



FUNCTIONAL OUTCOME OF PATIENTS WITH OSTEOARTHRISIS OF KNEE IN AND AROUND CHIDAMBARAM TREATED WITH TOTAL KNEE ARTHROPLASTY – PROSPECTIVE AND RETROSPECTIVE ANALYSIS

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ABSTRACT

Introduction: Osteoarthritis is the commonest of all joint diseases. Degenerative arthritis of the knee is a common affliction in our Indian population with major functional, medical, psychosocial and financial effects on the affected person, family and society. Knee replacement provides a way to overcome all afflictions of arthritis and is one of the most successful orthopaedic surgeries with immense patient satisfaction.

Aim of the study: To analyse the functional outcome of patients with Osteoarthritis of knee in and around Chidambaram treated with Total Knee Arthroplasty based on the range of motion, radiological measures and associated complications.

Materials and methods: This is a prospective study of patients from in and around Chidambaram diagnosed with Osteoarthritis of the knee joint and treated with Total knee arthroplasty during the period from June 2014 to October 2015 at Rajah Muthiah Medical College Hospital and a retrospective analysis of patients treated with Total knee arthroplasty for OA knee before and on regular follow up at our hospital during the same period. A total of 22 total knee replacements done on 19 patients were included and followed up in the study. The pre operative status and the post operative functional outcome and pain relief of our patients were assessed using the Knee society scoring system and Visual analogue scale respectively.

Results: Eight patients had excellent results, seven patients had good results, two patients had fair results and two had poor results. Fifteen patients were satisfied following their replacements (79%), two patients (10.5%) were not very satisfied and two patients were dissatisfied (10.5%). The commonest complications we encountered were knee stiffness, persistent knee pain, infection and transient foot drop.

Conclusion: The results of total knee arthroplasty on our study population from a rural background and predominantly agarian economy, when treated with standard operative techniques, post operative rehabilitation protocol, proper patient education and lifestyle modification are comparable to that of any other subset of population in the society.

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INTRODUCTION

Osteoarthritis is a chronic joint disorder characterized by progressive softening and disintegration of articular cartilage accompanied by new growth of cartilage and bone at the joint margins i.e., osteophytes and capsular fibrosis. The cardinal features are progressive cartilage

destruction, subarticular cyst formation, sclerosis of the surrounding bone and capsular fibrosis. Men and women are equally prone for the disease but more joints are affected in women than in men^{1,2}. Radiographic surveys suggest prevalence rises from 1% below the age of 30 years to over 50% of the people above the age of 60 years. Degenerative arthritis of knee is a common affliction in our Indian population with major functional, medical,

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psychosocial and financial effects on the affected person, family and society. Degenerative arthritis is a dynamic process causing pain, functional restriction and deformities, hence conservative treatment cannot stall the process of degeneration.

Knee replacement provides a way to overcome all afflictions of arthritis^{3,4} and is one of the most successful orthopaedic surgeries with immense patient satisfaction. Since 1973, when Insall and others⁵ had began the modern era of knee replacement the implants for total knee replacement have seen a paradigm shift in design leading to longer prosthesis life, better performance and increased mobility. Over the years, the dramatic improvement in techniques of replacements, usage of preoperative antibiotics, tourniquets, laminar flow theatres and appropriate patient selection have led to superior outcomes.

Our group of patients from rural Tamilnadu in and around the temple town of Chidambaram present to us with certain unique problems and limitations with regard to Total Knee Arthroplasty. These are people from low socio economic status with limited health care access, predominantly agarian occupation and an average length of stay (ALOS) in the hospital directly related to their household economy. They belong to the high risk category as far as arthroplasty is concerned, due to the greater amount of physical exertion in their occupation, means of transport in their daily lives, late presentation to the hospital, belief in native treatment methods and loss of follow up in the post operative period.

MATERIALS AND METHODS

This is a prospective study of patients from in and around Chidambaram diagnosed with Osteoarthritis of the knee joint and treated with Total knee arthroplasty during the period from June 2014 to October 2015 at Rajah Muthiah Medical College Hospital and a retrospective analysis of patients treated with Total knee arthroplasty for OA knee before and on regular follow up at our hospital during the same period. A total of 22 total knee replacements done on 19 patients were followed up and included in the study, of which 12 were females and 7 were males with an mean age distribution of 54 years.

Inclusion Criteria

Patients diagnosed with primary Osteoarthritis of the knee confirmed by clinical and radiological measures.

Exclusion Criteria

Patients with rheumatoid arthritis, post traumatic arthritis, congenital deformities, previous knee surgery, malignancy, bleeding disorder, extensive skin disease, local and systemic infection. Pre operative evaluation and planning of a patient consisted of detailed clinical history, thorough physical examination, accurate assessment of the patient's current ambulatory status and need. All the patients planned for TKA were subjected to a multi

system screening protocol to rule out any foci of infection. Patients previously operated at our hospital underwent a thorough examination of their hospital records and a detailed evaluation of their preoperative and postoperative status. Plain radiographs and routine blood investigations including markers for infection were taken. The Q angles of both knees were determined and the valgus cut angle was measured from weight bearing radiographs of the entire limb.

We employed the anteromedial parapatellar approach for exposure of the knee joint. Sagittal and coronal plane deformities were corrected by progressive soft tissue releases and bony procedures. The instrumentation was of the posterior referencing type with 3degrees of in built external rotation for the femoral side and extramedullary jig for limb alignment. The bony preparation consisted of six femoral cuts (anterior, distal femoral, posterior, anterior and posterior chamfer cuts, intercondylar notch cut) and two tibial cuts (proximal and stem cuts). The implant of choice was of cruciate substituting design with cementation. Patellar denervation with electrocautery was done for all cases.

The post operative protocol started with static quadriceps strengthening exercise on the first post op day and drain removal on 2nd post op day along with walker assisted weight bearing. On the 3rd post op day passive and active assisted knee mobilization was initiated as tolerated by the patient. The range of active and active assisted knee mobilization was progressively increased with individual variance. Suture removal was done on the 15th post op day. Patients were discharged after thorough education regarding activity modification and rehabilitation protocol. They were followed up post operatively on the first, third and sixth months with complete evaluation of knee joint function, scoring and weight bearing radiographs of the operated knee.

RESULTS

The pre operative status and the post operative functional outcome of our patients were measured using the Knee society scoring system (Insall modification). The pain relief was quantified using the Visual analogue scale. Eight patients had excellent results, seven patients had good results, two patients had fair results and two had

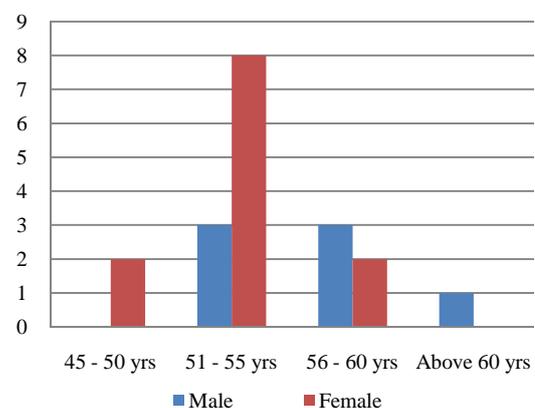


Figure 1 Age and Sex distribution



Figure 2 Kellgren and Lawrence system of grading Osteoarthritis of Knee joint

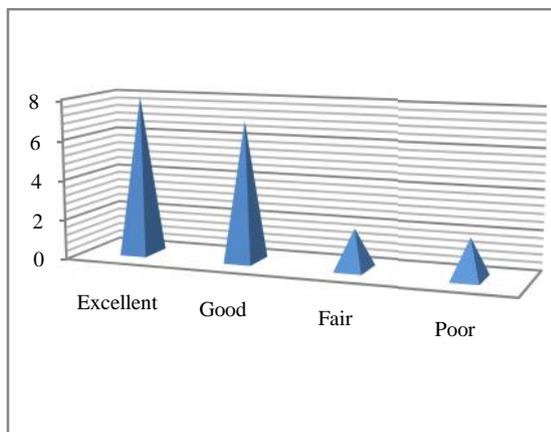


Figure 3 Knee Society Scoring

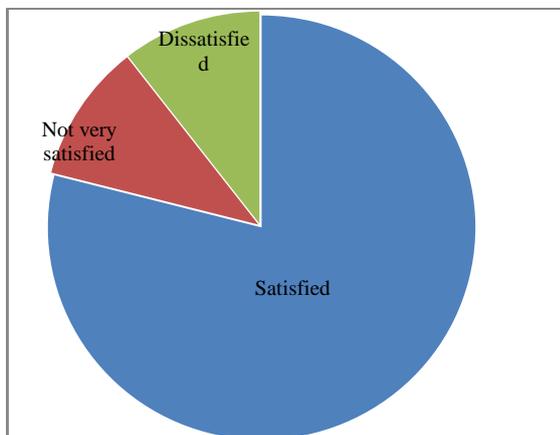


Figure 4 Patient satisfaction

poor results. Fifteen patients were satisfied following their replacements (79%), two patients (10.5%) were not very satisfied and two patients were dissatisfied (10.5%). The common complications we encountered in our study were knee stiffness (10%), persistent knee pain, infection (5%) and transient foot drop (10%).

In our study we had ten patients with their right knee replaced, six patients who had their left knee replaced and three patients with bilateral knee replacement. The osteoarthritic knees were graded based on the Kellgren and Lawrence system⁶ and of the 22 knee replacements

done, 18 knees were of grade IV severity and 4 were of grade III severity. The incidence of associated systemic comorbidities in our study was systemic hypertension (8 patients), type II diabetes mellitus (4 patients), coronary artery disease (two patients), obesity (two patients) and dental caries (one patient). Four of our patients had more than one associated systemic comorbidity.

Case Illustrations



Figure 5 Pre operative



Figure 6 Immediate post op



Figure 7 1 month follow up



Figure 8 6 months follow up



Figure 9 Pre operative xray



Figure 10 Post operative xray

DISCUSSION

The field of adult joint reconstruction has been at the forefront of changing concepts and evolving trends in Orthopaedics. The traditional teaching was to limit the use of total knee arthroplasty to patients with white collared occupation and people with limited manual labour. Thus there is an unmet need of a large subset of rural population with osteoarthritic knees who have been deprived the

fruits of success of modern day arthroplasty. Our study population was among the rural plains around Chidambaram town with a predominantly agrarian based economy. During the course of our study we understood that they were motivated towards arthroplasty by the severity of pain more than the restriction of movements. Pain relief was the most important long-term outcome for a patient correlating with patient satisfaction as also observed by D.W.Murray et al⁷.

The functional outcome scores (Knee Society Scoring) in our study were graded into excellent (>80), good (70–79), fair (60–69), and poor (<60) as defined by Michelle M Dowsey and Peter F M Choong⁸. The results and satisfaction level in our study are comparable to that of Vince et al³ done in 1988 on 'long term results of cemented total knee arthroplasty' and A S Sidhu et al⁹ in 2011 on 'total knee replacement in osteoarthritis knee with genu varus deformity'. The good results in majority of our cases reinforces the fact that total knee replacement is the gold standard for end stage arthritis of the knee joint as had been proved in the meta analysis by the U.S. Department Of Health And Human Services¹⁰ on 3519 references on total knee arthroplasty. These good to excellent outcomes in our study have been on patients from rural areas who are traditionally out of the ambit of advanced health care services as had been the case with Ippolyti Papakostidou et al⁴ who observed that residents of rural areas and lower socio economic strata can give equally good post operative results following TKA.

The equally good results in both males and females of our study group correlates with that of various studies done on the effect of gender on total knee arthroplasty outcomes^{1,10}. The average age of males undergoing total knee arthroplasty in our study was around 56.3 years and that of females was around 52.6 years due to the rapid progression of arthritis in the post menopausal age group as had been studied by Jennie McKee². The number of females undergoing total knee arthroplasty in our study was 63% and that of males is 37% which is directly reflective of the prevalence of osteoarthritis and its severity among females in the community.

The commonest deformity among the 22 knee replacements included in our study was found to be varus malalignment (86%) much more than the incidence of 53 – 76% reported by Cahue S et al¹¹ and other studies. The incidence of flexion deformity in our study group was around 10%. Around 80% of our patients were from the farming community with activities requiring active farm work or cattle rearing or both in many of the cases. They were advised moderate farming activity and to avoid heavy manual labour during their rehabilitation period. They were also advised not to step into the wet fields and restrict themselves from activities that may affect the stability and longevity of the prosthetic knee. The average duration of time before which they could resume their modified level of farming activity was found to be 3 - 4 months similar to the findings of the Ohio state university¹² on 'recovery from hip and knee replacements for farmers'.

The incidence of pre existing or newly diagnosed systemic illness in our study was 63%, commonest being systemic hypertension followed by diabetes mellitus. It was observed that patients with multiple systemic illnesses ended up with relatively poor outcomes (10%). Two patients in our sample group with associated obesity had good to excellent outcomes post operatively over an average of 6 months to one year follow up period and were satisfied with their results as also been observed by Ippolyti Papakostidou et al⁴ and McQueen DA et al¹³. Henry Ellis et al¹⁴ had found that patients from socially backward regions with lower socioeconomic status have a tendency towards late presentation on all health related issues as had been the case in our study with 82% presenting to us in stage IV and 18% in stage III of osteoarthritis.

Pre-operative status has consistently been shown to be the strongest determinant of post-operative pain and functional outcome¹⁴, which has been the case with the two patients who had poor outcomes in our study. We were able to notice that this stratum of patients had increased expectations of their post operative status despite the advanced stage of arthritis and associated comorbidities. The primary reason for knee stiffness (10%) in our study was found to be the reduced number of follow up visits and reluctance to follow regular rehabilitation programs after pain relief. In our study two patients with valgus knees had developed foot drop due to neuropraxia of the common peroneal nerve. They were managed with foot drop orthotic support and had recovered within 3 to 6 months duration of the post operative period. They did not have significant disability in the long term follow up, but had difficulties in immediate post operative rehabilitation. One patient in our study had developed infection at one year follow up with knee stiffness and flexion deformity following trauma and native treatment. He was treated with thorough joint lavage with prosthesis retention and post operative antibiotic therapy lasting for 6 weeks as had been suggested by Rand et al¹⁵. The patient recovered from the acute infection with residual deformity and restricted range of movements of the involved knee.

CONCLUSION

The functional outcome analysis in our study population highlights the fact that patients from rural background with a predominant agrarian economy when treated with standard operative techniques, post operative rehabilitation protocol, proper patient education and lifestyle modification can achieve results comparable to any other subset of population in the society. This implies the universality of Total Knee Arthroplasty in the treatment of Osteoarthritis of knee cutting across demographic variation and socioeconomic distributions.

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