

doi: 10.13241/j.cnki.pmb.2017.19.028

金属大头全髋关节置换术对股骨颈骨折患者血清 CRP, IL-6, TNF- α 水平及髋关节功能的影响 *

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摘要 目的:分析金属大头全髋关节置换术用于股骨颈骨折的临床评价及对功能恢复的影响。**方法:**选择我院 2013 年 2 月~2016 年 2 月收治的 104 例股骨颈骨折患者,分为对照组与观察组,各 52 例。对照组予以半髋关节置换术治疗,观察组予以金属大头全髋关节置换术治疗,比较两组手术时间、术中出血量,治疗前后血清 C 反应蛋白(CRP)、白细胞介素-6(IL-6)、肿瘤坏死因子- α (TNF- α),髋关节 Harris 评分及术后并发症。**结果:**观察组手术时间、术中出血多于对照组,差异有统计学意义($P<0.05$),观察组疼痛率低于对照组($P<0.05$);两组住院时间比较无差异($P>0.05$);治疗后两组患者血清 CRP、IL-6、TNF- α 比较,差异无统计学意义($P>0.05$)。治疗后,观察组髋关节活动度、Harris 评分、髋关节功能优于对照组($P<0.05$)。两组术后并发症无差异($P>0.05$)。**结论:**金属大头全髋关节置换术用于股骨颈骨折的临床效果确切,可利于功能恢复。

关键词:股骨颈骨折;金属大头全髋关节置换术;关节功能

中图分类号:R683 **文献标识码:**A **文章编号:**1673-6273(2017)19-3711-04

Effects of Metal Bulk Total Hip Replacement on Joint Functions of Patients with Femoral Neck Fractures and Its Clinical Efficacy*

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ABSTRACT Objective: To analyze the clinical efficacy of metal bulk total hip replacement on treatment of femoral neck fractures and its impact on joint functions. **Methods:** 104 cases with femoral neck fracture who were treated in our hospital from February 2013 to February 2016 were selected and randomly divided into the control group and the observation group with 52 cases in each group. The patients in the control group were treated with hemiarthroplasty, while the patients in the observation group were treated with metal head total hip replacement. Then the serum levels of c-reactive protein (CRP), interleukin-6 (IL-6) and tumor necrosis factor- α (TNF- α), the Harris scores and the postoperative complications were observed and compared. **Results:** The hospitalization, intraoperative blood loss of observation group was more than the control group, the difference was statistically significant ($P<0.05$), the Pain rate of observation group were less than the control group ($P<0.05$), hospitalization time between two group was no difference ($P>0.05$). After surgery, the CRP, IL-6, TNF- α was no difference between two groups ($P>0.05$). After surgery, the hip mobility, Harris score, hip function of observation group was better than that of control group ($P<0.05$). The postoperative complications was no difference between two group ($P>0.05$). **Conclusion:** The clinical effect is precise of bulk metal total hip replacement for femoral neck fracture, to restore function.

Key words: Femoral neck fracture; Bulk metal total hip replacement; Functional recovery

Chinese Library Classification(CLC): R683 **Document code:** A

Article ID: 1673-6273(2017)19-3711-04

前言

股骨颈骨折是由于外力、髋周肌肉群退变、骨质疏松等导致的股骨颈断裂,多发生于老年人,且女性发病率高于男性,可伴疼痛、畸形、肿胀、功能障碍等临床表现^[1]。股骨颈骨折因解剖部位存在一定的局限性,可出现血供不足,内固定治疗容易使

股骨头出现坏死。因此,关节置换术是治疗的最佳手段,可避免股骨颈不愈合及股骨头坏死^[2,3]。金属大头全髋关节置换术是近年来新研发的关节置换术,可增加股骨头的移动范围,降低术后脱位的可能性^[4,5]。目前临床上鲜有关于此类的报道,本研究旨在分析金属大头全髋关节置换术用于股骨颈骨折的临床评价及对功能恢复的影响。

* 基金项目:陕西省自然科学基金项目(2002C2-23)

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(收稿日期:2016-12-28 接受日期:2017-01-22)

1 资料与方法

1.1 一般资料

选择 2013 年 2 月~2016 年 2 月我院收治的股骨颈骨折患者,本研究已签署家属及患者知情同意书,且符合医院伦理委员会许可,按抽签法分组。纳入标准:①符合股骨颈骨折诊断标准,且经 X 线平提示为单侧移位股骨颈骨折(Garden);②年龄在 60 岁以上;③髋臼软骨未见显著退变;④未合并其他部位骨折。排除标准:①陈旧性股骨颈骨折;②伴类风湿关节炎或者腰部疾病史;③造血系统、心、肝肾等严重病变;④既往伴髋关节置换术史。对照组有 21 例男,有 31 例女;年龄 60~75 岁,平均(68.51±1.82)岁;骨折分型:有 28 例 Garden III 型,有 24 例 Garden IV 型。观察组有 23 例男,有 29 例女;年龄 60~75 岁,平均(67.69±1.91)岁;骨折分型:有 30 例 Garden III 型,有 22 例 Garden IV 型。比较两组基础资料无差异($P>0.05$),存在比较性。

1.2 方法

1.2.1 半髋关节置换术 对照组采用半髋关节置换术治疗,指导患者为健侧卧位,予以络合碘进行常规消毒。选择髋关节后外侧作为手术切口,切开关节囊,关节囊增生者可予以部分切除。取股骨头取出器将股骨头取出,保留股骨距(长度在 1~1.5 cm),冲洗髓腔并注入适量骨水泥,将双极股骨头假体安装并固定。

1.2.2 金属大头全髋关节置换术 观察组采用金属大头全髋关节置换术治疗,术中患者取健侧卧位,使其冠状轴面与手术床保持垂直,于患侧髋关节边缘处取切口。钝性分离深筋膜,沿着粗隆后嵴将阔筋膜切开,并将臀大肌纤维束适当向上切开,使臀中肌及臀小肌向内牵开,保持患肢内旋,沿粗隆缘将部分短外旋肌及梨状肌切断,并予以缝线、标记。将后方关节囊与短外旋肌界面进行钝性分离,使后方关节囊标记进行 "U" 型切开并完全显露,并沿后上方掀起,使股骨颈与股骨头充分显露。在小粗隆上缘 1.5 cm 左右处进行股骨颈的截骨,将股骨头取出,使髋臼显露,对孟唇行充分清理。将残留的圆韧带及髋臼的瘢痕组织切除,磨锉髋臼软骨,待骨面出现点状渗血,保持软骨下骨的完整性。选择适应的金属臼杯并打磨,保持臼杯边缘在骨面内并固定。股骨屈膝 90° 并内旋,保持小腿与手术台的平面垂直,采用弧形牵开器将股骨近端抬高,大小粗隆部处置于髋

臼拉钩,使股骨颈的断面充分显露,保持 15° 作用的前倾角。使髋关节复位,并测定髋关节的稳定性及活动范围,调整下肢长度并安装股骨头与股骨直柄假体,使髋关节过度内旋,并外旋复位。缝合切口,放置引流管。

1.2.3 术后处理 两组术后均常规使用万古霉素,口服 10 mg 利伐沙班片抗凝,术后第 1 天使患侧肢体处于外周中立位,并行髋关节的主被动的屈伸运动,股四头肌等训练,术后第 2 天将引流管拔除,术后 7 天时开始扶拐下地的不负重行走,术后 4 周指导患者行负重训练,于术后 6 个月时评估 Harris 评分及功能的临床优良率。统计两组手术情况。

1.3 观察指标

1.3.1 指标检测 抽取患者手术前及术后第 1 天 2 mL 空腹静脉血,常规分离血清后保存待检。C 反应蛋白(CRP)使用散射比浊法检测;白细胞介素-6(IL-6)使用酶联免疫吸附法检测;肿瘤坏死因子- α (TNF- α)。于手术前及术后 6 个月时对患侧髋关节活动度进行检测。

1.3.2 Harris 评分 包含疼痛,功能,畸形,活动度 4 个方面,疼痛:无法活动计作 0 分;重度疼痛,且活动出现限制计作 10 分;轻度疼痛,但经常服用止痛药计作 20 分;轻度疼痛,偶尔服用止痛药;轻微疼痛计作 40 分;未见疼痛计作 44 分。功能:包含步态、行走辅助、行走距离、上楼梯、坐椅子等(分别进行相应评分)。畸形计作 4 分。活动度:内旋、外旋、收、展、屈活动度在 0°~29° 之间计作 0 分,30°~59° 之间计作 1 分,60°~99° 之间计作 2 分,100°~159° 之间计作 3 分,160°~209° 之间计作 4 分,210°~300° 之间计作 5 分。参照 Harris 评分进行,总分为 100 分,超过 90 分表示优;80~90 分之间表示良,70~79 分表示可,低于 70 分表示差。

1.4 统计学分析

选择 SPSS18.0 行数据统计,用($\bar{x} \pm s$)表示计量资料,组间比较用 t 检验,用[(n)%]表示计数资料,用 χ^2 检验比较,等级资料用秩和检验,以 $P<0.05$ 为有统计学意义。

2 结果

2.1 比较两组患者手术指标

观察组手术时间、术中出血多于对照组,差异有统计学意义($P<0.05$),两组住院时间比较无差异($P>0.05$),见表 1。

表 1 比较两组患者手术指标

Table 1 Comparison of operation indexes between two groups($\bar{x} \pm s$)

Operation indexes	Control group(n=52)	Observation group(n=52)
Operation time(min)	109.43±13.62 ^a	116.57±14.50
Intraoperative blood loss(mL)	565.64±70.51 ^a	580.41±82.86
Hospitalization(d)	18.74±2.33	17.68±2.21

Note: compared with control group ^a $P<0.05$.

2.2 比较两组患者手术前后 CRP、IL-6、TNF- α

术前,比较两组 CRP、IL-6、TNF- α 无差异($P>0.05$);术后,两组 CRP、IL-6、TNF- α 均上升,但比较无差异($P>0.05$),见表 2。

2.3 比较两组患者手术前后髋关节活动度

术前,比较两组内旋、外旋、内收、外展、后伸、前屈活动度无差异($P>0.05$);术后,两组内旋、外旋、内收、外展、后伸、前屈

活动度均上升,观察组上升幅度更明显,差异有统计学意义($P<0.05$),见表 3。

2.4 比较两组患者手术前后 Harris 评分

术前,比较两组 Harris 评分无差异($P>0.05$);术后,两组 Harris 评分均上升,观察组上升更明显,差异有统计学意义($P<0.05$),见表 4。

表 2 比较两组患者手术前后 CRP、IL-6、TNF- α ($\bar{x} \pm s$)Table 2 Comparison of serum levels of CRP, IL-6 and TNF- α between two groups before and after the treatment ($\bar{x} \pm s$)

Items	Time	Control group(n=52)	Observation group(n=52)
CRP(mg/L)	Before treatment	4.11 $\pm$ 0.51	4.16 $\pm$ 0.53
	After treatment	67.20 $\pm$ 8.49 ^b	63.47 $\pm$ 7.98 ^{ba}
IL-6(ng/L)	Before treatment	45.27 $\pm$ 5.65	64.11 $\pm$ 9.16
	After treatment	46.50 $\pm$ 5.82 ^b	65.89 $\pm$ 8.12 ^{ba}
TNF- α (ng/L)	Before treatment	20.47 $\pm$ 2.55	21.25 $\pm$ 2.64
	After treatment	235.42 $\pm$ 29.36 ^b	238.63 $\pm$ 29.77 ^{ba}

Note: Compared with control group ^aP<0.05; Compared with before treatment ^bP<0.05.

表 3 比较两组患者手术前后髋关节活动度($\bar{x} \pm s$)Table 3 Comparison of hip motion between two groups before and after the treatment($\bar{x} \pm s$)

Items	Time	Control group(n=52)	Observation group(n=52)
Internal rotation($^{\circ}$)	Before treatment	3.41 $\pm$ 0.42	3.47 $\pm$ 0.48
	After treatment	21.70 $\pm$ 3.11 ^b	23.56 $\pm$ 2.94 ^{ba}
Outward turning($^{\circ}$)	Before treatment	12.38 $\pm$ 1.56	11.79 $\pm$ 1.45
	After treatment	39.70 $\pm$ 4.89 ^b	42.15 $\pm$ 6.11 ^{ba}
Adduction($^{\circ}$)	Before treatment	16.32 $\pm$ 2.03	16.78 $\pm$ 2.38
	After treatment	37.54 $\pm$ 4.70 ^b	40.22 $\pm$ 5.72 ^{ba}
Outreach($^{\circ}$)	Before treatment	10.18 $\pm$ 1.27	10.39 $\pm$ 1.30
	After treatment	39.27 $\pm$ 4.90 ^b	41.52 $\pm$ 5.92 ^{ba}
After stretch($^{\circ}$)	Before treatment	5.36 $\pm$ 0.66	5.58 $\pm$ 0.79
	After treatment	12.85 $\pm$ 1.84 ^b	14.29 $\pm$ 1.77 ^{ba}
Forward bends($^{\circ}$)	Before treatment	21.16 $\pm$ 3.02	21.87 $\pm$ 3.11
	After treatment	83.20 $\pm$ 11.87 ^b	85.49 $\pm$ 12.20 ^{ba}

Note: Compared with control group ^aP<0.05; Compared with before treatment ^bP<0.05.

表 4 比较两组患者手术前后 Harris 评分($\bar{x} \pm s$)Table 4 Comparison of Harris score between two groups before and after the treatment ($\bar{x} \pm s$)

Items	Time	Control group(n=52)	Observation group(n=52)
Harris score(points)	Before treatment	43.25 $\pm$ 5.40	87.35 $\pm$ 10.91
	After treatment	42.87 $\pm$ 6.11 ^b	93.41 $\pm$ 11.68 ^{ba}

Note: compared with control group, ^aP<0.05; compared with before treatment, ^bP<0.05.

2.5 比较两组患者髋关节功能

观察组优良率高于对照组, 差异有统计学意义(P<0.05), 见表 5。

表 5 比较两组患者髋关节功能[(例)%]

Table 5 Comparison of hip joint function between two groups [(n)%]

Item	Control group(n=52)	Observation group(n=52)
Excellent	16(30.76)	23(44.23)
Good	10(19.23)	17(32.69)
Can	14(26.92)	8(15.38)
Poor	12(23.07)	4(7.69)
Excellent rate	40(76.92)	48(92.30) ^a

Note: compared with control group ^aP<0.05.

2.6 比较两组术后并发症

两组术后均未见断裂、松动、脱位等并发症, 差异无统计学

意义(P>0.05); 对照组术后疼痛率 15.38(8/52) 高于观察组 3.84%(2/52), 差异有统计学意义(P<0.05)。

3 讨论

股骨颈骨折是老年人常见的骨折类型, 骨折后股骨颈囊中血管容易受到影响, 引起股骨头血供受限, 延迟骨折愈合, 还可导致股骨头坏死^[9]。传统内固定及牵引手术需长时间卧床, 从而增加感染、褥疮等并发症的可能性。因此, 临床上应使患者关节活动能力尽快恢复, 促进预后的改善^[10,11]。人工髋关节置换术能够避免股骨头缺血坏死、骨不连、内固定失败等所致的二次手术, 现已为股骨颈患者的首选治疗方式^[12]。

半髋关节置换术具有操作简单、术中失血量少等优势, 但髋臼下软组织容易与人工关节的股骨头产生磨损, 导致明显的髋部疼痛^[13]。全髋关节置换术能够保持股骨假体与人共髋臼实现完全匹配, 从而创造一个无痛、稳定的关节, 可缓解髋臼磨损, 具有有效、安全、疼痛轻等优势^[14,15]。相关研究表明, 金属大

头全髋关节假体更利于解剖选择中心的重建,与髋关节正常的生物力学性能相吻合,可增加股骨头活动范围,减少其与髋臼的磨损^[6]。同时,金属大头全髋关节假体能够增加髋外展肌与附件软组织张力,进而增加"脱位距离",增强关节功能的稳定性,降低关节脱位率,为术后的功能锻炼提高良好条件,利于关节功能的恢复^[17,18]。本研究结果显示,半髋关节置换术组手术时间、失血量均优于金属大头全髋关节置换术组,但两组住院时间无差异,且半髋关节置换术组疼痛例数较高,表明金属大头全髋关节置换术虽然手术时间较长、失血量相对较大,但未增加患者术后的住院时间,且疼痛更轻^[19]。

有研究表明,假体异物置入、手术创伤等外界因素均可刺激机体产生系列应激反应,其中炎症反应是其主要表达方式^[20]。CRP作为一种急性时相蛋白,机体正常状态下含量极低,创伤、炎症等可诱导其浓度增加。IL-6是机体炎症反应及防御机制的关键介质,可起到多种调节作用,可介导趋化因子和黏附因子的表达,是反映机体组织受损的可靠指标。TNF- α 可促进白细胞聚集,导致血管内皮细胞受损,使局部炎症反应加剧。本研究结果显示,两组术后CRP、IL-6、TNF- α 浓度均上升,比较无差异,表明金属大头全髋关节置换术未增加机体创伤及手术风险。考虑与金属间采用独特的"液体薄膜润滑"作用,显著降低了金属之间的磨损,且磨损颗粒及释放的金属离子引起的组织反应和骨溶解较轻有关。髋关节活动度及功能可有效反映人共关节置换术的疗效,本研究结果显示,金属大头全髋关节置换术后髋关节活动度、Harris评分及髋关节优良率显著优于半髋关节置换术组,表明金属大头全髋关节置换术的效果确切,可利于术后患者关节功能的恢复,有关报道报道结果一致^[21]。但术后两组并发症比较无差异,可能与本研究随访时间较短有关。

综上所述,金属大头全髋关节置换术用于股骨颈骨折的临床效果确切,利于功能恢复。

参考文献(References)

- [1] Lim HS, Kim CK, Park YS, et al. Factors Associated with Increased Healing Time in Complete Femoral Fractures After Long-Term Bisphosphonate Therapy [J]. J Bone Joint Surg Am, 2016, 98(23): 1978-1987
- [2] Juhász K, Boncz I, Pátczai B, et al. Risk factors for contralateral hip fractures following femoral neck fractures in elderly: analysis of the Hungarian nationwide health insurance database [J]. Eklem Hastalik Cerrahisi, 2016, 27(3): 146-152
- [3] Bishop J, Yang A, Githens M, et al. Evaluation of Contemporary Trends in Femoral Neck Fracture Management Reveals Discrepancies in Treatment[J]. Geriatr Orthop Surg Rehabil, 2016, 7(3): 135-141
- [4] Hussey DK, Madanat R, Donahue GS, et al. Scoring the Current Risk Stratification Guidelines in Follow-up Evaluation of Patients After Metal-on-Metal Hip Arthroplasty: A Proposal for a Metal-on-Metal Risk Score Supporting Clinical Decision-Making [J]. J Bone Joint Surg Am, 2016, 98(22): 1905-1912
- [5] Laaksonen I, Donahue GS, Madanat R, et al. Outcomes of the Recalled Articular Surface Replacement Metal-on-Metal Hip Implant System: A Systematic Review[J]. J Arthroplasty, 2017, 32(1): 341-346
- [6] Elgeidi A, Elganainy AE, Abou Elkhier N, et al. Interleukin-6 and other inflammatory markers in diagnosis of periprosthetic joint infection[J]. Int Orthop, 2014, 38(12): 2591-2595
- [7] Siddique T, Sah RK, Masood F, et al. Improvement in Harris Hip Score after cementless total hip arthroplasty in young active adults with secondary hip arthritis- A short-term follow-up result [J]. J Pak Med Assoc, 2015, 65(11): S63-S66
- [8] Dettoni F, Pellegrino P, La Russa MR, et al. Validation and cross cultural adaptation of the Italian version of the Harris Hip Score [J]. Hip Int, 2015, 25(1): 91-97
- [9] Song HK, Choi HJ, Yang KH. Risk factors of avascular necrosis of the femoral head and fixation failure in patients with valgus angulated femoral neck fractures over the age of 50 years [J]. Injury, 2016, 47(12): 2743-2748
- [10] Dargan DP, Callachand F, Diamond OJ, et al. Three-year outcomes of intracapsular femoral neck fractures fixed with sliding hip screws in adults aged under sixty-five years[J]. Injury, 2016, 47(11): 2495-2500
- [11] Do LN, Kruke TM, Foss OA, et al. Reoperations and mortality in 383 patients operated with parallel screws for Garden I-II femoral neck fractures with up to ten years follow-up [J]. Injury, 2016, 47(12): 2739-2742
- [12] Bodrogi AW, Sciortino R, Fitch DA, et al. Use of the supercapsular percutaneously assisted total hip approach for femoral neck fractures: surgical technique and case series[J]. J Orthop Surg Res, 2016, 11(1): 113
- [13] Hailer NP, Garland A, Rogmark C, et al. Early mortality and morbidity after total hip arthroplasty in patients with femoral neck fracture[J]. Acta Orthop, 2016, 87(6): 560-566
- [14] Maceroli M, Nikkel LE, Mahmood B, et al. Total Hip Arthroplasty for Femoral Neck Fractures: Improved Outcomes With Higher Hospital Volumes[J]. J Orthop Trauma, 2016, 30(11): 597-604
- [15] Le Duff MJ, Takamura KB, Amstutz HC. Metal-on-metal hip resurfacing in patients aged 65 or older[J]. Hip Int, 2012, 22(6): 648-654
- [16] Li J, Zheng W, Zhao J, et al. Large diameter metal on metal total hip replacement for femoral neck fractures with neurological conditions: A retrospective assessment[J]. Indian J Orthop, 2014, 48(6): 605-611
- [17] Wang W, Geller JA, Hasija R, et al. Longitudinal evaluation of time related femoral neck narrowing after metal-on-metal hip resurfacing [J]. World J Orthop, 2013, 4(2): 75-79
- [18] Amanatullah DF, Sucher MG, Bonadurer GF, et al. Metal in Total Hip Arthroplasty: Wear Particles, Biology, and Diagnosis[J]. Orthopedics, 2016, 39(6): 371-379
- [19] Ras Sørensen SL, Jørgensen HL, Sporing SL, et al. Revision rates for metal-on-metal hip resurfacing and metal-on-metal total hip arthroplasty - a systematic review[J]. Hip Int, 2016, 26(6): 515-521
- [20] Liow MH, Dimitriou D, Tsai TY, et al. Preoperative Risk Factors Associated With Poor Outcomes of Revision Surgery for "Pseudotumors" in Patients With Metal-on-Metal Hip Arthroplasty[J]. J Arthroplasty, 2016, 31(12): 2835-2842
- [21] McArthur BA, Abdel MP, Taunton MJ, et al. Seronegative infections in hip and knee arthroplasty: periprosthetic infections with normal erythrocyte sedimentation rate and C-reactive protein level [J]. Bone Joint J, 2015, 97(7): 939-944