

Primary Total Joint Replacement Preliminary Analysis of a Local Experience

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ABSTRACT : Twenty-nine patients who underwent primary total joint replacements were reviewed at the Mekati Medical Center over a five year period from 1984 to 1989. Fifteen patients underwent total hip replacements while 14 patients had total knee arthroplasties. This study was done to present the results of our primary total joint replacements. Post-operative assessments were based on regular clinic follow-up during which the patients clinical status and check x-rays were done. The Harris hip scoring system developed by the Hospital for Special Surgery were utilized in this study. So far, our follow-up results were very satisfactory and fulfilling.

INTRODUCTION

About 200,000 total joint replacements are performed in the United States annually. In abroad, this surgery is widely accepted as the treatment of choice for severe degenerative arthritis and rheumatoid arthritis. In the Philippines, total joint replacements are being performed more frequently.

In this paper, we would like to describe our experience in primary total joint replacement of the hip and knee at the Makati Medical Center. Six total joint operations were performed by the senior authors in this institution from 1984 to 1989. Of these, 39 were primary arthroplasties in 29 patients. There were 17 total hip replacements and 22 total knee replacements. Ten patients underwent bilateral arthroplasties in one setting.

MATERIALS AND METHODS

There were 15 males and 14 females in this study with an average of 60 years. Primary degenerative joint disease was the primary pathology in 13 patients (8 knees and 5 hips). Nine

patients had avascular necrosis of the hips, while 6 patients had rheumatoid arthritis of the knees. One 70-year-old male patient had a metastatic lesion on the proximal femur. The overriding indication for total joint replacement in these patients was severe pain which was unresponsive to medical treatment. Before undergoing surgery, the patients were evaluated using the Harris hip scoring system and the knee scoring system developed by the Hospital for Special Surgery. These scoring systems evaluate the patient as to pain, function, functional activity and absence of deformity.

TOTAL HIP REPLACEMENT

Roentgenograms of the hips and knees were taken and measured with templates to determine the size of the implant to be used. The templates are enlarged to 15-12 per cent magnification. Routine AP and lateral views were taken. The largest acetabular cup that could be accommodated on the x-rays was determined by having at least 6 mm. of the thickness between the outer and inner diameters. The femoral component was measured using a 26 mm. head, and either a short, standard or long neck and stem.

All patients were given parenteral antibiotics - a cephalosporin and an aminoglycoside - at induction and continued for 24 hours post-operatively. The hip joint was approached using a posterolateral incision with the patient in a lateral recumbent position. The acetabular and femoral component prosthesis were all cemented. The acetabulum was reamed to about 3 mm. bigger than the estimated acetabular component. Multiple drill holes were made into the reamed surface for optimum cement penetration. On the femoral side, the neck osteotomy line was guided by a trial femoral component saving the calcar, which is approximately one fingerbreath proximal to the lesser trochanter. After rasping the medullary canal, a plug was inserted approximately 1 to 2 cm. distal to the location of the stem. Pressurization of the bone cement into the acetabulum and the femoral canal were obtained with the use of special instruments to prevent bubble formation and improve the penetration of cement into the

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lattices of the bone. Bilateral total hip replacements took an average of two hundred and fifty minutes, and unilateral procedures had an average of ninety-two minutes. Post-operatively, all patients were placed on abductor splints. They practiced their post-op rehabilitation routines prior to admission emphasizing isometric quadriceps and hamstring strengthening as well as ambulation with appropriate walking aids. The average hospital stay was eleven days. There was no difference in the length of hospital stay between bilateral and unilateral procedures. The average intra-operative blood loss for unilateral procedures was three hundred seventy millilitres while bilateral replacements was five hundred twenty millilitres.

TOTAL KNEE REPLACEMENTS

Routine AP and lateral views were taken. The knees were measured to the four available sizes - small medium, large and extra-large. The surgical approach was through a medial parapatellar incision with the patient in supine position. All implants including the femoral, tibial and patellar components were cemented. The Howmedica total condylar prostheses were used in ten patients and the Genesis system in four patients. The techniques were standard using the applicable instrumentation for each system. Careful cementing technique with pressurization was also emphasized. The tourniquet was turned off before closure of the wound. The average operating time for unilateral procedure was eighty minutes while bilateral replacements lasted for one hundred and fifty five minutes.

The patient were immobilized for a day on a Jones' bandage. On the second post-op day, they were placed on a continuous passive motion machine and made to flex the knee at ninety degrees on the fourth post-op day. The average hospital stay was twenty days. There was no difference in the length of hospital stay between bilateral and unilateral procedures. The average intraoperative blood loss in bilateral arthroplasties was four hundred and eighty millilitres, while unilateral replacement had an average of three hundred and ten millilitres.

RESULTS

TOTAL HIP REPLACEMENT (15 patients)

Fifteen patients who underwent total hip replacement were followed-up from 12 to 60 months with an average of 30 months. Their average pre-operative Harris hip score was 43. At follow-up, all hip scores improved dramatically as shown in table I.

The average post-op. hip score was 90, or 5 points from a perfect score of 95. The maximum improvement in the scores took place within the first year and did not deteriorate up to 60 months post-op.

Seventy-four per cent of the patients were completely pain-free at follow-up, while 26 per cent had minimal pain. No patient had pain disabling enough to limit ambulation.

TOTAL KNEE REPLACEMENT (14 patients)

The follow-up period ranged from 12 to 48 months. All knee scores, as evaluated using the knee scoring system developed by the Hospital for Special Surgery, improved

Table I

FOLLOW-UP (MONTHS)	:	NO.OF PATIENTS	:	NO. OF HIPS	:	MEAN PRE-OP	HIP :	SCORE POST-OP
12	:	2	:	4	:	48	:	91
24	:	3	:	3	:	43	:	88
36	:	5	:	5	:	40	:	90
48	:	1	:	1	:	35	:	92
60	:	4	:	4	:	50	:	90
TOTAL	:	15	:	17 AVERAGE	:	43	:	90

Table II

FOLLOW-UP (MONTHS)	:	NO.OF PATIENTS	:	NO. OF HIPS	:	MEAN PRE-OP	HIP :	SCORE POST-OP
12	:	3	:	6	:	33	:	92
24	:	1	:	1	:	30	:	91
36	:	7	:	9	:	35	:	94
48	:	3	:	6	:	40	:	93
TOTAL	:	14	:	22 AVERAGE	:	35	:	92

significantly at follow-up from an average of 35 pre-operatively to an average of 92 at follow-up. As in our total hip replacement patients, maximum improvement in mean knee scores took place during the first year and did not also deteriorate over time. (table II)

Ninety-two per cent of the knee patients were completely pain-free at follow-up. Three patients had mild pain post-operatively, but improved after a year. All patients were pain-free after 2 years.

COMPLICATIONS

In our series, the only complication so far was one posterior hip dislocation which occurred in a patient while being transferred from the OR table to the stretcher. The dislocation was reduced immediately and the hip subsequently remained stable. We had no cases of deep infection. The routine use of thromboembolic stockings and anti-coagulant therapy for Caucasian patients prevented thromboembolism. Loosening of the prosthesis was not encountered in our series.

DISCUSSION

Our experience with total hip and total knee replacements are quite encouraging. Achieving over 100 degrees of knee flexion is better for function since this enables patients to get up from a chair without difficulty and manage stairs normally.¹ In our series, we obtained knee flexion of more than 90 degrees by putting them on continuous passive motion machine and by having them undergo physical therapy before and after surgery. For the long term results, proper cementing technique is important in achieving reliably good results.

Reports have indicated that at 10 years post-operatively, one third or more of the components may be loose² and in certain groups of patients, the incidence of loosening has been higher (50%) after less than 10 years.³ Harris et al, reported from his series that by plugging the femoral canal and using a cement gun to deliver the cement, the incidence of femoral component

loosening after an average of three years was low (1.1 per cent). The largest femoral stem that will allow a surrounding cement envelope should be selected and the implant introduced into the proximal femur in one steady motion.⁴ Using this technique, we were able to obtain good results among our patients to this date. We firmly believe that longevity of the implants depend on the proper selection of implants and good cementing technique. Clinical support for the use of larger femoral stem was derived from Mayo Clinic (review of 333 patients who underwent Charnley total hip arthroplasty and were followed up for four to seven years), a 24 per cent incidence of roentgenographic evidence of femoral component fixation failure was observed.⁴ In patients with bilateral joint involvement, the question naturally arises as to whether both knees or hips should be operated at the same time.

Murray, et al⁵, in his studies on total knee replacements, initially preferred to operate on both knees at separate operations, a minimum of 3 weeks apart. However, in as much as pain and deformity in the opposite unoperated knee would seriously compromise the rehabilitation program of the first knee, recent experience favors bilateral procedures in one setting when indicated. Our bilateral operations had demonstrated no marked difference with unilateral replacements in the hospital stays and estimated blood loss as concerned. Furthermore, no additional complications ensued with bilateral surgery.

CONCLUSION

In conclusion, the good results that we had attained in the 17 total hip and 22 total knee replacements that have been performed so far in our institution was comparable with the results in the foreign literatures. This encouraged us to enlarge our experience in this field of orthopaedics. We are happy with the average improvement of both hip and knee scores at follow-up. We attribute this to proper cementing technique, correct sizing of implants and adequate instrumentation, as well as meticulous rehabilitation and close out-patient follow-up. We think that total joint surgery has arrived in the Philippines.

REFERENCES

1. Marmor L. Unicompartmental and total knee arthroplasty. *Clin Orthop* 1985;192:59-68.
2. Harris W, McCarthy JC, O'Neill DA. Femoral component loosening using contemporary techniques of femoral cement fixation. *J Bone Joint Surg (Am)* 1982;64:1063-7.
3. Beckenbaugh RD, Ilstrup DM. Total hip arthroplasty; a review of three hundred and thirty-three cases with long follow-up. *J Bone Joint Surg (Am)* 1978;60:306-13.
4. Bourne RB, OH I, Harris WH. Femoral cement pressurization during total hip arthroplasty. *Clin Orthop* 1984;183:12-16.
5. Murray DG. Total knee arthroplasty. *Clin Orthop* 1985;192:59-68.