ORIGINAL ARTICLE

Improvement in Harris Hip Score after cementless total hip arthroplasty in young active adults with secondary hip arthritis- A short-term follow-up result

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Abstract

Objective: To determine the improvement in Harris Hip Score after non-cemented total hip replacement in younger patients with secondary hip joint arthritis.

Methods: The quasi-experimental study was conducted at Unit I, Department of Orthopaedic Surgery and Traumatology, Mayo Hospital, Lahore, and comprised patients diagnosed clinically and radiologically as secondary hip joint arthritis from September 2009 to December 2014. Harris Hip Score was calculated pre-operatively. All patients were operated by the same surgical team. One dose of second-generation intravenous cephalosporin after test dose was given at induction of anaesthesia followed by 3 times daily postoperatively along with aminoglycosides twice daily for three days followed by oral quinolones for 2 weeks. Patients were followed up for 6 months. The improvement in hip score was classified as poor, fair, good and excellent. Data entry and analysis was done using SPSS 11.5.

Results: Of the 65 patients in the study, 43(66%) were male and 22(34%) were females. Right hip was involved in 40(62%) patients and 25(38%) had pathology in the left hip. Overall mean age of male and female patients was 35.69±5.55 years and 35.72±5.95 years respectively. Harris Hip score improved over 6 months from poor to fair.

Conclusion: The use of non-cemented total hip arthroplasty conferred a significant improvement in function in young patients with arthritis of the hip joint.

Keywords: Non-cemented total hip replacement, Harris Hip Score, Young adults, Hip joint arthritis. (JPMA 65: S-63 (Suppl. 3); 2015)

Introduction

Hip is a unique joint regarding its higher incidence of secondary arthritis affecting the younger age group.[1] In contradiction to primary osteoarthritis of hip, which is an age-related disease, secondary arthritis of hip can result from avascular necrosis (AVN), trauma, infection and tumours.[2] Hip arthritis (HA) is a condition with loss of the articular cartilage hip joint which appears on X-ray as a loss in joint space.[3]

The prevalence of hip joint arthritis is about 3% to 6%. HA is more common in men than in women. Initially, asymptomatic patients finally ended up with joint destruction, thus requiring surgical intervention.[4] Though treatment is facilitated by using international classification system like Steinberg classification (modification of Ficat classification), magnetic resonance imaging (MRI) can be used for earlier diagnosis and hence more aggressive management. But at later stages, pathology becomes advanced enough to be evident on plain X-rays.[5]

Most patients with advanced disease require total hip arthroplasty (THA). Recently, total hip replacement (THR) is being performed in active young patients with success rates being promising in the short term. A study has shown 90% success in younger patient following non-cemented THA. Studies have shown high success and patient satisfaction in a well-performed THA.[6]

The current study was planned to determine percentage improvement in Harris Hip Score (HHS) after non-cemented THR in younger patients with advanced arthritis of hip joint.

Patients and Methods

The prospective quasi-experimental study was conducted at Unit I, Department of Orthopaedic Surgery and Traumatology (DOST-I), Mayo Hospital, Lahore, and comprised patients between 20 and 45 years of age diagnosed clinically and radiologically as secondary hip joint arthritis from September 2009 to December 2014.

The patients were admitted through outpatient department (OPD) of Orthopaedic Department. All those having history of surgical intervention to the affected joint in the past, congenital joint deformity and local (skin) and/or remote infection were excluded.

Those included had 5 out of 5 power of hip flexors,

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extensors, abductors, adductors and rotators clinically. Patients were evaluated radiographically with anteroposterior (AP) and lateral views of both hips for assessing the type and severity of the problem. Digital X-rays of pelvis with bilateral hip with zero percent magnification was obtained for pre-operative planning and templeting.

The patients were very poor and non-affording but still required surgery for pain-free return to their daily activity and work. After written informed consent, demographic data (name, age, gender, and contact) was obtained from each patient. Every patient was assessed according to HHS pre-operatively. All patients were operated by the same surgical team. All these cases were managed with hydroxyapatite-coated pressfit non-cemented THA (Johnson &Johnson). One dose of second-generation intravenous (IV) cephalosporin after test dose was given at induction of anaesthesia followed by 3 times daily postoperatively along with aminoglycosides twice daily for three days followed by oral quinolones for 2 weeks. Physical and occupational therapy was performed inward and was also taught to the patient and it included precaution in THA with avoidance of hip flexion of over 90 degrees and any degree of internal rotation or adduction. All patients were discharged within a week after physical rehabilitation training. They were provided with Lofstrand crutches at the time of discharge and were advised to use cane on the contralateral side with the help of a home physical therapist (usually at 3 weeks).

The Occupational Therapy Department arranged for the use of an elevated toilet seat and additional devices. Patients were followed up for 6 months in OPD after two weeks, one month, and six months of surgery. The improvement in HHS was then classified as poor, fair, good and excellent.

Data entry and analysis was done using SPSS 11.5. Qualitative variables like gender were presented by frequency and percentage. Quantitative variables like age, pre-operative and post-operative HHS were presented as mean and standard deviation (SD). The pre- and post-operative mean HHS were compared and percentage improvement was measured. Improvement in baseline HHS was calculated using paired t-test.

Results

Of the 65 patients in the study, 43(66%) were male and 22(34%) were females. Right hip was involved in 40 (62%) patients and 25(38%) had pathology in the left hip. The overall mean age was 35.70±5.64 years (range: 20-45 years).Mean age of male and female patients was 35.69±5.55 and 35.72±5.95 years respectively.

Table: Descriptive statistics.

		Post-Operative Follow up		
	Baseline	**2nd Week**	**1st Month**	**6th Month**
N	65	65	65	65
Mean	41.15	58.76	68.13	78.64
SD	5.12	4.57	4.55	2.28
Improvement (%)	-	42.79%	65.56%	91.10%
Min	29	46	52	73
Max	49	69	78	86
p-value		0.000 (17.61) Base Line to 2nd Week		
p-value		0.000 (26.98) Base Line to 1st Month		
p-value		0.000 (37.49)Base Line to 6th Month		

SD: Standard deviation.

Infection was the most common cause of hip arthritis in 42(64.6%) patients followed by 21(32.3%) having history of trauma to hip and 2(3.07%) having a vascular necrosis of the head of femur. Mean duration of hospital stay was 6±2.8 days (range: 5-14 days).

HHS was calculated for all patients at 2nd week, 1st month and 6th month post-operatively. At baseline, mean HHS was 41.15±5.12 (range: 29-49). At 2nd week, mean HHS was 58.76±4.57 (range: 46-69). At 1 month, mean HHS was 68.13±4.55 (range: 52-78). At 6month, mean HHS was 78.64±2.28 (range: 73-86) (Table).

All patients were in poor HHS grade at baseline, but the grade improved over 6 months to fair ($p<0.05$). All patients were able to return to their pain-free daily activities.

There were 3(4.6%) cases of hip joint dislocation after THA. Among this 1(33.3%) case related to recurrent dislocation in an epileptic patient who was managed with adductor tenotomy. One (33.3%) case had vertical acetabular component which was then revised within 2 days. The third case (33.3%) was managed conservatively with protected position of limb. There were also 5(7.7%) cases of superficial infection which was managed with debridement and IV antibiotic according to culture and sensitivity test. We had no patient with deep vein thrombosis (DVT) or pulmonary embolism (PE). No case of myositis ossificans and implant-loosening was noted at the last follow-up.

Discussion

Selection of appropriate implant and surgical technique are important in young patients undergoing THA because of their high physical demands and for long-term survival of the implant. Only few long-term studies of cementless hydroxyapatite-coated implants in younger patients are present in our country.

In younger THA patients, higher physical activity or functional demand may increase the rates of mechanical failure and bone destruction. Use of first-generation cemented THAs in young patients was not favourable in long-term studies, with revision rates upto 10% to 39%.[7-9]

One study evaluated the clinical and radiographic results of modern design non-cemented THA in patients less than twenty years of age. Mean preoperative HHS was 51.9 points (range: 40.1-82.3) that improved to 77.3 points (range: 60-99) at last follow-up (p=0.0017).[10]

In our study, mean baseline HHS was 41.14, at 2nd week 58.76, at 1st month 68.13 and at 6months78.64. The HHS improved by 37.49 points. These results are consistent with the results reported by the earlier study.[10]

Another study reported high survival in young patients using a second-generation non-cemented THA. It used HHS to determine preoperative and postoperative activity levels and found HHS improving from a mean of 45 points preoperatively to 91 points at last follow-up (p<0.001).[11] Mean improvement in our study was less than those reported earlier[11] but results did show improvement in HHS (p<0.001).

One study clinically evaluated patients by 2 independent observers, using HHS. It reported that at the final follow-up in the 63 unrevised hips, mean HHS was 92 (range:45-100).[12]

It reported a 29-point score improvement in HHS at last follow-up, while in our study the difference between baseline and last follow-up HHS scores was 37.49 which is higher.

One study radiographically and clinically assessed the results of THA patients below 30 years of age with advanced coxarthrosis secondary to non-inflammatory pathology using modern non-cemented implants. Patients were evaluated preoperatively and postoperatively at 6 weeks, 6 months, one year, and two yearly thereafter with clinical examination, HHS and radiographs. It reported mean 33.4 point (95% confidence interval [CI]: 28.0-37.6) improvement in HHS after THA, with mean preoperative HHS being 62.7 (95% CI: 57.3-68.0) and a mean postoperative HHS being 94.7 (95% CI: 92.2-97.1).[13]

A study followed 95 non-revised hips for mean duration of 61months. The mean preoperative HHS was 42 which improved postoperatively to 83, concluding that contemporary THA in patients below 25 years of age had improved hip function, and secured fixation of implants in early follow-up.[14] Similarly, mean improvement reported by the study was consistent with the results reported in this study.

Keeping in mind all these results, it was observed that using cementless implants for THA in younger age groups had promising and effective results in younger patients.

The aim of surgical treatment in younger active population is to provide a long-term solution for relief of pain and restoration of function. Results of our study indicated improved short-term outcome following contemporary THA. Cementless fixation with good bearing material of implant provide better long-term outcome in young adult patients.

Conclusion

Non-cemented THA conferred a significant improvement in function and acceptable short-term outcome in young adult patients with arthritis of the hip joint.

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