

Midterm results of all poly total knee replacement versus metal-back total knee replacement

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Abstract

Background: Osteoarthritis of knee is one of the most common form of arthritis causing degeneration of articular cartilage and subchondral bone. Joint replacement is the gold standard treatment for patients with advanced osteoarthritis of the knee who despite appropriate medical management, have an unacceptable level of pain or physical function or both. There are mainly two types of implants used for total knee replacement nowadays. One is metal back type and other is all poly type.

Materials and Methods: This is a retrospective multicentric study of 100 total knee replacements performed for comparison of metal back(50) versus all poly(50) total knee replacement on the basis of Clinical(KSS-knee society score, WOMAC-western Ontario & Macmaster university osteoarthritis index score, pain, deformity), radiological(alignment), complications and survival of that joint. All total knee arthroplasty are cruciate sacrificing and done through medial parapatellar approach.

Result:

- Average age of patients in our study was 58.4 years with a range of 52-80 years. We included 72 females and 28 males in our study.
- Knee society functional scores were improved from 36.4 to 75.1 for metal back component and 34.90 to 74.20 in all poly total knee replacement
- Womac score improved from 52.01 to 81 in metal back total knee replacement and improved from 54.07 to 82.39 93 in all poly total knee replacement.
- 97% patients of metal back and 98% of all poly tkr showed improvement in pain.
- Post operatively 82% patients from the metal back total knee replacement and 92% patients of all poly total knee replacement had alignment between 5 degree valgus to 5 degree varus.
- The mean fixed flexion deformity in metal back total knee replacement improved from 9 to 3 degrees in metal back total knee replacement and 11 to 1 in all poly total knee replacement.
- Crude survival rate of implant in our study was 95 % in metal back total knee replacement and 93% in all poly total knee replacement.

Conclusion: Total knee replacement was responsible for pain relief in majority of the patients. Improvement in pain found same in both types.Improvement in ROM[range of movement] was better in metal back total knee replacement but improvement in FFD[fixed flexion deformity], extensor lag and alignment was better in all poly total knee replacement. Complication rates of infection and periprosthetic fractures were similar in both joints. There was no case of loosening of implant noted in our study.

Keyword: Osteoarthritis knee, Total knee replacement, Metalback, Kss [knee society score], Womac [western Ontario & Macmaster university osteoarthritis index]score

Introduction

Osteoarthritis of knee is a most common form of arthritis causing degeneration of articular cartilage and subchondral bone. Joint replacement is the gold standard treatment for patients with advanced osteoarthritis of the knee who despite appropriate medical management, have an unacceptable level of pain or physical function or both.

There are mainly two types of implants used for total knee replacement nowadays. One is metal back type and other is all poly type.

Studies have suggested that metal back components have better load transmission and heat sink capacity. It has also better intra operative flexibility and modularity to be used with stems. For this reason metal back implants are of choice nowadays. However, various studies have shown similar results between metal back and all poly total knee replacement in terms of post-

operative knee society score, Range of movement, quality of life and complications.

The surgeon must optimize the patient's pre-operative medical status, pay meticulous attention to the level of constraint of prosthesis, soft-tissue balancing and contracture release in the operating room, and closely monitor the patient's postoperative course.

In our present study we tried to look out for comparison of midterm clinical outcomes in metal back versus all poly total knee replacement. All total knee arthroplasty are cruciate sacrificing and done through medial parapatellar approach.

Aims and Objectives

Comparison study of clinical outcomes and radiological parameters in metal back total knee replacement versus all poly total knee replacement.

Comparison study of complications and survival rate after surgery in metal back versus all poly total knee replacement.

Materials and Methods

Study Design: Retrospective

This is the retrospective study of 100 patients operated for total knee arthroplasty around 6 years ago either metal back or all poly varieties of implant. follow up is around 6 years.

All Patients were divided in 2 groups:

- Metal back
- All poly

Inclusion criteria:

- Documented patients with operated total knee replacement

Exclusion criteria

- Less than 18 months follow up
- Patients expired due to an unrelated cause

Preoperative clinical findings were obtained from extensive scrutiny of available records in form of operative records, discharge cards, pre-operative x-rays and case sheets. These were supplemented by use of questionnaires for patient regarding their preoperative status in terms of functional capabilities.

Methods

Clinically, patients were assessed for pain, deformity, range of motion, activity level and functional capabilities preoperatively. All patients were given antibiotic prophylaxis preoperatively.

Functional assessment was done by using KSS (Knee society score) and WOMAC (Western Ontario & Macmaster University of Osteoarthritis Index) score. Radiological assessment was done in form of AP, lateral x-rays and skyline view. Postoperative varus valgus was calculated from AP radiograph.

End point of survival was removal or revision of any component for any reason. Thereafter we calculated a crude survival rate from the collected data.

Follow up

Patients were followed up at every 1st, 3rd and 6th month and final follow up after 1 year for assessing clinical and functional parameters.

Discussion

This is a retrospective study of 100 total knee arthroplasty operated patients. Fifty patients were operated by metal back type of implants and fifty were operated by all poly type of implants. Patients from multiple centres were included in our study.

The mean age of patients in our study was 58.4 year. With youngest patient being 52 years old and the oldest being 80.

Studies⁵¹ have shown that risk of loosening traditionally associated with all poly implants over long

term is not seen usually and all poly implants tend to have similar survival in long term studies as their metal back counter parts.

Patients were followed-up and compared for survival, range of motion, knee society score, function, anterior knee pain, patellar or any other complication and radiological evaluation.

KSS-knee society Score

We used Knee society score for evaluation of the replaced knee.

The mean clinical knee score improved from 35 to 83 for metal back component and 32 to 81 in all poly component. The average improvement in Knee society score noted was 47.47 for metal back component and 46.89 for all poly component, statistically there was no difference found in improvement of knee society score in both types of total knee replacement. ($p > 0.05$) Dojcinovic et al reported an average KSS[knee society score]© of 77.2 +/- 13.2 with a range of 40-95 points in both types.

Dojcinovic et al reported an average KSS[knee society score](f) of 75.3 +/- 19.3 with a range of 30-100 points for metal back total knee replacement and 72.07 with a range of 28 to 99 for all poly total knee replacement.

Womac-western ontario & macmaster university osteoarthritis index Score

Womac[western ontario & macmaster university of osteoarthritis index] score improved from 52.01 to 81 with a minimum pre op score of 22 and maximum of 71 and follow up score ranging from 37 to 97 in metal back tkr and improved from 54.07 to 82.39 with a minimum pre op score of 19 and maximum of 74 and follow up score ranging from 29 to 93 in all poly tkr. Statistically there was no difference in improvement of WOMAC score of both types of tkr. ($p = 0.87$)

Pain Score: Pain is the most common indication for total knee replacement surgery. 97% patients of metal back and 98% of all poly total knee repl replacement showed improvement in pain. And 83 % patients of metal back total knee replacement and 81% of all poly total knee replacement had no pain or just mild pain.

Dojcinovic et al et al reported an average Knee society score © of 77.2 +/- 13.2 with a range of 40-95 points in both types.

Dojcinovic et al reported an average Knee society score of 75.3 +/- 19.3 with a range of 30-100 points for metal back total knee replacement and 72.07 with a range of 28 to 99 for all poly total knee replacement. Studies by Lee and Laskin demonstrated remarkable reduction in pain scores of patient of both types.

Range of movement: The mean range of movement improved from 78.3 to 109 degrees in metal back total knee replacement and mean Range of movement

improved from 72.09 to 106 degree in all poly total knee replacement.

Dojcinivic et al found no difference in data of improvement of Range of movement. Laskinetal reported that ROM[range of movement]did not improve statistically except in those patients who had severe flexion contracture preoperatively in both types in RA patients.

Complications

Late infections were the most common complication noted in our study after anterior knee pain with an incidence of 5 percent. They were a direct cause of failure of implant requiring removal of implant and revision surgery or arthrodesis. Periprosthetic fracture was noted in one knee. These complications were associated additionally with decreased function of other uninvolved knee in bilateral cases.

Crude survival rate of implant in our study was 95 percent. No case of implant loosening was seen.

Summary

1. This is a retrospective study of 100 primary total knee replacements. 50 operated metal back component and 50 operated by all poly component.
2. Average age of patients in our study was 58.4 years with a range of 52-80 years. We included 72 females and 28 males in our study.
3. The mean duration of follow up of patient was 3.7years with a minimum follow up of 18 months and a maximum of 11 years.
4. 97% patients of metal back total knee replacement and 98% of all poly total knee replacement showed improvement of their preoperative pain.
5. The mean range of movement increased from 78.3 to 109 in metal back total knee replacement and 72.09 to 106 in all poly total knee replacement. 72% of patients achieved a ROM[range of movement] of 100 degrees and above in metal back total knee replacement and 66% in all poly total knee replacement.
6. The mean clinical knee score improved from 35 to 83 for metal back component and 32 to 81 in all poly component. The average improvement in KSS score noted was 47.47 for metal back component and 46.89 for all poly component.
7. WOMAC score improved from 52.01 to 81 in metal back total knee replacement and 54.07 to 82.39 in all poly total knee replacement.
8. Crude survival rate of implant in our study was 95% in metal back total knee replacement and 93% in all poly total knee replacement.

Table 1: Sex Distribution

Sex	All Poly	Metal Back
Male	12	16
Female	38	34
Total	50	50

Table 2: Age Distribution

Age	All Poly	Metal Back
<50	0	0
50-60	11	12
60-70	213	30
>70	16	8

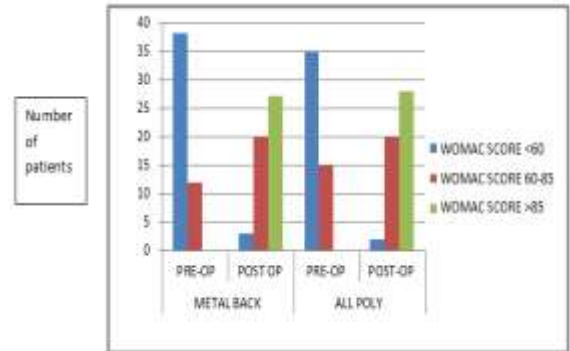


Fig. 1: WOMAC Scoring

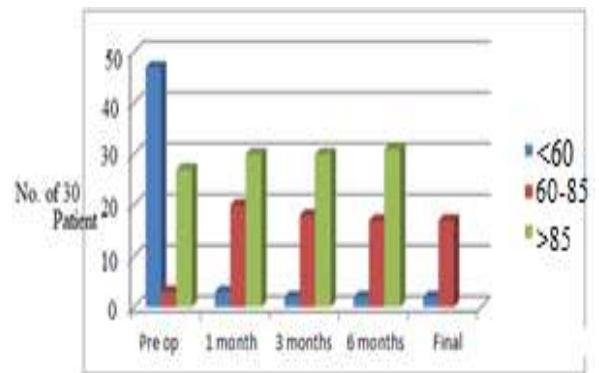


Fig. 2: KSS Score (Metal Back)

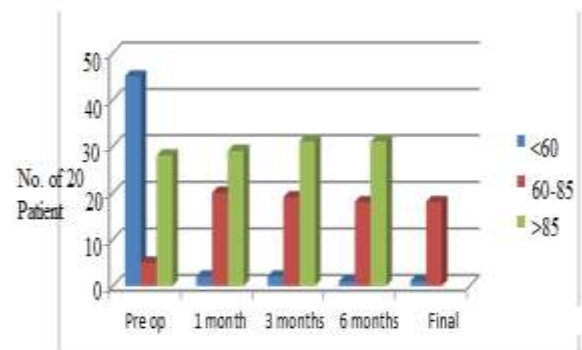


Fig. 3: KSS Score (All Poly)

Table 3: Shows range of motion in all patients

Range of Movements				
	All Poly		Metal Back	
	Pre-Op	Post-Op	Pre-Op	Post-Op
<50	8	0	5	1
50-75	14	0	12	0
75-100	28	17	33	13
>100	0	33	36	36

Table 4: Shows fixed flexion deformity in all patients

Fixed Flexion Deformity				
	Metal Back		All Poly	
	Pre- Op	All Poly	Pre-Op	Post-Op
<10	33	47	28	44
10-20	7	1	9	4
20-30	2	1	1	2
>30	8	1	12	0

Table 5: Shows Pain score in all patients

Pain Score				
	Metal Back		All Poly	
	Pre-Op	Final	Pre-Op	Final
5	22	0	20	0
4	23	2	19	2
3	5	6	11	9
2	0	9	0	8
1	0	16	0	17
0	17		0	14

Conclusion

Total knee replacement was responsible for pain relief in majority of the patients. Improvement in pain found same in both types. Range of movement improved in patients after total knee replacement in general, however most significant improvement were seen in patients who were bedridden preoperatively because of severe deformities. Improvement in range of movement was better in metal back total knee replacement but increase in activity was same in both types. Improvement in pain severity, activity level, Knee society score and WOMAC [western ontario & macmaster university of osteoarthritis index] scores was similar in both types but improvement in Fixed flexion deformity, extensor lag and alignment was better in all poly total knee replacement. The most common complication following total knee replacement was infection. Periprosthetic fracture and quadriceps extension mechanism failure also occur.

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