



ISSN: 2395-1958
IJOS 2018; 4(2): 1015-1017
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www.orthopaper.com
Received: 24-02-2018
Accepted: 25-03-2018

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Assessing functional outcome using modified Harris hip score in patients undergoing total hip replacement

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DOI: <https://doi.org/10.22271/ortho.2018.v4.i2o.144>

Abstract

Introduction: Harris Hip Score (HHS) is used for assessing functional outcome in patients undergoing total hip replacement (THR). The present study aimed to assess patients who underwent THR for various indications with modified HHS at different stages pre- and post-operatively.

Methodology: Patients who were admitted to our indoor ward for THR from December 2008 till December 2010 were included in the study. Detailed history and physical examination was done for all patients. On every follow up day patients were x-rayed and scored according to the Modified HHS. Pre-operative and intra-operative details were noted using a pretested semi-structured questionnaire.

Results: We analysed 20 hip joints in the study. Most common indication of surgery was osteoarthritis secondary to avascular necrosis head of femur. Average modified HHS was 28 preoperatively, increased to 64 at 6 weeks, 86 at six months, 90 at one year and 92 at the last follow-up. After one year follow up, modified HHS was excellent in 17 patients and good in three patients. Modified HHS was excellent in 11 cases where duration of surgery was 136 to 160 minutes and in 2 cases where duration of surgery was 161-185 minutes. Furthermore, modified HHS was excellent in patients in whom partial and full weight bearing was started early.

Conclusions: Patients who underwent early partial and full weight bearing also reported excellent modified HHS at final follow up. We recommend the use of modified HHS for assessing post-THR functional status of patients.

Keywords: Harris hip score, total hip replacement, outcome, fracture

Introduction

Total hip replacement (THR) is a highly effective procedure for patients with hip pain due to joint deterioration from a variety of conditions; it can relieve pain, can restore function, and can improve quality of life by replacement of the diseased articular surfaces with synthetic material. The 30-day mortality rate of THR is less than 1%, although a variety of complications may occur during and following the procedure. Published results of THR have demonstrated excellent clinical, functional and radiographic outcomes in patients. These results, however, vary depending upon the implant, the surgical technique, the type of fixation, the biomaterials, the patient's age, and numerous other factors. Standard Harris Hip Score (HHS) is a validated and the most commonly used tool to measure the functional capacity of an individual before and after a surgical procedure [1]. It has been used extensively in many studies for evaluating functional outcomes of THRs [2]. However, HHS includes a component of physical examination, which can vary widely among examining surgeons [3]. Subsequently to minimise this variability, modified HHS was developed in which the clinical evaluation part was removed. Modified HHS has been used in the past to assess functional outcome of THR over telephone [4] and for assessing functional outcome in non-traumatic indications of THR [5]. The present study aimed to assess patients who underwent THR for various indications with modified HHS at different stages pre- and post-operatively.

Methodology

Study design and sampling

Patients who were admitted to our indoor ward for THR from December 2008 till December 2010 were included in the study. All patients with good bone stock, long life expectancy needing THR for painful disabling hip were included in the study. We excluded patients who were older with life expectancy less than 15 years, soft osteoporotic bones, requiring revision surgery, active infection of hip joint, insufficiency of abductor mechanism, hips unsuitable for summit stem on templating and those refusing written consent for inclusion in the study.

Surgical technique and postoperative care

With tube to film distance of 40 inches to get standard magnification for templating, x-rays of both hips with upper half of femora-antero posterior views in neutral position and then in 150 degrees internal rotation, lateral views of both hips with upper half of thigh were taken. Computerized Tomography (CT) scan of both hips was required in some patients to get more information regarding hip joint space, fibrous or bony ankylosis, cystic lesions in femoral heads, thickness of medial wall of acetabulum, defects in acetabular wall particularly in fracture dislocations. Templating was done to choose appropriate implants and anticipating unusual needs during surgery. Most sizing predictions for acetabulum and femoral component were made on the antero-posterior radiographs of the hip. Post-operatively patients were instructed to avoid adduction, flexion and internal rotation to prevent dislocation of hip joint and were advised to do active toe movement and quadriceps exercises, once patients were out of anaesthesia. Good post-operative analgesia was given to all the patients, round the clock. On first post-operative day patients were allowed to sit with the help of backrest. On the second post-operative day primary dressing was done and the negative suction drain was taken out. Depending upon the general condition of the patients and fixation of implants patients were allowed to stand and walk. Patients who were allowed to walk, were advised to increase the walking distance gradually. On 14th postoperative day, skin sutures were taken out and antibiotics was stopped. By this time those patients who were allowed to walk early were able to walk comfortably and confidently in the hospital premises and were discharged from hospital. Those patients in whom walking was delayed were discharged only after they were walking confidently with crutches. On discharge, patient was advised not to squat and sit cross legged, avoid low-level chairs/sofas and sleeping on the operated limb. Patients were advised to use western type of seat in toilet, keep limb abducted, not to adduct, not to flex more than 90 degrees and internally rotate the hip. Active quadriceps, hip and knee bending exercises, flexion stretches were advised to the patient. Every patient was advised to come for follow up at 6 weeks interval. Modified Harris Hip scoring was done for all included patients pre-operatively and at regular intervals in the postoperative period [6].

Data Collection and Data Analysis

After obtaining approval of the institutional ethics committee, eligible patients were explained the purpose of the study and an informed written consent was obtained. Detailed history and physical examination was done for all patients. Routine and specific laboratory investigations were performed as part of the pre-anesthetic assessments and fitness. On every follow up day patients were x-rayed and scored according to the Modified Harris hip scoring and compared with previous

scoring. Pre-operative and intra-operative details were noted using a pretested semi-structured questionnaire. Data were analysed descriptively and tabulated to draw conclusions.

Results

We analysed 20 hip joints in the study, mean age was 47.5 years and male patients predominated in our study population (Table 1). Both sides were operated with equal frequency, while one patient had a bilateral THA. Most common indication of surgery was osteoarthritis secondary to avascular necrosis head of femur. Two patients had infection. Amongst them one case was operated previously with excision of head of femur & debridement for tuberculosis hip. Another case was operated case of fracture neck of femur with active infection and was also treated in two stages. All cases were operated with a posterolateral approach under general anesthesia. Duration of surgery ranged from 110 minutes to 190 minutes, mean duration being 139 minutes. All patients were followed up for at least a year post-operatively. Average pre-operative modified HHS was 28 (poor), which remained poor (64) when measured 6 weeks postoperatively (Table 2). Six months post-operatively, average modified HHS was excellent (90 to 100) in six patients and good (80 to 89) in 14 patients. After one year follow up, modified HHS was excellent in 17 patients and good in three patients. At the last follow up, out of 16 cases of osteoarthritis 14 had excellent modified HHS while 2 had a good score (Table 3). Modified HHS was excellent in 11 cases where duration of surgery was 136 to 160 minutes and in 2 cases where duration of surgery was 161-185 minutes. Metal on metal large head acetabular cup was used in 8 cases, of which 7 were reported to have an excellent modified HHS at the last follow up. Pinnacle acetabular cup was used in 11 cases, of which 9 were found to have an excellent modified HHS and two had a good score. Furthermore, modified HHS was excellent in patients in whom partial and full weight bearing was started early. In early post-operative period, two cases had superficial infection and one patient had hypotension. In the late post-operative period, no patient reported any complications till the end of their follow up.

Discussion

This study assessed modified HHS at different stages of management of patients who underwent THR at our centre. Average modified HHS was 28 preoperatively, increased to 64 at 6 weeks, 86 at six months, 90 at one year and 92 when the patients were examined at the last follow-up. Partial weight bearing with two crutches was started in 17 cases within 7 to 14 days and the results were excellent in 15 & good in two cases. Full weight bearing was started at 5 to 6 weeks in 19 patients and the score was more than 90 in 16 of them. It was concluded that earlier the patient on FWB, better was the score. In a study by Santori *et al.* all cases were granted full weight bearing immediately with the help of two walking sticks & with one stick after 2 weeks [7]. The clinical evaluation has been obtained with the Harris Hip score and the radiological results with continual check up. Score was excellent in all cases. In the present study, metal on metal articular surface replacement (MOM ASR) cup was used in 8 cases, Pinnacle in 11 cases and Duraloc was used in one case. Score was excellent in 7 cases using MOM and in 9 cases using Pinnacle. The essential advantage of MOM cup large head, that is squatting and sitting cross-legged, is not a feature in Harris Hip score, so can not be used to evaluate the two cups.

There were no intra-operative complications in our study. The incidence of fracture during THR ranges from 0.1 to 1% for cemented components and from 3 to 18% for uncemented components [8]. Most intraoperative fractures occur on the femoral side during stem insertion. Minor fractures may be left alone or treated with wires or cables. More extensive fractures may require more complex solutions including revision of components, bone grafting, and/or supplementary hardware. The incidence of nerve injury in primary THR ranges from 0 to 3% and injury to the sciatic nerve is most common, but the femoral, obturator, and superior gluteal nerves may also be injured [9]. In our study one patient was having limb lengthening of 1.5 cms and two patients with 5mm, postoperatively. Numerous factors affect perceived postoperative leg length, and true leg length should be differentiated from apparent leg length. There is no universal consensus on what constitutes a significant inequality [10]. Some surgeons define a significant difference as 2 cm or more. Others define a significant difference as one that adversely affects patient function.

Conclusion

In this study we describe our experience of performing THR and assessing patients with modified HHS at regular intervals. Six months post-operatively excellent scores on modified

HHS were observed. Patients who underwent early partial and full weight bearing also reported excellent modified HHS at final follow up. We recommend the use of modified HHS for assessing post-THR functional status of patients.

Table 1: Baseline characteristics of patients included in the study

Total number of patients	20
Age structure	
21 to 30	2
31 to 40	3
41 to 50	8
51 to 60	4
More than 60	3
Gender distribution	
Females	6
Males	14
Side of surgery	
Right	9
Left	9
Bilateral	1
Indication of surgery	
Osteoarthritis secondary to avascular necrosis head of femur	16
Polyarticular rheumatoid	1
Fracture neck of femur	1
Infection	2

Table 2: Modified Harris Hip score at various stages of patient management

Score	Preoperative	At six weeks	At six months	At one year	Last follow up
90-100 (Excellent)	0	0	6	17	17
80-89 (Good)	0	0	14	3	3
70-79 (Fair)	0	0	0	0	0
< 70 (Poor)	20	20	0	0	0
Total	20	20	20	20	20

Table 3: Description of Modified Harris Hip score according to different patient related variables

	Modified HHS at last follow up			
	90-100 (excellent)	80-89 (good)	70-79 (fair)	Less than 70 (poor)
Gender				
Male	12	2	0	0
Female	5	1	0	0
Indication of surgery				
Osteoarthritis	14	2	0	0
Polyarticular rheumatoid	0	1	0	0
Fracture neck of femur	1	0	0	0
Infection	2	0	0	0
Duration of surgery (in minutes)				
110-135	3	0	0	0
136-160	11	2	0	0
161-185	2	0	0	0
> 185	1	1	0	0
Type of acetabular cup				
Metal on metal	7	1	0	0
Pinnacle	9	2	0	0
Duraloc	1	0	0	0
Partial weight bearing				
1 to 2 weeks	15	2	0	0
3 to 4 weeks	2	1	0	0
5 to 6 weeks	0	0	0	0
7 to 8 weeks	0	0	0	0
Full weight bearing				
5 to 6 weeks	16	3	0	0
7 to 8 weeks	0	0	0	0
More than 8 weeks	1	0	0	0

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