文章编号:1000-5404(2013)10-1027-03

论著

钽棒植入治疗早期股骨头坏死短期临床疗效观察

张 琦,王 雨,王爱民 (400042 重庆,第三军医大学大坪医院野战外科研究所关节四肢外科)

[摘要] **目的** 探讨钽棒植入治疗早期股骨头坏死临床疗效。**方法** 2008年4月至2012年6月我科采用钽棒植入治疗早期股骨头坏死26例31髋,包括男性21例25髋,女性5例6髋,其中单侧21例,双侧5例,年龄(43.8±10.7)岁,体质指数为(23.5±3.0)。病因:激素性11例14髋,酒精性10例12髋,特发性5例5髋。Harris评分为(65.2±20.7)分:优4髋、良4髋、中5髋、差18髋;根据Steinberg分期:ⅠC期3髋、ⅡB期3髋、ⅡC期25髋。**结果** 术后随访7~57(29.4±14.8)个月,26例31髋全部获得随访。以最后一次随访结果作为评定依据,Harris评分为(86.6±13.9)分:优17髋、良7髋、中3髋、差4髋,优良率为77.4%,与术前比较差异有显著性($P<0.05$);根据Steinberg分期:ⅠC期3髋、ⅡB期4髋、ⅡC期15髋、ⅢC期2髋、ⅣB期1髋、ⅣC期6髋,29.0%(9/31)影像学进展为Steinberg Ⅲ期或以上;无手术并发症发生。**结论** 钽棒植入治疗早期股骨头坏死可显著改善髋关节功能,延缓病情进展,短期疗效良好。

[关键词] 钽棒;股骨头坏死;疗效观察
[中图法分类号] R318.08;R681.8;R687.4 [文献标志码] A

Short-term efficacy of porous tantalum implantation in treatment of early femoral head necrosis

Zhang Qi, Wang Yu, Wang Aimin (Department of Joint and Limb Surgery, Institute of Surgery Research, Daping Hospital, Third Military Medical University, Chongqing, 400042, China)

[**Abstract**] **Objective** To discuss the efficacy of porous tantalum implantation in treatment of early femoral head necrosis. **Methods** From April 2008 to June 2012, twenty-six patients with 31 hips of early femoral head necrosis were treated with porous tantalum implantation. Five patients suffered from bilateral hip involvement. The mean age was 43.8 years and the mean body mass index was 23.5. Eleven patients (14 hips) suffered from osteonecrosis as a result of corticosteroid therapy, and ten patients (12 hips) had alcohol-induced osteonecrosis. For five patients (five hips), no etiological factor could be detected. According to Harris hip score, four hips were assessed as excellent, four as good, five as moderate and eighteen as poor, and the average score was 65.2±20.7. According to Steinberg stages, three hips were identified as stage ⅠC, three as ⅡB and 25 as ⅡC. **Results** All patients were followed up with an average duration of 29.4±14.8 months. The final evaluation was made according to the last follow-up data. According to Harris hip score, seventeen hips were assessed as excellent, seven as good, three as fair and four as poor. The excellent to good rate was 77.4% and the average score was 86.6±13.9 with a statistical difference ($P<0.05$). According to Steinberg stages, three hips were identified as stage ⅠC, four as ⅡB, fifteen as ⅡC, two as ⅢC, one as ⅣB and six as ⅣC. The radiographic progression rate to Steinberg ⅢA or more advanced was 29.0%. No serious adverse reaction occurred during this period. **Conclusion** Porous tantalum implantation in treatment of early femoral head necrosis can improve the joint function and delay the disease with good short-term efficacy.

[**Key words**] porous tantalum; osteonecrosis; femoral head

Corresponding author: Wang Aimin, Tel: 86-23-68757936, E-mail: trauma2@163.com

股骨头坏死是一种进展性髋关节疾病,好发于中青年,若未经及时、有效治疗,5年内约80%的患者将出现股骨头塌陷,最终大多数不得不接受全髋人工关节置换术,其中年轻患者还需面对人工关节翻修的问题[1-2]。因此,早期诊断,保留股骨头,重建血运,防止关节面塌陷,最终避免或推迟接受全髋人工关节置换

[通信作者] 王爱民, E-mail:trauma2@163.com
[优先出版] http://www.cnki.net/kcms/detail/51.1095.R.20130321.1104.014.html(2013-03-21)

手术的时间,是治疗股骨头坏死的基本原则[3]。2008年4月至2012年6月我科采用钽棒植入治疗早期股骨头坏死26例31髋,现将结果汇报如下。

1 资料与方法

1.1 临床资料

2008年4月至2012年6月,我科采用钽棒植入治疗早期股骨头坏死26例31髋,包括男性21例25髋,女性5例6髋,单侧21例,双侧5例,年龄26~65(43.8±10.7)岁,体质指数15.2~28.4(23.5±3.0)。病因:激素性11例14髋,酒精性10例12髋,特发性5例5髋。术前患者均通过MRI确诊。Steinberg分期[4]:ⅠC期3髋、ⅡB期3髋、ⅡC期25髋;Harris评分[5]为(65.2±20.7)分:优4髋、良4髋、中5髋、差18髋。纳入标准:年龄18~65岁、体质量指数<40。排除标准:Steinberg Ⅲ期及以上、创伤性股骨头坏死、随访时间<6个月或局部严重感染者。研究经过医院伦理委员会批准,患者签署知情同意书。

1.2 手术方法

采用持续硬膜外麻醉,患者取平卧位,患髋垫高30°;常规消毒铺巾,C臂透视确认进针点,切开对应皮肤,长约2 cm,逐层切开皮下及阔筋膜张肌,纵行劈开股外侧肌,暴露股骨近端外侧皮质;C臂透视下以小转子稍上方水平线与股骨外侧皮质交点为进针点,向股骨头坏死区域中心点钻入导针,直至关节面下5 mm,C臂透视确保导针在正侧位均位于股骨颈靠中心的位置;顺导针以孔钻扩大钉道直径至10 mm,拔出导针,多角刮勺清除坏死骨组织;以测深器探测钉道长度,攻丝,根据结果选用合适植入物,C臂透视保证假体与钉道方向一致,头端位于软骨下区;逐层缝合切口。

1.3 术后康复

术后6周内患肢禁忌负重,床上主、被动锻炼患髋活动范围;6~12周患者在双侧腋杖辅助下锻炼行走功能,患肢部分负重;12周后患者根据自身耐受情况逐渐完全负重。

1.4 疗效评估

根据Harris评分系统评价髋关节功能,总分为100分,<70分为差,71~80分为中,81~90分为良,91~100分为优;根据Steinberg分期评价影像学变化。术前完善髋关节正侧位X线片、MRI及Harris评分,术后3、6、12、24、36、48、60个月定期随访,完善髋关节正侧位X线片及Harris评分。以最后一次随访结果作为评定依据。

1.5 统计学分析

计量资料以$\bar{x} \pm s$表示,采用SPSS 19.0统计学软件,采用配对样本t检验比较手术前后Harris评分。无论任何原因导致的资料缺失均由前一次所得资料对应填充。

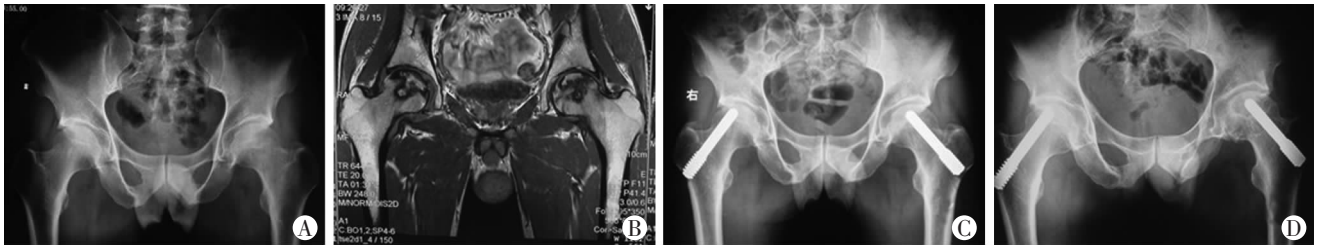
2 结果

术后随访7~57(29.4±14.8)个月,26例31髋全部获得随访。以最后一次随访结果作为评定依据,Harris评分为(86.6±13.9)分:优17髋、良7髋、中3髋、差4髋,优良率为77.4%(24/31),与术前比较统计学有显著性差异($P<0.05$);Steinberg分期:ⅠC期3髋、ⅡB期4髋、ⅡC期15髋、ⅢC期2髋、ⅣB期1髋、ⅣC期6髋,29.0%(9/31)影像学进展为Steinberg Ⅲ期或以上;无手术并发症发生。

典型病例(图1):男性,45岁,体质指数19.0,因"左髋疼痛40 d"入院,行X线片、MRI检查,诊断为"双侧股骨头坏死(右侧Steinberg ⅠC期,左侧Steinberg ⅡC期)",遂行双侧钽棒植入术,术后2年随访提示双侧股骨头坏死(右侧Steinberg ⅡC期,左侧Steinberg ⅡC期)。

3 讨论

目前关于治疗早期股骨头坏死的经典方法主要有髓芯减压和带血管蒂的腓骨移植术[6-9]。髓芯减压术缓解骨内高压,改善股骨头的血液供应,但是由于术后缺乏对软骨下骨板的有效力学支撑,增加软骨下骨折和关节面塌陷的风险;带血管蒂的腓骨移植术克服了前者的弱点,但存在手术技巧要求高、移植相关并发症多、增加日后全髋人工关节置换难度等诸多问题。Christie设计发明了多孔钽棒来克服带血管蒂的腓骨移植术中存在的问题。多孔钽棒钽涂层厚度10~100 μm,孔隙率75%~80%,孔隙直径平均为430 μm,其骨向内生长的能力高出传统多孔涂覆材料2~3倍,而表面剪切抵抗力是传统材料的2倍;平均屈曲强度为10 N·m,与人腓骨平均屈曲强度(8~12.5 N·m)相当;弹性模量为3 GPa,介于软骨下骨板(1.5 GPa)与皮质骨(15 GPa)之间;摩擦系数相对于松质骨和皮质骨分别为0.88和0.74,比传统材料高



A:术前X线片;B:术前MRI;C:术后X线片;D:术后2年X线片

图1 典型病例双侧钽棒植入术手术前后影像学表现

40%～80%[10]。Pedersen等[11]利用三维有限元模型研究证明多孔钽棒支撑股骨头的作用类似于腓骨移植,还发现:①多孔钽棒与骨的弹性模量相当,故在股骨头内具有相似的应力和应变模式;②多孔钽棒最主要承受的是压力而非弯曲及张力;③多孔钽棒植入的最佳位置在股骨上外侧,以便其头端接触并支持软骨下骨板。另外,钽金属具有良好的生物相容性,在避免局部异物感染方面的表现亦引人瞩目[12]。

鉴于钽棒的诸多生物学及生物力学特性,经过美国食品药品监督管理局批准和相关医疗器械临床试验申报允许,自2000年6月起开始在全美境内进行钽棒植入治疗早期股骨头坏死的临床研究。Tsao等[13]率先报道96髋(Steinberg Ⅱ期)随访资料,结果显示Harris评分术前为63分,术后6个月为75分,术后1年为78分,术后2年为78分,术后3年为86分,术后4年为83分;以钽棒植入术为起点,全髋人工关节置换术为终点,上述时间髋关节生存率分别为97.8%、85.3%、79.1%、72.5%和72.5%。Shuler等[14]随后报道对比研究钽棒植入术与带血管蒂腓骨移植术治疗早期股骨头坏死的45例病例的短期随访资料,结果表明,以全髋人工关节置换术为终点,经过平均39个月随访,髋关节生存率分别为86%和67%,二者间比较无统计学差异,但是钽棒植入术具有出血少、手术时间短、住院时间短、并发症少等优点。因此,钽棒植入术被认为是一种治疗早期股骨头坏死的安全、有效、微创的方式。自2008年钽棒被引入中国后,我科积极开展钽棒植入治疗早期股骨头坏死的临床实践,短期临床随访结果与国外研究一致。

虽然钽棒植入术操作过程简便,类似于股骨颈骨折空心钉固定,但是围手术期的几个细节问题值得重视。①定位:股骨头坏死最常累及负重区,通常为股骨头前上方;钽棒植入术要求钽棒头端位于关节面下5 mm处,方能对软骨下骨板予以有效力学支撑。因此应充分利用术前影像学资料及C臂透视技术,务必保证导针尖端位于股骨头坏死区域中心、关节面下5 mm处。②病灶清除:股骨头坏死区域边缘硬化,阻碍新生血管张入。因此,应利用多角度刮匙或磨钻充分清除坏死骨,对于坏死区域过大者,可取同侧大转子松质骨或人工骨予以植骨处理。③髓芯减压:髓芯减压能够打破股骨头髓腔封闭状态,降低骨内压力,减少血管阻力,从而缓解患者髋部疼痛,改善局部血液循环。因此,可利用细针多孔髓芯减压技术,于钉道准备完成后,用直径3.0 mm克氏针从钉道内向四周钻孔减压,进一步缓解患者疼痛,改善局部血液循环。

综上所述,钽棒植入术是一种治疗早期股骨头坏死的安全、有效、微创的方式,短期内能够有效缓解患者疼痛,改善关节功能,但中、远期疗效依赖进一步临床观察。

参考文献:

[1] Kaushik A P, Das A, Cui Q. Osteonecrosis of the femoral head: An update in year 2012 [J]. World J Orthop, 2012, 3(5): 49-57.

[2] Mont M A, Zywiel M G, Marker D R, *et al*. The natural history of untreated asymptomatic osteonecrosis of the femoral head: a systematic literature review [J]. J Bone Joint Surg Am, 2010, 92(12): 2165-2170.

[3] Aldegheri R, Taglialavoro G, Berizzi A. The tantalum screw for treating femoral head necrosis: rationale and results[J]. Strategies Trauma Limb Reconstr, 2007, 2(2/3): 63-68.

[4] Steinberg M E, Hayken G D, Steinberg D R. A quantitative system for staging avascular necrosis [J]. J Bone Joint Surg Br, 1995, 77(1): 34-41.

[5] Harris W H. Traumatic arthritis of the hip after dislocation and acetabular fractures: treatment by mold arthroplasty. An end-result study using a new method of result evaluation [J]. J Bone Joint Surg Am, 1969, 51(4): 737-755.

[6] Hitt K D, Reddix R N. Core decompression for osteonecrosis of the hip [J]. Semin Arthro, 2004, 15(3): 145-150.

[7] Castro F P Jr, Barrack R L. Core decompression and conservative treatment for avascular necrosis of the femoral head: a meta-analysis [J]. Am J Orthop (Belle Mead NJ), 2000, 29(3): 187-194.

[8] Korompilias A V, Lykissas M G, Beris A E, *et al*. Vascularised fibular graft in the management of femoral head osteonecrosis: twenty years later [J]. J Bone Joint Surg Br, 2009, 91(3): 287-293.

[9] Johnson A J, Khanuja H S, Mont M A. Osteonecrosis of the Femoral Head: Femoral Head Sparing Treatments [J]. Semin Arthro, 2010, 21(1): 2-4.

[10] Levine B R, Sporer S, Poggie R A, *et al*. Experimental and clinical performance of porous tantalum in orthopedic surgery [J]. Biomaterials, 2006, 27(27): 4671-4681.

[11] Pedersen D R, Brown T D, Poggie R A. Finite element characterization of a porous tantalum material for treatment of avascular necrosis [J]. Trans Orthop Res Soc, 1997, 22: 598.

[12] Schildhauer T A, Robie B, Muhr G, *et al*. Bacterial adherence to tantalum versus commonly used orthopedic metallic implant materials [J]. J Orthop Trauma, 2006, 20(7): 476-484.

[13] Tsao A K, Roberson J R, Christie M J, *et al*. Biomechanical and clinical evaluations of a porous tantalum implant for the treatment of early-stage osteonecrosis [J]. J Bone Joint Surg Am, 2005, 87 Suppl 2: 22-27.

[14] Shuler M S, Rooks M D, Roberson J R. Porous tantalum implant in early osteonecrosis of the hip: preliminary report on operative, survival, and outcomes results [J]. J Arthroplasty, 2007, 22(1): 26-31.

(**收稿**:2013-01-27;**修回**:2013-03-07)

(编辑 龙 亮)