Total knee replacement in osteoarthritis knee with genu varus deformity - A study of seventy four cases

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ABSTRACT

The present study was carried out for the evaluation and analysis of the role of total knee replacement (TKR) in managing osteoarthritis knee with varus deformity. A total of 74 cases were included and the results were evaluated using Knee score to see whether total knee replacement is an effective solution for managing genu varus deformity in O.A. knee.

Our results showed that the TKR provides an unparalleled improvement in the disease symptomatology, deformity, stability and life style in the patients suffering from osteoarthritis. In India where people have an oriental life style, this is possibly the best treatment in knee osteoarthritis.

Keywords: osteoarthritis, total knee replacement, varus deformity

INTRODUCTION

The term osteoarthritis or degenerative arthritis or more appropriately osteoarthrosis is currently used to define an idiopathic slowly progressive disease of synovial joints occurring late in life characterised pathologically by focal degeneration of articular cartilage, subchondral bone thickening, osteophytes and joint deformity. Due to increasing pain, there is muscle spasm which consequently causes deformity of the joint, genu varus being the most common.

Ligament balancing of a severely deformed knee is the essence of a successful total knee arthroplasty (TKA). Even in knees with minimal deformity, some ligament releases are necessary. Load transfer through a correctly aligned and balanced knee will optimize the longevity of the knee arthroplasty and minimize polyethylene wear. Varus knee deformity is far more frequent than valgus deformity. The soft tissue contractures with a fixed varus deformity often include static stabilizers and dynamic stabilizers. Static stabilizers are the ligamentous and fascial structures, and dynamic stabilizers are the semimembranosus and pes tendon group. As a rule, the dynamic stabilizers must be released to achieve a balanced knee. The musculotendinous structures are more compliant and usually do not require surgical release.

For management, conservative approach in the form of various drugs and physiotherapy is followed at first. Arthroplasty is indicated when there is significant pain, deformity, functional loss with restricted range of motion or joint stability.

MATERIAL AND METHODS

The study was conducted between 2004-2010 on the patients suffering from tricompartmental degeneration of knees, having severe pain (even at rest), contractures and decreased range of motion and had no relief with other conservative modes of management.

The patients were taken up from Orthopaedic OPD and were operated at Govt. Medical College & Rajindra Hospital, Patiala and were followed up thereafter in OPD.

We most commonly used anterior midline skin incision. Midvastus exposure was done. Fixed varus was the malalignment problem encountered during total knee
replacement in our study. The first step is to remove any remaining osteophytes from the femur or tibia especially those located posteromedially under the semimembranous tendon. If the varus deformity persists, we next extend the subperiosteal dissection of the medial capsular sleeve beyond the midcoronal plane to the level of the posteromedial corner of the tibia.

The results were evaluated on the basis of Knee Society Scoring System which were graded as poor (<60), fair (60-69), good (70-84) and excellent (85-100).

RESULTS
Out of the total 74 cases, 50 cases i.e. 67% were males and 24 cases i.e. 33% were females. Maximum number of cases were in the age group of 60-69 years (34 cases) followed by 30 cases on 70 year and above age group. There were only 10 cases on the age group 50-59 years and 8 of them were males.

In our present study only 5 patients were obese, 30 were overweight and the remaining were normal in weight. The 5 cases that were obese belonged to the age group of 60-69 years. Among the patients with normal weight, there were 37 cases with excellent result, 2 cases with good result. Out of the 30 cases that were overweight, the results were 20 excellent, 8 good and 2 fair.

In the group 50-59 years, there were 5 cases of hypertension diagnosed at the time of pre-operative check-up. In this age group there were no other systemic illnesses. In the age group 60-69 years there were 10 cases having DM, 17 cases had hypertension, with 8 of them had an underlying cardiac pathology. 2 cases had history of infection in knee. The most common systemic illness in the cases that were operated was hypertension (51 out of 74). Of the 5 cases with duration of disease less than 3 years, all of them manifested excellent results. Among the 24 cases with duration of disease between 4-6 years, there were 2 good and 22 excellent results. 12 patients had excellent and 2 good results with duration of disease 7-9 years. In 30 cases with duration of disease above 10 years, there were 18 excellent, 7 good and 5 fair results.

All the cases in the present study had a varus alignment of the knee to a variable degree. 27 cases had a varus alignment of 0-20 degrees, maximum number of cases i.e. 40 had a varus alignment of 11-20 degrees and the remaining 7 cases this value was 21-30 degrees. Post operatively there were 8 cases with an acceptable varus <10 degrees, rest of the cases had a valgus alignment of 0-10 degree, 66 cases in number.

In our study in the age group of 50-59 years there were 8 patients with normal quadriceps function, 2 cases with weak quadriceps and none of the cases in this age group had wasting of quadriceps. In the age group 60-69 years these numbers were 17, 14 and 3 cases respectively. The corresponding numbers in the age group 70 years and above were 11, 14 and 5. In total there were 36 with normal, 30 cases with weak and 8 cases with wasted quadriceps. Among the 36 cases having good quadriceps function 31 cases had excellent results and 5 cases had good results. Out of the 30 cases with weak quadriceps, 2 cases had fair, 6 cases had good results and 22 cases had excellent results. In comparison the 8 cases with wasting of quadriceps exhibited 3 fair, 6 good and 2 excellent results.

There were 47 cases with preoperative stability less than 5 mm but post operatively this number rose to 68. In 15 cases the stability was 5-10 mm and post operatively this number was only 1. As compared to 2 cases that had a stability of >10 mm there was no such case post operatively. In present study there were 42 cases with a preoperative medio-lateral stability <5 mm as against 71 postoperatively. There were only 3 cases with ML stability 6-9 mm post operatively whereas preoperatively this number was 20 cases. In 10 cases it was 10-14 mm and in 2 cases it was over 15 mm.

In the current study there was limited range of motion in most of the patients with maximum no. of cases i.e. 17 cases each were in the group 71-80 and 81-90 degrees. There were 10 cases each with ROM 91-100, 61-70 and below 50 degrees. There were 5 cases each with ROM 51-60 and above 100 degrees. After surgery most of the cases i.e. 54 cases had ROM above 100 degrees, 15 cases with ROM 91-100 degrees and 5 cases with 81-90 degrees. There were no cases in which ROM was <80 degrees.

The cases were followed up for one year on an average. In our study there were 57 excellent results, 12 good results and 5 fair results according to evaluation on the basis of knee society scoring system.

In present study, there was one complication of patellar tendon defect as compared to study by Clayton et al who demonstrated patellar complications. There was no case of deep infection. This was presumably due to strict asepsis and antibiotics.

DISCUSSION
The original review in the first consecution 220 arthroplasties was published by Insall et al in 1979 and they reported 137 (62%) excellent, 61 (28%) good, 10 (4.5%) fair and 12 (5.5%) poor results with a follow up of 3-5 years in total condylar prosthesis. In similar study carried out by Vince and Colleagues...
in 1988 revealed 79.2% excellent 16.7% good and 4.2% poor results. In the present study, the follow up was done once and the results were 77% excellent, 17% good, 6% fair and no poor results.

Hvid and Nielsen\textsuperscript{8} carried out a study and published in 1984 and observed that there were radiolucencies in the knees of the patients in whom there was varus alignment of the knee. They observed inconsistent success in achieving the desired 2-12 degree of valgus. Kjaersgaard-Anderson\textsuperscript{9} et al 1989 also noticed loosening of prosthesis consequent to varus implantation of the tibial component.

In present study out of the total 74 cases we were able to achieve the physiological values of 2-12 degrees in 67 cases. No cases were observed with tibial or femoral component loosening. Scott and Rubinstein\textsuperscript{10,11} published an interim of 56 knees with a follow up of 3-6 years. This series was unusually distinguished by an even distribution by gender with 20 women and 18 men. Average age was 67.7 years and average weight was 66 kgs. They observed that the preoperative motion was a major factor in determining post Arthroplasty flexion.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{pre_and_post_op_x-rays}
\caption{57 year female pre and post op x-rays}
\end{figure}
In our study, there were 50 males and 24 females with 8 bilateral arthroplasties. The success rate in our study was found to be 94% which is comparable to the study carried out by Vince et al. The mean age at which patients underwent TKR was 66.2 years, preoperative flexion was 99 degrees and postoperative flexion was 106.5 degrees.

Spice and Pomeroy et al published a study in August 2001 in which they studied the correlation of obesity (BMI) and outcome of TKR. They found that these obese patients had an improvement in knee score by 41.9 points as compared to 43.7 points in normal weight person. They also found that review arthroplasty was required more often in obese patients. The findings of present study also corroborate the above mentioned studies. Considering BMI d” 25 as normal, the mean age at which these patients underwent TKR was 69 years and in patients with BMI > 25 this age was 63 years. In the 5 obese cases (BMI e” 30) there were 2 fair and 3 good results.

Mizner 2005 carried out a study in which he observed the outcome after TKR surgery and preoperative quadriceps strength and he found these variables to be proportionate to each other i.e. better functional outcomes after TKR surgery and better quadriceps strength preoperatively. In our study, all the patients who had normal quadriceps strength preoperatively had excellent results whereas when quadriceps was weak or wasted the results were not as good.

CONCLUSION

Maximum number of cases belonged to the age group of 60-69 years, males turned up more for surgery in the ration of 2:1. The late acceptance for surgery can be attributed to poverty, illiteracy and taboo surrounding surgery. Females present in less numbers and follow more conservative approach, probably because of illiteracy and males being more outdoors and gender bias in our country.

The duration of disease, thus can be concluded adversely affects the outcome after surgery. The co morbidities all adversely affect the outcome of TKR as DM increases the chances of infection and there is delayed wound healing but no such complication occurred in our study probably because of strict asepsis and broad spectrum antibiotics. There were over 90% acceptable results in patients with normal or weak quadriceps and in patients in whom wasting was present there were 67% acceptable results. Nothing can be said conclusively, though because of the small sample size in the group with wasted quadriceps.

Though this data does not conclusively suggest about the prognosis of TKR after obesity but the age of the patients which required TKR was less in overweight and obese patients as compared to patients with normal weight and this was evident as average age of patient undergoing TKR with normal weight was 67 years as compared to 63 years in overweight and obese patients.

There is marked improvement in ROM, considerable deformity correction and improved stability after TKR. It can be thus concluded from the present study that TKR provides an unparalleled improvement in the disease symptomatology, deformity, stability and life style in the patients suffering from osteoarthritis. In India where people have an oriental life style, this is possible the best treatment in knee osteoarthritis.

REFERENCES