

Single Stage Bilateral Total Knee Arthroplasty -Patient Safety and Functional Outcome

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ABSTRACT

INTRODUCTION: Knee Osteoarthritis is a common disorder of knee joint in patient over 60 years age. Total knee arthroplasty provides pain relief and improvement in function in end stage osteoarthritis. Controversy exist between single stage versus staged total knee arthroplasty, proponent's claims reduced cost, single anesthesia, symmetric rehabilitation and reduced overall hospital stay as advantage of single stage surgery while other believes increased risk of mortality and morbidity compared to staged bilateral total knee replacement. In this study we looked for the patient safety and functional outcome of single stage bilateral total knee replacement in our center.

METHODOLOGY: All single stage bilateral total knee replacement done in sports and arthroplasty unit of department of orthopedics in Tribhuvan University Teaching Hospital between May 2016 to November 2017 were prospectively followed for one year. Immediate and early postoperative complications were recorded and functional outcome at one year was analyzed using hospital for special surgery knee score.

RESULTS: Mean age of patients was 68.02 ± 6.87 years, of them 24 were female and 7 were male. Mean drop in hemoglobin postoperatively was 2.47 ± 1.33 gm/dl; of them 16 % (5 cases) required blood transfusion. Functional outcome at 1 year follow was excellent in 38.7 % (12 cases) and good in 61.3 % (19 cases).

CONCLUSION: Single stage bilateral total knee arthroplasty has good functional outcome without significant increase in morbidity and mortality at one year follow-up.

KEYWORDS: Total Knee Arthroplasty (TKA), Bilateral Single Stage TKA (SBTKA), Staged TKA (sBTKA)

INTRODUCTION

Knee Osteoarthritis(OA) is a common disorder of knee joint, it is strongly associated with ageing and can affect up to 30% of people over 60 years of age[1]. Primary total knee arthroplasty(TKA) is most commonly done surgery for severe knee osteoarthritis. The aims of TKA are pain relief and improvement in function[2]. Studies shows 33% of patient receiving TKA has bilateral severe OA and 20% required contralateral TKA within first two years[3]. The rationale behind one-stage bilateral knee replacement

is the reduced hospitalization, symmetric rehabilitation, cost and the need for only one anesthetic[4]. The functional outcomes and patient satisfaction scores are comparable or higher in persons undergoing bilateral versus unilateral TKA that too without increased cost[5]. Opponents of simultaneous bilateral TKA claims that this procedure has more risk and higher mortality rate than staged bilateral TKA[6]. Thus controversy exists in decision making regarding patient safety and outcome of single stage versus staged bilateral TKA[7].

In this study we looked for the patient safety and functional outcome of single stage bilateral TKA (SBTKA) in our center.

METHODOLOGY

This is a prospective observational study on SBTKA done in sports and arthroplasty unit of department of orthopedics and trauma surgery in Tribhuvan University Teaching Hospital. Ethical clearance was taken from Institutional Review Board of Institute of Medicine. All cases of bilateral severe knee osteoarthritis (Pic. 1); that underwent SBTKA during the study period (May 2016 to November 2017) were included in this study. Unilateral, Staged TKA and complex or revision TKA (requiring constrained prosthesis) done during this period were excluded from the study. All SBTKA was performed by the author's team using Posterior stabilized (PS) TKA implant (Stryker, Scorpio). Tourniquets was used in all cases and injection Tranxemic acid 1gm intravenous bolus was given 10 minutes before cementing. Complications and requirement of blood transfusion (transfusion was done if postoperative hemoglobin was less than 8 gm/dl on first postoperative day, as in study by Hafez MA et al 8) were noted in all cases. Functional outcome of surgery was assessed at 1 year using hospital for special surgery (HSS) knee score. Data collection was done in structured proforma and entered in Microsoft excel (version 2015). Frequency distribution, mean, standard deviation of the required data was calculated using excel and Wilcoxon signed rank test was used to calculate p value for analyzing the statistical significance of data.

RESULTS

Thirty one patient with symptomatic severe bilateral knee osteoarthritis had SBTKA during this study period. Mean age of patients was 68.02 ± 6.87 years, of them 24 were female and 7 were male. Most of them were hypertensive and diabetic. (Fig.1)

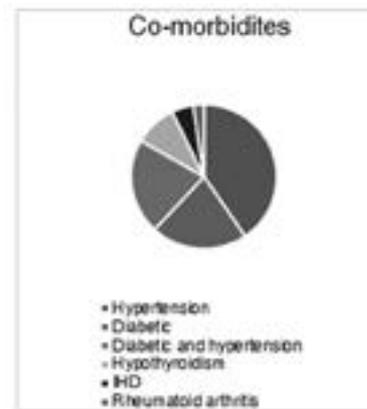


Fig.1.Co-morbidites in cases undergoing SBTKA

Mean pre-op and post-op hemoglobin was 12.77 ± 1.22 and 10.20 ± 1.73 gm/dl respectively, thus mean postoperative drop in hemoglobin was 2.47 ± 1.33 gm/dl (p value < 0.001). Of them 5(16%) patient needed blood transfusion; 2 units each for 3 patient and 1 unit each for 2 patient.

None of the patient had postoperative wound infection and deep venous thrombosis. One patient developed pneumonia and hypoproteinemia in immediate post op period and she later died due to cardiac failure after 1 month of surgery.

Mean preoperative HSS score for knee was 47.67 ± 6.02 and 48.67 ± 5.36 for right and left knee respectively. There was significant improvement in mean HSS score for knee at one year follow-up- 79.29 ± 6.88 and 79.09 ± 7.72 for right and left knee respectively (p value < 0.002).

Functional outcome as per HSS knee score at 1 year follow was excellent in 38.7 % (12 cases) and good in 61.3 % (19 cases). (Pic.2)

DISCUSSION

Controversy exists regarding many aspects of decision making pertaining to same-day versus staged bilateral TKA (BTKAs). BTKAs are more invasive and complex procedures associated with increased risk for perioperative adverse events compared with unilateral TKA in an unselected group of patients. So more restrictive patient selection criteria must be laid down and if a patient is not deemed a candidate for same-

day BTKAs, a second TKA should be scheduled no sooner than 3 months after the first[7]. Only 25% of knee arthroplasty surgeons in Scotland per year ever performed a SBTKA[9]. These were the data from western countries, where TKA is performed in large volume in state of art hospital setup. We conducted this study to see patient safety and functional outcome of SBTKA in our setup.

Risk of blood loss in single stage bilateral TKA is more than in staged TKA[10]. In our study mean postoperative drop in hemoglobin on day one was 2.47±1.33mg/dl This similar to Rosencher N et al[10] study in which the average hemoglobin drop after primary total joint arthroplasty showed a mean hemoglobin drop of 2.8 g/dl. However in study done by Zhong-Yi Chen et al[11] showed that in 186 cases (82.3%) Hgb level was the lowest on post-operative day (POD) 4, 32 cases (14.1%) on POD 3, six cases (2.7%) on POD 5, and two cases (0.8%) on POD 2. Thus concluded that hemodilution peaks on POD 4 and serial haematocrit monitoring is essential till 4th POD to find out cases that might require blood transfusion. Requisite of blood transfusion is significant after SBTKA, it has been reported to be required in 8-18% case[12]. 16% of our cases required blood transfusion too. In our study none of the patient had postoperative wound infection and deep venous thrombosis. One patient developed pneumonia and hypoproteinemia in immediate post op period and she died due to cardiac failure after 1 month of surgery. Hussain N et al [13] in their study also found similar infection and other complications but higher mortality rate as compared to staged TKR.

In our study functional outcome as per HSS knee score at 1 year follow was excellent in 38.7% (12 cases) and good in 61.3% (19 cases). Shriram K et al [14] reported significant improvement of the mean preoperative oxford knee score improved from 11.47 preoperatively to 35.57 three months postoperative and 46.31 at one year follow-up. Zeni Jr JA et al [15] in their comparative study of simultaneous bilateral versus unilateral TKA found no significant difference in postoperative

Nepal Orthopaedic Association Journal (NOAJ) walking ability, walking aid requirement, range of motion and length of hospital stay.

Limitations of this study were small study population, ASA grade was not taken in consideration before selecting patient for SBTKA and lack of serial monitoring of postoperative hemoglobin for transfusion requirement.

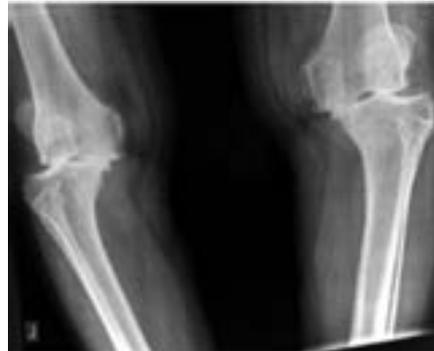
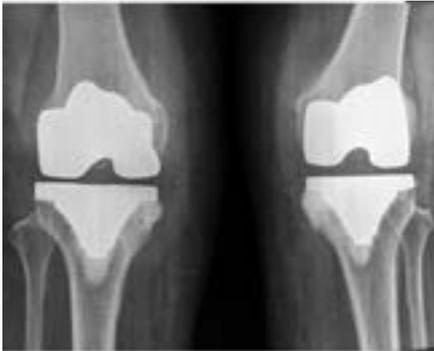
CONCLUSION

Single stage bilateral total knee arthroplasty (SBTKA) is safe procedure in selected group of patient and provides good functional outcome in one year follow-up in cases of symptomatic symmetric severe knee OA.

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Pic.1 X-ray both knee AP View Pre-op and 1 year post-op.



Pic.2. Knee ROM (120 degree flexion and full extension) at one year follow-up

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