

## · 临床研究 ·

# 采用小白杯置换与髋臼加深行全髋关节置换治疗 Crowe IV 型髋脱位

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**【摘要】** 目的: 总结 Crowe IV 型先天性髋脱位采用小白杯置换和髋臼加深行全髋关节置换术治疗的手术方法和疗效。方法: 自 2000 年 1 月至 2005 年 12 月, 共收治 14 例(16 髋)患者, 其中男 2 例, 女 12 例; 单髋 12 例, 双髋 2 例; 年龄 38~75 岁, 平均 49 岁。所有患者均符合 Crowe 分型标准的 IV 型诊断。手术指征: 因髋关节严重疼痛和下肢不等长影响日常行走和活动者。白杯均采用金属杯+聚乙烯内衬组装设计, 外径 42~44 mm, 内径 22.225 mm, 聚乙烯内衬厚 6~7 mm, 其中 Duraloc (Depuy, Warsaw, USA) 10 髋, Pressfit S II (LINK, Germany) 6 髋。全部患者均采用髋臼内壁磨锉加深, 以改善髋臼对白杯的覆盖, 无一例因白杯覆盖不满意而采用大块骨植骨加盖。评定指标: 手术前、后的髋关节功能均采用 Harris 标准评分, 臀中肌按 5 级肌力标准和 Trendelenburg 征检查。术后 X 线摄片检查包括白杯的固定区域(真臼区的大小和位置按 Ranawat 三角测量法确定)、覆盖度(以白杯最内和最外缘距离的百分率表示)以及外展角等。结果: 术后 X 线摄片显示白杯负重区获髋臼覆盖达 98% 以上, 白杯平均从 Ranawat 三角内移(5.8±1.2) mm, 上移(6.2±1.7) mm。随访 3~9 年, 髋关节功能从术前的 25~32 分改善至手术后 1 年的 90~98 分。X 线片显示: 加深后的髋臼内壁缺损和骨水泥覆盖区均在手术 4~8 个月后获骨性愈合, 聚乙烯内衬线性磨损率每年(0.10±0.03) mm, 至今无一髋需行翻修术治疗, 也无一髋假体显示有肯定松动或可能松动以及骨溶解。结论: 采用小白杯置换与髋臼加深行全髋关节置换术治疗 Crowe IV 型髋脱位具有手术简单、创伤小、恢复快等优点, 且早、中期疗效满意。

**【关键词】** 关节成形术, 置换, 髋; 髋脱位, 先天性; 髋臼; 治疗效果

**Total hip replacement for the treatment of Crowe IV congenital hip dislocation using small acetabular components combined with medial protrusion technique** SUN Jun-ying, HAO Yue-feng, YANG Pei-yan, YANG Yu-sheng. Department of Orthopaedic, the First Affiliated Hospital of Suzhou University, Suzhou 215006, Jiangsu, China

**ABSTRACT** **Objective:** To summarize the surgical technique and the clinical results of small acetabular components combined with medial protrusion technique in primary total hip arthroplasty (THA) for the treatment of Crowe type IV congenital hip dislocation (CHD). **Methods:** From January 2000 to December 2005, total 14 patients (16 hips) of Crowe type IV CHD underwent cementless THA (12 unilateral, 2 bilateral) with this new technique. There were 2 males and 12 females with an average age of 49 years (range, 38 to 75 years). The indications for surgery was severe hip pain and leg length discrepancy with difficulty in walking and activating. Cup design: Duraloc (Depuy, Warsaw, USA) in 10 hips, Pressfit S II (LINK, Germany) in 6 hips. The outside diameter of the cup was 42 to 44 mm; and the thickness of the polyethylene liner was 6 to 7 mm. Total hip replacement were performed with the medial protrusion technique to stabilize the fit of a hemispherical metal cup in the acetabulum. The hip functions were evaluated by Harris hip score. The muscle strength of the gluteus medius and gait were respectively evaluated in accordance with the standards of five and four classes. **Results:** The X-ray showed that the average superolateral bone coverage in these 16 hips (none of which had bone graft) was more than 98 percent. The cup was an average of (5.8±1.2) mm medial and (6.2±1.7) mm superior to the Ranawat triangle. The follow-up period ranged from 3 to 9 years. The Harris hip score improved from 25 to 32 preoperatively to 90 to 98 1 year postoperatively. X-ray showed that perforated area of the medial acetabulum were repaired with healed bone mud 4 to 8 months after operation. The rate of linear wear of the polyethylene liner averaged (0.10±0.03) mm each year. Until now, no aseptic loosening or osteolysis was identified around the acetabulum components, no acetabular components were revised for loosening or other reasons. **Conclusion:** Small acetabular components combined with medial protrusion technique is a simple, reliable and flexible surgical technique. Early and mid-term result in total hip arthroplasty with this technique for the treatment of Crowe type IV CHD is satisfactory.

**Key words** Arthroplasty, replacement, hip; Hip dislocation, congenital; Acetabulum; Treatment outcome

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全髋关节置换术(total hip arthroplasty, THA)治疗 Crowe IV型先天性髋关节脱位 (congenital hip dislocation, CHD),因髋臼发育浅、发育小,髋臼外上方骨缺损等畸形,常使臼杯难以获得理想的髋臼覆盖和固定,最终可危及手术疗效。如何改善这一类型 CHD 的臼杯覆盖和固定,是近年来该领域的研究重点之一。为解决这一难题,至今已相继问世了小白杯<sup>[1]</sup>、沟槽式臼杯<sup>[2]</sup>、增强型臼杯<sup>[3]</sup>等特殊臼杯置换,及植骨加盖<sup>[4]</sup>、髋臼加深<sup>[5]</sup>、高位髋中心固定<sup>[6]</sup>和骨水泥加固等技术。自 2000 年 1 月以来,采用髋臼加深结合小白杯置换行 THA 治疗 Crowe IV型 CHD 14 例 16 髋,总结这一技术和疗效。

**1 资料与方法**

**1.1 临床资料** 2000 年 1 月至 2005 年 12 月,共收治 14 例(16 髋)CHD,其中男 2 例,女 12 例;单髋 12 例,双髋 2 例;年龄 38~75 岁,平均 49 岁。全部患者均表现髋关节疼痛伴下肢不等长、跛行,经各项检查确定为先天发育不良引起。对常规 X 线片采用 Crowe 等<sup>[7]</sup>分型标准诊断,所有患者符合 IV 型诊断,即股骨头完全脱位(图 1a)。

**1.2 手术指征** 因严重疼痛和下肢不等长影响日常行走和活动者为本组的主要指征,而 CHD 的严重度、继发性骨关节炎的范围、患者年龄、功能要求以及骨质的可利用度等则是本手术的附加指征。

**1.3 假体设计** 臼杯为金属杯+高铰链聚乙烯内衬组装设计,外径 42~44 mm,内径 22.225 mm,聚乙烯内衬厚 6~7 mm,其中 Duraloc (Depuy, Warsaw, USA)10 髋,Pressfit S II (LINK, Germany)6 髋。

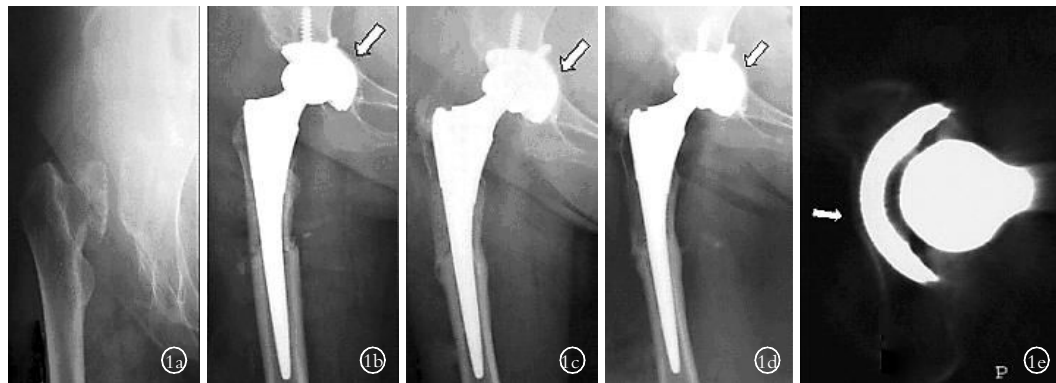
**1.4 手术方法** 常规侧卧位,改良 Hardinge 入路切开,显露真臼后采用髋臼锉加深,首选 38 mm 直径的髋臼锉置于真臼区,作髋臼内壁的磨锉加深,通常内壁磨锉穿透范围以直径 1 cm,或<25%的白面为标准。然后逐级递增选用较大号髋臼

锉,作外展 45°,前倾 15°位的髋臼磨锉,最终磨锉直径的确定必须参考真臼区的矢状径,以不危及髋臼前、后柱为原则。完成髋臼磨锉后,相继置入臼杯试件、金属帽臼杯,取骨水泥覆盖内壁穿透缺损区,2 枚螺钉固定,安装聚乙烯内衬。术后卧床 6 周,以后扶双拐下地行走,6 周后改用单拐行走,约 3 周后弃拐行走。

**1.5 观测指标及方法** 手术前、后的髋关节功能采用 Harris 评分标准进行评定。臀中肌按 5 级肌力标准和 Trendelenburg 征检查<sup>[8]</sup>。术前常规摄 X 线片(正位和斜位片)和 CT (Mendes<sup>[9]</sup>法)及三维重建等方法检查真臼和假臼的矢状、冠状径,骨缺损的部位和程度,以及由此产生的髋臼倾斜度异常等。术后 X 线摄片检查包括臼杯的固定区域(真臼区的大小和位置按 Ranawat 三角测量法<sup>[5]</sup>确定)、覆盖度(以臼杯最内和最外缘距离的百分率表示)以及外展角,此后间隔 3 个月、半年,以后每年 1 次,检查内壁穿透区的骨水泥植骨是否已获骨性愈合、臼杯有无松动(Hodgkinson 标准<sup>[10]</sup>)以及线性磨损(Dorr 等<sup>[5]</sup>方法)和可能的骨溶解等。

**2 结果**

本组无一例感染或神经血管损伤。术后 2 周内发生脱位 2 例,经复位髋“人”字石膏固定 3 周后未再复发。术后 X 线摄片显示臼杯均位于真臼区,髋臼对臼杯负重区的覆盖均达 98%以上,臼杯平均从 Ranawat 三角内移(5.8±1.2) mm,上移(6.2±1.7) mm,位于髂耻线和 Kohler 线内侧的臼杯外侧表面区域均<40%,臼杯外展角为(45±5)°,前倾角(10±5)°(图 1b)。随访 3~9 年,髋关节功能 Harris 评分从术前的 25~32 分改善至手术 1 年后的 90~98 分。臀中肌肌力 1 年后均恢复至 4 级以上,其中 9 例表现 Trendelenburg 征阴性,5 仍维持轻度阳性,这 5 例均为老年女性患者。跛行步态从术前的重度 9 例,中度 5 例,恢复到术后的无跛行 9 例和轻度跛行 5 例。随访 X



**图 1** 患者,女,55 岁,Crowe IV 型先天性髋脱位 **1a.** 术前正位 X 线片 **1b.** 术后 X 线片示髋臼内壁缺损与骨水泥覆盖植骨区(箭头示) **1c.** 手术 4~6 个月后的 X 线片示骨水泥植骨区已愈合(箭头示) **1d.** 最近随访的 X 线片示假体无松动,原植骨区已形成新的髋臼内壁(箭头示) **1e.** 随访时 CT 示髋臼内侧已形成新的髋臼内壁(箭头示)

**Fig.1** Female,55-year-old, congenital hip dislocation of Crowe type IV **1a.** Preoperative AP X-ray **1b.** Immediate postoperative AP X-ray showed that bone mud grafts on the perforated area of the medial acetabulum(arrow) **1c.** X-ray at 4 to 6 months after operation showed that perforated area of the medial acetabulum were repaired with healed bone mud (arrow) **1d,1e.** The latest X-ray and CT showed a new medial wall of the acetabulum had been formed without evidence of loosening of either component(arrow)

线片显示:髋臼内壁骨缺损采用骨水泥覆盖植骨区,均在手术后 4~8 个月获骨性愈合(图 1c-1e)。聚乙烯内衬线性磨损率每年(0.10±0.03) mm,至今无一髋需行翻修术治疗,也无一髋假体显示有肯定松动或可能松动以及骨溶解(图 1d)。

### 3 讨论

臼杯至少应获得多少髋臼骨的覆盖才能获得理想固定,至今尚未达成共识。Morsi 等<sup>[1]</sup>认为髋臼对臼杯的覆盖至少应达到 70%。其他学者普遍认为植骨块对臼杯的覆盖面积不应>30%,否则植骨块在爬行替代过程中易吸收松动而危及臼杯固定,大块植骨虽能改善对臼杯的覆盖,但有较高翻修率和失败率,鉴此,主张设计小白杯对 CHD 者进行置换<sup>[1]</sup>。其原理是通过人为减少臼杯的外表面积,改善髋臼对臼杯的覆盖。Sochart 等<sup>[1]</sup>总结了 60 髋成人 CHD 的疗效,其中 43 髋采用直径<38 mm 小白杯骨水泥固定,术后 20 年,22 髋被翻修,臼杯 10 年生存率为 97%,25 年为 58%。本组采用小白杯生物学固定 16 髋,随访 3~7 年,无一髋松动或翻修,表明采用小白杯置换的早、中期疗效满意。

然而对于某些 Crowe IV 型 CHD,因真臼区发育特别小,有时即使采用小白杯也很难获得髋臼对臼杯的理想覆盖,而采用外上方植骨,又存在植骨块易吸收松动的风险。为解决这一难题, Hartofilakidis 等<sup>[10]</sup>采用髋臼内壁磨锉法加深髋臼,经 86 髋(66 例)临床应用,平均 7 年后的优良率 94%(81/86 髋),假体生存率 5 年为 100%,10 年 93%。Dorr 等<sup>[5]</sup>随访 X 线片证实,在内壁加深缺损区,骨水泥植骨均已愈合,并形成新的髋臼内壁,5 年后无一例臼杯松动。Crowe 等<sup>[7]</sup>平均随访 4 年,凡采用这一方法手术者,无一例因臼杯松动而翻修。本组结果亦表明早、中期疗效满意。

关于髋臼加深后的臼杯内移距离,普遍认为应随 CHD 严重程度而增加,通常 Crowe III、IV 型者,股骨头中心内移平均距离 25 mm,认为在保留髋臼内壁完整基础上,将股骨头中心内移 25 mm,则失败率显著降低。而 Dorr 等<sup>[5]</sup>则认为,即使不保留内壁完整,也可内移这一距离。确切的内移距离应根据术后 X 线片,测量臼杯最内缘至 Kohler 线的水平距离来确定。本组臼杯均选择在真臼区固定,结果表明髋臼加深配合小白杯置换,无须植骨加盖即可获得满意的臼杯覆盖和固定。

通常认为聚乙烯内衬的理想厚度至少应 8 mm 以上,否则易产生蠕变,加速磨损,危及远期疗效。由于臼杯的直径大小受真臼区矢状径的限制,因此,本文采用的髋臼加深法虽能有效改善髋臼对臼杯外上方的覆盖,但仍不能选择外径更大的臼杯以增加聚乙烯内衬达理想的>8 mm 厚度,内衬厚度仅为 6~7 mm,虽然本组患者的早、中期疗效理想,但从理论上推测这一聚乙烯内衬的厚度将对远期疗效构成影响。因此,对本组患者尚需进行远期随访,以确定远期疗效。

为了确保手术成功,尚需注意以下几点:①磨锉髋臼内壁所产生的骨缺损范围应恰当,Dorr 等<sup>[5]</sup>认为缺损区应以直径 1 cm,或<25%的髋臼面积最为理想,否则将危及髋臼前、后柱的力学强度,导致置入臼杯的 45%区域突出于 Kohler 线以内,影响臼杯固定的稳定性。假如缺损范围>25%,应采用金属丝网加颗粒骨打压植骨重建。②髋臼内壁加深的深度,通常

以内壁骨膜完整为宜,但有时也可磨穿此层,深达髂肌为止。这一深度在术后的 X 线片上显示臼杯内缘恰好位于髂坐线和髂耻线以内,是改善臼杯覆盖的理想深度。③与小白杯匹配的小直径假体头,因头-径比例不恰当,以及降低了假体头在脱位前的位移距离,易导致术后脱位<sup>[12]</sup>。本组 16 髋,发生术后脱位 2 髋。因此,术后 6 周内适当限制关节活动幅度是避免关节脱位的关键。

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