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MID-TERM RESULTS OF GENDER HI-FLEX KNEE IMPLANTS - VIS-A-VIS STANDARD HIGH FLEXION IMPLANTS

Orthopaedics

Dr Ankit Kedia Associate Professor - Al-falah School Of Medical Sciences & Research Centre, Faridabad

ABSTRACT

Total knee replacement is one fo the most common procedure performed for patients with osteoarthritis of knee. Knee systems with gender specific femur were introduced for a special subset of female patients, which constituted almost 61% of total patients undergoing surgery. These implants have designs for better contour and fit in females with narrower femur. This is a prospective study of 146 consecutive tkr surgeries performed in 101 female patients using high flexion knee implants. 67 patients received gender specific femur were followed up for average of 9.8 years and 34 patients received standard high flexion joints were followed up for average of 10.9 years. High flexion knee systems give excellent results with marked improvement in KSS and also survivorship at mid term followup was 96.6%. However no statistically significant difference was found in both groups in terms of KSS, range of motion, anterior knee pain or complications. There is no evidence to suggest that gender specific implants make a meaningful difference in outcome.

KEYWORDS

INTRODUCTION

Total knee replacement surgeries have been constantly increasing worldwide, with almost 1 million knee replacements being performed in U.S.A. alone in 2017 1. Women constitute major subset of patients undergoing tkr with almost 61% of patients being females. Proper fit of implant has been a major factor in determining outcome after the surgery. So the need arose for implants specific for the geometry of female knees.

Women have a higher Q angle due to their wider pelvis. Also the femur tends to be narrower and more trapezoidal in shape.2-4 To cater to these differences , gender specific femoral plants were designed. This implants have three specific changes - narrower and thinner anterior flange, higher trochlear groove angle and modified mediolateral/anteroposterior aspect ratio. The tapered narrowing of Gender knees from posterior to mid-box to angering flange, reduce irritation of soft tissues and help in better soft tissue balancing. Their thinner flange with increased angle improve patellar tracking and extensor function and reduce patello-femoral stuffing and stresses.These design modifications helped to improve the knee range of motion, with faster recovery and reduced anterior knee pain.

Our study aims to ascertain the mid term results of these gender specific high flexion implants and compared their outcome with standard high flexion knee joints.

MATERIALS AND METHODS

This is a prospective study of 146 consecutive total knee replacements performed in 101 female patients using high flexion implants. 67 patients (97 knees) were operated with Gender Specific Femur Knee System (GSF- Zimmer) while 34 patients (49 knees) were operated with standard high flexion knee systems which included Nexgen LPS-Flex, Scorpio NRG, Scorpio Hiflex, Exactech Hiflex systems.

The selection of implant for a patient was random. Initial clinical assessment was done for deformity, instability and range of motion. Radiological recent weight bearing anteroposterior, lateral and patellar skyline radiographs were taken. Mechanical axis for various or valves deformity was determined.

Almost all patients were operated in combined spinal and epidural anaesthesia, except 8 who were given general anaesthesia. Medial parapatellar approach was used in all cases. Tkr was performed using standards zigs and instrumentations. Patelloplasty was done involving removal of osteophytes, smoothening of edges and subchondral decompression. Postoperative early mobilisation was aimed for with aggressive rehabilitation protocols. Thrombo-prophylaxis was given to all cases unless contraindicated. Staples were removed on 14th day. Periodic followup visits were done at 3 months, 6 months , 1 year, yearly for 3 years then 3 yearly. All patients underwent clinical and radiological assessment.

RESULTS AND DISCUSSIONS

This is a prospective study of knee replacements surgeries performed in 101 connective female patients using high flexion knee implants. Two groups were randomly formed, with 67 patients receiving Gender Specific Femoral implants and 34 patients receiving standard high flexion knee implants.

Patients operated for Gender knee stem had mean age of 61.4 years with range of 40 to 84 years, while standard high flexion knee system had mean age of 64 years with range of 45 to 73 years. 93 % were operated for degenerative osteoarthritis, 5 % for rheumatoid arthritis and 2 for post traumatic arthritis. Average followup for gender knee group was 9.8 years with range of 7 to 11.8 years. For standard knee group average was 10.9 years with range of 7.6 to 12 years.

One patient died on 4 th post-operative day due to pulmonary embolism. Two patients in gender group had to undergo revision surgery for infection at 3 and 6 years post-operative. One patient in standard group had peri-prosthetic fracture due to high velocity trauma at 7 years post-operative which required conversion to hinge prosthesis. One patient each in both groups had loosening of implants with osteolysis due to polyethylene wear, after 7 years in standard group and 9 years in gender group. Excluding the patient who died due to pulmonary embolism overall survival rate of high flexion implants was 96.6 % at mid term followup with 96.8 % in gender knee group and 95.9 % in standard high flexion group. This is comparable to 10 year survival rates of 95.5 % due to all reasons and 98.7% due to mechanical failure (loosening, lysis, wear) in 505 patients by Nakumara et al. 5

There was significant improvement in Knee Society Scores in patients operated with high flexion implants. Average increase in scores was from 24 to 90 in gender group and 27 to 87 in standard high flexion group. The difference in improvement in both groups was not statistically significant. Similarly average functional score improvement was from 29 to 76 in Gender group and 30 to 77 in Standard group, again the difference was statistically insignificant using chi square test.

Post-operative range of motion achieved at 6 months followup was average of 134 degrees in Gender knee group and 131 degrees in Standard High flexion knee group. No significant difference in both groups. It is imperative to note that factors associated with less post-operative flexion included obesity, pre-operative flexion less than 70 degrees.

Gender High Flexion knee implants provide a good range of motion due to improved designs including extended posterior femoral condyle with a deep articulating surface, deep anterior patellar cut and modified cam/spine interaction for improved stability in deep flexion.

Knee replacement proves to be the gold standard for persons with severe knee arthritis due to any cause with gross improvement in knee scores. High flexion implants also fare same in this with pain score decreasing from 7-10 pre-operatively to 0-3 post-operatively as per Vas scoring on a scale of 0 to 10. However the difference in gender and

standard groups was statistically not significantly different.

For anterior knee pain incidence of Grade I pain was 28% in Gender knee and 29% in Standard high flexion knee, and Grade II pain was only 1 %. Here also difference was not significant. In no case we had to undergo resurfacing for intractable anterior knee pain.

CONCLUSION

In mid term with followup of 7-10 years, Gender high flexion knee implants have an excellent outcome, with marked improvement in Knee scores, functional scores and reduction in pain. They have good overall survivorship of 96.8 %. However no significant difference was seen between Gender and Standard High Flexion knee systems. Bigger trials with more number of patients and multiple centres involvement are required to ascertain the same.

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