

[13] Park MS,Yoon SJ,Lee JR. Outcomes of polyethylene liner cementation into a fixed metal acetabular shell with minimum follow-up of 7 years[J]. Hip Int,2015,25(1):61-66.

[14] Lim SJ,Lee KH,Park SH,et al. Medium-term results of cementation of a highly cross-linked polyethylene liner into a well-fixed acetabular shell in revision hip arthroplasty[J]. J Arthroplasty,2014,29(3):634-637.

[15] Callaghan JJ,Hennessy DW,Liu SS,et al. Cementing acetabular liners into secure cementless shells for polyethylene wear provides durable mid-term fixation[J]. Clin Orthop Relat Res,2012,470(11):3142-3147.

[16] Koh KH,Moon YW,Lim SJ,et al. Complete acetabular cup revision versus isolated liner exchange for polyethylene wear and osteolysis without loosening in cementless total hip arthroplasty[J]. Arch Orthop Trauma Surg,2011,131(11):1591-1600.

[17] Wang JP,Chen WM,Chen CF,et al. Cementation of cross-linked polyethylene liner into well-fixed acetabular shells:mean 6-year follow-up study[J]. J Arthroplasty,2010,25(3):420-424.

[18] 刘志宏,冯建民,杨庆铭. 单纯聚乙烯内衬更换在髋关节翻修手术中的应用[J]. 中华关节外科杂志:电子版,2009,3(5):547-551.
Liu ZH,Feng JM,Yang QM. Simple polyethylene liner in hip revision[J]. Zhonghua Guan Jie Wai Ke Za Zhi:Dian Zi Ban,2009,3(5): 547-551. Chinese.

[19] Yoon TR,Seon JK,Song EK,et al. Cementation of a metal-inlay polyethylene liner into a stable metal shell in revision total hip arthroplasty[J]. J Arthroplasty,2005,20(5): 652-657.

[20] Haft GF,Heiner AD,Callaghan JJ,et al. Polyethylene liner cementation into fixed acetabular shells[J]. J Arthroplasty,2002,17(4 Suppl 1):167-170.

[21] Maloney WJ,Paprosky W,Engh CA,et al. Surgical treatment of pelvic osteolysis[J]. Clin Orthop Relat Res,2001,(393):78-84.

[22] Bensen CV,Del Schutte HJ,Weaver KD. Mechanical stability of polyethylene liners cemented into acetabular shells[J]. Crit Rev Biomed Eng,2000,28(1-2):7-10.

[23] 孙波,李瓦里,滕东辉,等. 股骨颈骨折人工髋关节置换的偏心距调整[J]. 中国骨伤,2007,20(8): 540-542.
Sun B,Li WL,Teng DH,et al. The offset adjustment of hip prosthesis replacement after femoral neck fracture[J]. Zhongguo Gu Shang/China J Orthop Trauma,2007,20(8):540-542. Chinese with abstract in English.

[24] Nieuwenhuis JJ,Malefijt Jde W,Hendriks JC,et al. Unsatisfactory results with the cementless Omnifit acetabular component due to polyethylene and severe osteolysis[J]. Acta Orthop Belg,2005,71(3):294-302.

[25] Von Schewelov T,Sanzén L,Onsten I,et al. Catastrophic failure of an uncemented acetabular component due to high wear and osteolysis:an analysis of 154 omnifit prostheses with mean 6-year follow-up[J]. Acta Orthop Scand,2004,75(3):283-294.

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