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Dr. Sai Deiv Ramkumar M
M.S (Ortho), Department of
Orthopaedic Surgery, Saveetha
Medical College and Hospital,
Thandalam, Chennai,
Tamil Nadu, India

Dr. Alagurswamy Ravi
M.S (Ortho), Department of
Orthopaedics Surgery, Saveetha
Medical College and Hospital,
Thandalam, Chennai,
Tamil Nadu, India

Dr. Arun Kumar
M.S (Ortho), Department of
Orthopaedics Surgery, Saveetha
Medical College and Hospital,
Thandalam, Chennai,
Tamil Nadu, India

Dr. P Krishna Sandeep
M.S (Ortho), Department of
Orthopaedic Surgery, Saveetha
Medical College and Hospital,
Thandalam, Chennai,
Tamil Nadu, India

Dr. Yeshwanth Subash
Professor, Department of
Orthopaedic Surgery, Saveetha
Medical College and Hospital,
Chennai, Tamil Nadu, India

Corresponding Author:
Dr. Yeshwanth Subash
Professor, Department of
Orthopaedic Surgery, Saveetha
Medical College and Hospital,
Chennai, Tamil Nadu, India

Functional outcome of total knee arthroplasty among low socioeconomic patients

Dr. Sai Deiv Ramkumar M, Dr. Alagurswamy Ravi, Dr. Arun Kumar, Dr. P Krishna Sandeep and Dr. Yeshwanth Subash

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Abstract

Introduction: Among the people of India, osteoarthritis of the knees causes a serious amount of loss in productivity and immense hardships. Total knee arthroplasty [TKA] gives a solution to overcome these problems of the condition. The patients selected for this study were from the lower socioeconomic strata who are mostly presenting with higher incidences of deformities, have poor nutritional status, coupling this with usually late presentation to the hospitals makes them high risk candidates.

Method: In our study, 40 patients were operated and followed for a period of 6 months to 18 months. 24 were female and 16 were male. American knee society score was used to grade the functional levels. Patients were classified into mild, moderate and severe. Posterior cruciate substituting prosthesis was utilized for all the subjects with the surgery being done in our institution. Complications were documented. Satisfaction levels were assessed based on the patients demands, mode of transport and pain relief.

Results: In our study, 60 % of the patients comprised of females and 40% of males. In this study 22% of patients had excellent results, 25% of patients had poor results, 53 percent of patients had good to fair results. Satisfaction among patients was poor 62.5% of patients were not satisfied with their replaced knee. A number of patients had developed complications - knee stiffness, infection (deep, superficial), persistent pain were predominant complications.

Conclusion: Through this study, patients from the lower socioeconomic levels had poor satisfaction levels despite having successful TKA. The study reported with roughly 63% of the study subjects not being satisfied which was due to high expectations and demands from the patients. People having low demands, no resting pain and moderate arthritis were found to be ideal candidates for TKA.

Keywords: Osteoarthritis; American knee society score; total knee arthroplasty; low socio-economic status

Introduction

Among the people of India, osteoarthritis of the knees causes a serious amount of loss in productivity and immense hardships, which is quite common. It has major effects on the patients affected with in the form of medical expenses, loss of productivity, psychological breakdown, and financial burden. Its effects are spread across the patient, their family and society as a whole. Non- operative managements have shown to have poor results for the patients. Since this is a progressive degeneration, patients cannot be managed with conservative methods alone. Pain, restriction of functions along with deformities are common Total knee arthroplasty [TKA] gives a solution to overcome these problems of the condition. TKA has shown to be quite successful with very good patient satisfaction. Modern orthopaedics has a special place for TKA which provides succour for the patient [1]. Various methods of treatment used previously, which have not yielded effective results, such as heat fomentation, analgesics, physiotherapy management, osteotomies and arthrodesis. TKA has shown to be consistent and reproducible along with providing pain relief and correction of any deformities. The techniques employed for TKA and the implants utilized have been improved multiple times giving us a significant shift over the years with satisfactory outcomes. The patients selected for this study are from the lower socioeconomic strata who experience a certain set of issues related to degenerative arthritis and TKA.

Their occupations are highly demanding physically which coupled with their mode of transport and rigorous daily activities contribute to increased wear on the prosthesis making them not so good candidates for TKA [2]. They are also presenting with higher incidences of deformities, have poor nutritional status, coupling this with usually late presentation to the hospitals makes them high risk candidates [3].

Materials and Methods

This prospective study was carried out from June 2020 to December 2021 in patients with chronic arthritis of knee. This was done in the Department of Orthopaedics of our institution.

Inclusion criteria

- Knee joint arthritis which is chronic
- Patients with no previous history of knee surgeries
- Age: 40 -70 years of age

Exclusion criteria

- Debilitative patients/conditions
- Knee joint infections which are active
- Systemic infection
- Blood dyscrasias
- Skin conditions which are extensive

40 patients were operated and followed for a period of 6 months to 18 months. 24 were female and 16 were male. Rest pain being a major player in prognosis, it was used as a basis upon which patients were divided. Ten patients presented with rest pain on admission, the rest of patients were having severe pain but rest pain at rest wasn't present. American knee society score was used to grade the functional levels. Patients were classified into mild, moderate and severe by the Arthritis Foundation and Wheelless Textbook, on the symptoms and severity basis. 3 patients had moderate arthritis, 37 patients had severe arthritis. Conservative management was provided initially for the patients after a clinical examination, and proper assessment of the functional needs of the patient. Routine blood and radiographic investigations were done. Varus/valgus angulation of each knee was assessed through the radiographs. The etiology of arthritis was identified and if required appropriate treatment is initiated. Posterior cruciate substituting prosthesis was utilized for all the subjects with the surgery being done in our institution.

Operative Technique

The medial parapatellar approach was used. Patient was in supine position and the knee was kept in flexed position. A straight midline incision was made extending till just below the tibial tubercle. Medial parapatellar capsular incision was then made. Complete resection of the PCL was done. Checks were done for symmetry and balance of the flexion and extension gaps. The differences in the gaps were addressed. Soft tissue releases were done. Osteophyte excision was done to make the release easier. Posteromedial osteophytes removed after the proximal tibia is resected. Elevation of the knee ligaments were done with the knee in extension along with the insertion of pes anserinus. Valgus knee was approached similar to the varus knee approach. Osteophytes were removed from the lateral compartment. The arcuate ligament was cut transversely at the joint line. The nearest

size of the prosthesis within 2mm of the measured anatomy was selected, while sizing the femoral component, we preferred to select the closest size of the prosthesis. Upsizing was done and downsizing and downsizing wasn't chosen because it is posterior stabilizing design. At least 9-10 mm of the medial femoral condyle should be as the resected portion. Depending the femoral component rotation, the lateral portion resection was selected. Anterior referencing technique was used. Symmetrical flexion space was created by resecting 8-10mm from the posterior medial condyle followed by external rotation of the femoral component. Posterior osteophytes with a 3/4-inch curve-on-flat osteotome were removed. Extramedullary jig was used for obtaining the alignment followed by resection of the proximal tibia of about 7-9 mm. Flexion and extension gaps were assessed. With the knee flexed 90°, start with the thickest Spacer/Alignment Guide that will easily fit between the posterior femoral condyles and the resected tibia. Progressively thicker spacers were used until the proper soft tissue tension is obtained. The resultant flexion space was balanced and found to be symmetrical. The tibial resection were checked by placing the Alignment Rod through the handle of the Spacer/Alignment Guide. Then, we extended the knee and checked the soft tissue tension and the alignment of the joint. The femoral and tibial components were placed in the respective places along with the trial spacers range of movements were evaluated. Following trial reduction, the components are removed and the prosthesis of the desired sizes were fitted into their positions using bone cement. The movement of knee joint may be further checked during closure of capsule. The patella was examined and osteophytes if present, were removed patellar resurfacing were not done routinely in our study. The nerve supply patella was ablated using diathermy. Two patients who were suffering from patella femoral arthritis were underwent patellar replacement procedure. Complete haemostasis was secured. The wound is closed in layers over a suction drain. Bulky dressing was applied over the wound. Post-operative intravenous antibiotics were given for 72 hours, the patients knee was mobilized after three or four days, protected weight bearing was started after five to seven days adequate pain relief was provided, sutures removed on 15th day. One patient had developed a hematoma in post operative period which was drained and thorough joint lavage was given. Patients discharged after thorough education regarding activity modification and rehabilitation protocol.

Follow up

Patients came for follow-up at 1, 3, 6 months post surgery. Complete evaluation of knee joint function, scoring done and radiographs were obtained for follow-up. The longest follow up was 16 months and shortest was 6 months with a mean of 10 months.

P-value was calculated using chi-square test and found to be significant at $p < 0.05$.

Results

40 patients were enrolled for this study. TKA was done on the right side for 22 patients and on the left side for 18 patients. 24 females and 16 males constituted the study group. 15 patients were satisfied following their replacement (37.5%), 13 patients (32.5%) were not very satisfied, 12 patients were dissatisfied (30%). More than 50% of the patients were not satisfied. (Figure 1)

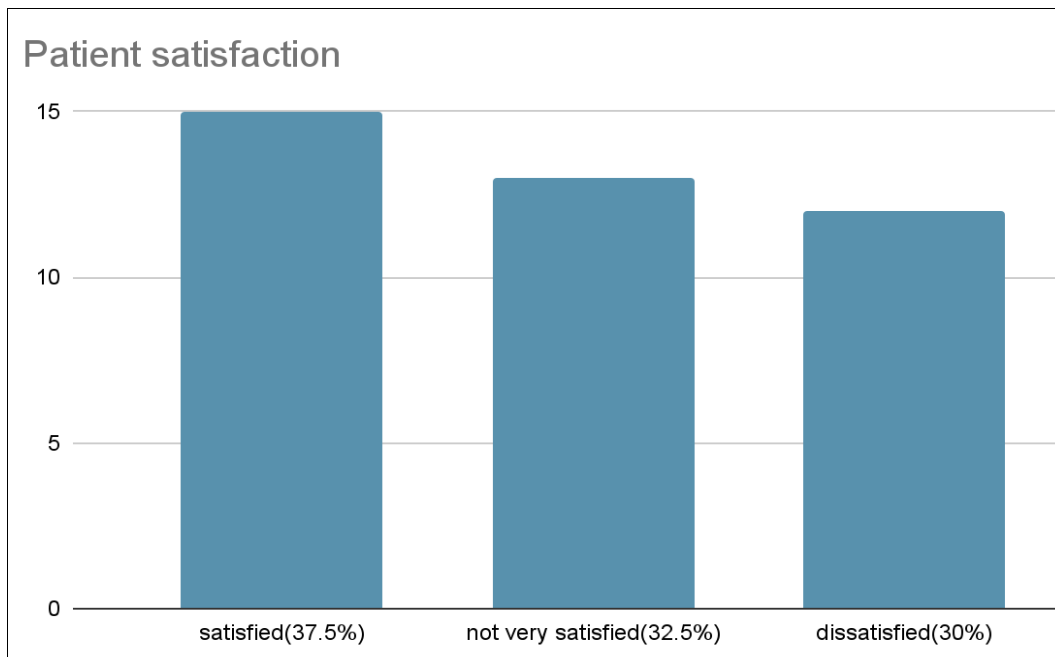


Fig 1: Shows the patient satisfaction levels amongst the study group

On asking the patients what was the factors or basis upon which they gave their level of satisfaction, they mentioned activities of daily life, ability to travel in public transportation were the main factors. Therefore, the patients who were able to go about their daily life and public transportation as a mode of travelling without much difficulty were the ones who were self ambulant and more satisfied. American knee society

score was used for functional outcome. Based on those scores, 21 patients had good to fair results, 10 patients had poor results, 9 patients had excellent results. The amount of pain relief, level of activity, and mobility functional scoring was done. Visual analogue score(VAS) was utilized for grading the pain relief. (Figure 2)

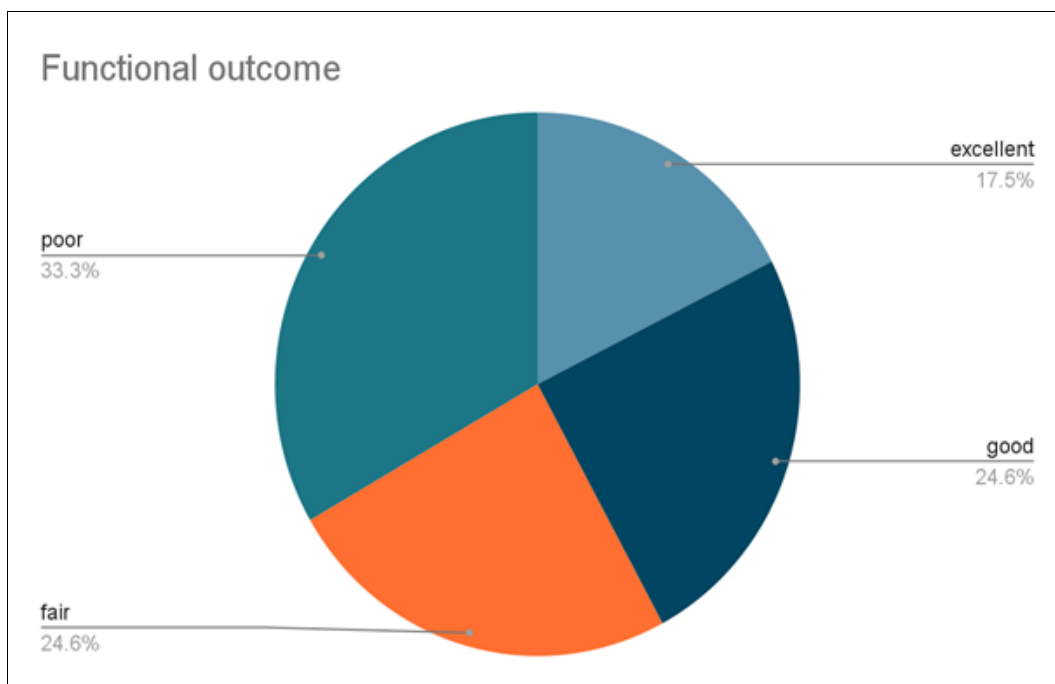


Fig 2: Shows the percentage of the patients with different functional outcomes

Patients experiencing reduced mobility and more dependence due to other joint issues, existing co-morbidities fell into the group had much lower satisfaction levels despite having the replacement procedure done. Persistence of pain was one more factor which lead to reduced satisfaction amongst the subjects. Furthermore, complications which followed the surgical procedure also was contributing to reduction in satisfaction among the patients. Majority of these patients were not quite adherent to the rehabilitative protocol assigned

to them in the program. 4 patients had infection which was 10% of the total study subjects. One more subject was found to have low grade infection on having a bone scan done due to pain persistence. 3 patients who had a valgus knee before the surgery itself, developed foot drop as a result of peroneal nerve neuropraxia. These patients were provided with ankle foot orthosis (AFO) and they showed recovery within 4 months. Deep vein thrombosis was also one more complication which was observed among 2 of our patients

which who managed appropriately. They recovered without any further events. Secondary procedures were needed for 5 of the patients and it was done. They were manipulation under anaesthesia and procedures following infection. Such patients experienced less than satisfactory outcomes. Nine patients in the study who had experienced rest pain preoperatively, had persistence of pain postoperatively too.

Discussion

In spite of the success rates of TKA it still remains to be seen what materials and designs are the most effective for certain populations. Also, the optimal surgical approach which delivers the most success are questions yet to be answered. Such queries are influenced by physical demands of the patients, social issues and psychological factors which determine the success rates of TKA. This understanding can be employed to construct a better protocol for decision making for the entire period surrounding the procedure giving the patients more satisfaction. Many studies are out there showing the superior results of TKA but we did this study among the socially deprived groups to have better understanding of the outcomes for such people since they were experiencing a different set of problems and requirements as compared to the more affluent part of the society. Pain is major factor in determining the outcomes since this procedure's outcome is aimed at pain reduction and better functional living. Thus, there lies the need in identifying the level of pain which exists preoperatively to identify the patients who are less likely to be benefited by such procedures. The patients look for better functional use of their joints by alleviation of pain and stiffness and thereby be independent in their day-to-day activities. A study by Dickensen et al showed that better range of motion and difficulty in climbing up a flight of stairs were seen as bad outcomes of the procedure [4]. Henry ellis et al, in their study found that people from the lower economic groups had lesser education levels, lack of understanding of their condition, rigorous hard work in their profession, lower salaries which make them present late for the treatment [5]. Because of this about 50% had results ranging from good to fair. About 25% experienced poor results. Edward T.Davis et al had a study done where there was relation between below average income and low preoperative scores which is similar to our study findings too [6]. Patients with low education and income levels had poor understanding of the condition which they had, the available healthcare facilities, need for early detection which can improve their outcomes and life. They also had apprehension towards terms which they were not familiar with or facilities which had not witnessed before. Its known through the studies that proper education and care during the preoperative period leads to much better results in the immediate post-op period and till a follow-up period of 2 years [7] in our study, nearly 63% of our patients were not completely satisfied with their replaced knee. Yong et al showed through studies that such people from the lower strata who more likely to be in need of TKA to almost as twice as much as the regular population but at the same time were less than likely to be getting those services [8]. High pain levels in patients preoperatively recorded showed more chances of need of revision surgery [9]. Lundbald et al suggested long standing arthritis can cause central sensitization. Despite having bad preoperative knee conditions many patients from the lower strata where more likely to have high expectations for postoperative results [10]. Roughly 40% of our study group were expecting better results which has led onto them having poor satisfaction levels. Comorbidities also play a role in the

outcomes of such procedures [11] and a majority of our study subjects were having some comorbidity such diabetes mellitus, hypertension, etc. Poor follow-up is also another contributing factor and such patients do exhibit a high reluctance in following up. Our Study had patients who experienced knee stiffness postoperatively which was treated with manipulation under anaesthesia and improved within 4 months which is corroborated by Vineeth et al [12]. Three patients experienced foot drop postoperatively and were managed by AFOs and improved within five months. Adam Jacob et al have demonstrated that foot drop incidence is between 0.3 to 1 % [13]. Infection is also an important postoperative complication which can lead to reduced outcomes [14]. After successful replacement procedures being completed perception of pain persistence and functional restrictions in their activities have shown to cause the patient to perceive such procedures as inadequate [15]. Understanding the shortcomings through this study is of paramount importance since TKA can be of even better use for such people and improve the productivity and quality of life for them with better understanding of the condition, the medical care being provided, overcoming apprehensions which limit early detection and treatment. Patients also need to make better decisions with regards to their treatment choices for improving their quality and productivity in life, thereby reducing the burden of society.

Conclusion

Through this study, it was found that patients with degenerative arthritis of the knee undergoing total knee arthroplasty were facing a set of problems which affected their functional outcomes for TKA. Patients from the lower socioeconomic levels had poor satisfaction levels despite having successful TKA. The study reported with roughly 63% of the study subjects not being satisfied. This was found to be due to high expectations from the patients. This was due to their physical demands at work, travel mostly utilizing the public transport, leading an active life which also lead them to having severe disease which leads to lesser satisfactory levels. It also revealed the deficits in the patients understanding of the disease and the treatment options. People having low demands, no resting pain and moderate arthritis were found to be ideal candidates for TKA. This would be of immense significance since it can help us get better pre-operative assessments for the patients based on their backgrounds to devise better treatment protocols and counselling regarding their condition and rehabilitation which would help the patients take a better informed decision.

Conflict of Interest

Not available

Financial Support

Not available

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