

| Free Paper Session I: Adult Joint Reconstruction |

1.1

EARLY RESULTS OF ATTUNE TOTAL KNEE REPLACEMENT SYSTEM IN HONG KONG CHINESE

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Introduction: A new total knee replacement system is available in Hong Kong for a few years. We are going to review the clinical results.

Methodology: We have performed 109 Attune TKR in 97 people from April, 2015 to April, 2018. We retrieved the data from the cluster hospital joint registry system to review the clinical outcome, knee scores and functional scores, complications and radiological findings.

Results and Analysis: Thirty men and 67 women received 109 Attune TKR in Tuen Mun Hospital and Pok Oi Hospital. They were all performed by medial para-patellar approach with tourniquet. The indication of surgery is primary osteoarthritis (107) and rheumatoid arthritis (2). Knee score improved from 59.7 to 86.1 and function score improved from 52 to 65.5. Forty-five patients suffered from preop flexion contracture and 40 of them could be correct to full extension. There is no infection in the whole group of patients. Two patients developed patellar cluck syndrome about one year after the TKR. Proximal tibia bone resorption is noted in one patient two years after the TKR. One woman has persistent knee pain after the TKR. Imaging showed implants are in desirable alignment. Exploration showed scarring only with no loosening of implants.

Discussion and Conclusion: The early outcome of Attune TKR system is satisfactory. The unsolved issue for tibial tray loosening reported in another paper may need more investigations.

1.2

EARLY CLINICAL OUTCOMES AND SURVIVORSHIP OF THE ATTUNE TOTAL KNEE ARTHROPLASTY SYSTEM

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Introduction: Total knee arthroplasty (TKA) is an effective treatment for end-stage osteoarthritis. Modern day implant designs have boasted long survivorships of more than 90% at twelve years. The ATTUNE Total Knee Replacement system was developed in 2013 with hopes to improve patella tracking and knee kinematics. This study is to evaluate the early survivorship and clinical outcomes of this modern implant design.

Methodology: Retrospective review of all ATTUNE TKAs with a minimum two-year follow up performed since 2014 in Queen Mary Hospital and Duchess of Kent's Children Hospital. Implant survivorship, complications and causes for revision were analysed. Clinical outcomes including pre-operative and post-operative range of motion, flexion deformity, Knee Society Knee Score (KSKS), Knee Society Function Score (KSFA) and hip-knee-ankle mechanical alignment were assessed.

Results and Analysis: There were 422 ATTUNE TKAs performed in 377 patients with 65.9% (278/377) female predominance. The average age was 66 years old (range: 42-87). Average pre-operative flexion deformity improved from 6.9 degrees (range: 0-40, SD: 6.3) to 1 degree (range: 0-30, SD: 2.5) after operation ($p < 0.01$). Flexion range also significantly improved from 102 degrees (range: 30-130, SD: 14.5) to 108.5 degrees (range: 70-130, SD: 11.3) post-operatively ($p < 0.01$). Clinical outcome measurements at two years showed improvement of the KSKS from 43.9 to 91.7 ($p < 0.01$) and KSFA from 48.4 to 68.9 ($p < 0.01$). We report a survivorship of 99% at two years with only three cases requiring revision surgery. These included one case each of peri-prosthetic infection, aseptic loosening and insert dislocation requiring exchange.

Discussion and Conclusion: Early results show good clinical outcomes and survivorship at two years.

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MATCHED-PAIR ANALYSIS OF CLINICAL AND RADIOLOGICAL RESULTS OF MEDIAL-PIVOT TOTAL KNEE ARTHROPLASTY VERSUS POSTERIOR STABILIZED TOTAL KNEE ARTHROPLASTY

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Introduction: Total knee arthroplasty (TKA) with a medial-pivot design was developed to mimic the natural kinematics of the knee. Studies have shown satisfactory survivorships and medium-term outcomes. However, controversy remains as the clinical superiority when compared to posterior stabilized (PS) TKA has yet to be seen. The purpose of this study is to assess clinical outcomes of the medial-pivot knee compared to PS TKA.

Methodology: Since 2015, 119 medial-pivot TKA were included and matched to 119 PS TKA based on age, gender, body mass index and pre-operative alignment. Baseline characteristics were compared. Clinical outcomes measured included pre-operative and post-operative knee flexion deformity, range of motion, Knee Society Knee Score (KSKS) and Knee Society Function Score (KSFA). Radiographic evaluation with pre-operative and post-operative hip-knee-ankle mechanical alignment were also analysed. Matched-pair analysis was used to determine statistical significance.

Results and Analysis: The average follow-up was 1 year. Baseline characteristics including age, gender, BMI, pre-operative range of motion, KSKS, KSFA, mechanical alignment and follow-up time were comparable ($p>0.05$). Range of motion fared worse in the medial-pivot TKA group. There were 4.5 degrees more flexion range gained in the PS TKA group compared to the medial-pivot group ($p<0.01$). However, post-operative clinical scores were significantly better in the medial-pivot TKA group with post-operative KSKS scores of 93.7 compared to 86.5 in PS TKA ($p<0.01$). Other clinical parameters including knee flexion deformity, KSFA scores and radiological alignment were otherwise similar.

Discussion and Conclusion: Matched-pair analysis of medial-pivot knees showed better clinical outcome scores despite less range of motion gained.

1.4

ROUTINE DRAIN AFTER TOTAL KNEE REPLACEMENT: PREVENTING OR INVITING TROUBLE?

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Introduction: Suction-drain is commonly used following TKR to prevent hematoma collection and deep surgical site infection. This might increase post-operative blood loss, need of transfusion and pose risk for retaining foreign body. With advancement of wound and bleeding management, the role of suction-drain is questionable. Studies have shown that TKR without drain insertion could safely avoid drain-related complications, decrease post-operative blood loss and accelerate rehabilitation. Since January 2017, suction-drain is only used in patients who have bleeding tendency, failed water seal repair or complex operation in Alice Ho Miu Ling Nethersole Hospital (AHNH).

Methodology: This Single Centre Retrospective Cohort Study included all TKR at AHNH since establishment of joint center (October 2015) to October 2017. Operations were done under same surgical team with standardized protocol. Drain status and surgical outcomes were reviewed.

Results and Analysis: 560 cases of TKR were performed at AHNH during the study period. There were 24 out of 326 cases before January 2017 and 191 out of 234 cases from January to October 2017 underwent TKR without drain respectively. There was shortening length of stay in "no drain" group (7.1 vs 5.3 days; $P<0.001$). There was no significant difference in mean hemoglobin drop, transfusion rate and function outcome between both groups. No retained drain particles and joint infection were recorded. There is even more cases of wound related complications in "drain" group (3.18% vs 1.87%; $P=0.351$).

Discussion and Conclusion: With appropriate case selection, routine suction-drain after TKR can be abandoned without inferior surgical outcomes and eliminate drain related complication that can lead to sentinel event.

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1.5

EARLY RESULT OF TOTAL KNEE REPLACEMENT WITHOUT USE OF DRAIN, A RANDOMIZED CONTROL TRIAL

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Introduction: Use of drain in total knee replacement was known to decrease the volume of intra-articular collection after operation. However, it is not without complication like persistent drain site discharge, wound pain or even infection. With the use of intra-articular tranexamic acid, early results of total knee replacement in groups with or without drain insertion were reviewed.

Methodology: Patients aged 60 to 80 years old without contraindication for use of tranexamic acid were recruited and randomized into two groups (with or without drain). Results of hemoglobin drop, pain score, range of movement, complication and length of hospital stay were studied.

Results and Analysis: Both groups showed similar results in range of movement, change in hemoglobin post operation and pain score. The mean length of stay is 5.93 days in no drain group and 7.03 in drain group. There was one case of persistent drain site discharge after operation.

Discussion and Conclusion: With the use of intra-articular tranexamic acid, total knee replacement without drain is a safe option with the advantages of eliminating drain related complication and cost of suction drain. It also showed similar early results and shorter length of hospital stay.

1.6

COMPARISON OF DIFFERENT METHODS OF SAGITTAL ALIGNMENT MEASUREMENT AFTER TOTAL KNEE REPLACEMENT IN TERMS OF INTER-OBSERVER VARIABILITY

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Introduction: Coronal alignment measurement of total knee replacement (TKR) is well described, but not sagittal alignment measurement. There is no standardized method, and there could be high inter-observer error. There was no study compare different ways of sagittal alignment measurement. Our aim is to find the better way of sagittal alignment measurement by comparing their inter-observer variability.

Methodology: The lateral view and standing sagittal alignment xray of 38 TKR with the same implant were reviewed. For both the femoral and tibial side, 3 axes were defined: (1) the medullary axis and (2) anterior cortical axis on lateral view, (3) sagittal mechanical axis on standing film. They were compared with the component fixation surface. The femoral flexion angle and posterior tibial slope were recorded. 2 Orthopaedic surgeons did the measurements separately and their results were compared. Intraclass correlation coefficient (ICC) was used to find the inter-observer variability of the 6 methods (3 for each component).

Results and Analysis: The ICC for femoral flexion angle measured by axes 1, 2 and 3 were 0.747, 0.83 and 0.881 respectively. The ICC for posterior tibial slope measured by axes 1, 2 and 3 were 0.758, 0.822 and 0.909 respectively.

Discussion and Conclusion: Our study showed that measurement of both femoral flexion angle and posterior tibial slope were most accurate on standing sagittal alignment xray. If only the lateral view xray is available, measurement with the anterior cortical axis is more accurate than the medullary axis.

1.7

EARLY PROMISING RESULT OF BICOMPARTMENTAL KNEE REPLACEMENT

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Introduction: Partial knee replacement is one of the treatment options in relatively young patients with less extensive knee osteoarthritis. The indications remain controversial, especially in patients with osteoarthritis in both medial compartment and patellofemoral joint. We performed bicompartamental knee replacement (BKR) in this group of patients and compared the outcome with total knee replacement (TKR).

Methodology: From 2016-2017, 14 BKR were performed in patients with mainly medial and patellofemoral osteoarthritis. They were retrospectively compared with 14 TKR performed in patients with similar age and severity. The incision length, operative time, blood loss (in terms of hemoglobin drop) and length of stay were recorded. Pre and post-operative range and Knee Society score at 1 year follow up were compared.

Results and Analysis: The mean incision length for BKR is shorter than TKR (130.1 vs 185.1 mm), but the mean operation time is also longer (152.6 vs 88.1 mins). The difference in mean hemoglobin drop (1.8 vs 2.6 g/dL) and length of stay (7.4 vs 9.2 days) were not statistically significant. The mean post-operative knee score is better in BKR group (177.6 vs 166.4), but the mean post-operative flexion is similar for both groups (115.7 vs 111.4 degrees).

Discussion and Conclusion: In selected patients, BKR is a good alternative to TKR, with a shorter incision and tissue preserving and good early clinical outcome. However, there is a learning curve as reflected by the increase operative time. Longer follow up is necessary to study on the performance and survivorship.

1.8

RADIOGRAPHIC OUTCOMES OF ACCELEROMETER-BASED NAVIGATION SYSTEM FOR TIBIAL AND FEMORAL RESECTION IN TOTAL KNEE ARTHROPLASTY

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Introduction: Optimal component placement fosters long-term implant survival.

Methodology: This study compares the accuracy of accelerometer-based KneeAlign 2 (KA2) navigation system against conventional methods for accurate positioning of the femoral and tibial components in Total Knee Arthroplasty. 37 conventional alignment and 20 accelerometer-based KA2 navigation system cases in primary elective TKA were examined consecutively.

Results and Analysis: Analysis demonstrated both the conventional alignment and KA2 navigation were able to achieve a neutral mechanical axis of the lower limb with no significant difference between the groups ($p=0.287$). The femoral component varus/valgus angles for the conventional and KA2 groups were respectively $89.9 \pm 2.1^\circ$ and $88.9 \pm 1.9^\circ$ ($p=0.090$); the tibial component varus/valgus angles were respectively $88.3 \pm 2.0^\circ$ and $90.0 \pm 1.1^\circ$ ($p=0.001$); the tibial component posterior slopes were respectively $7.3 \pm 2.2^\circ$ and $1.3 \pm 2.1^\circ$ ($p<0.001$).

Discussion and Conclusion: In conclusion, KA2 navigation was significantly more accurate than conventional alignment methods for optimal positioning of the tibial component in both the coronal and sagittal plane, while no significant difference between the 2 groups was appreciated in the positioning of the femoral component in the coronal plane. Nevertheless, it should be noted that both alignment methods were able to achieve a satisfactory placement of femoral and tibial component placement in the coronal plane, within the accepted range used in this study of $90 \pm 3^\circ$. However, only the KA2 navigation system was able to achieve such accuracy for the tibial component in the sagittal plane with the mean posterior slope within the range of $0 \pm 2^\circ$.

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1.9

RETROSPECTIVE RADIOLOGICAL ANALYSIS OF MIDPOINT BETWEEN TIBIAL SPINES AS A LANDMARK FOR NAVIGATION TOTAL KNEE ARTHROPLASTY (TKA) IN CHINESE POPULATION

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Introduction: Mid-point between tibial spines is commonly adopted as the registration point in navigation TKA. Recent studies demonstrated that the center of tibial plateau has a higher reproducibility with variability in different ethnicities. The objective of this study is to assess the reliability of using center of tibial spines as landmark for navigation TKA in Chinese population.

Methodology: Retrospective review of lower limb scanograms taken in United Christian Hospital was conducted. The study period was from January 2015 to January 2017. Inclusion criteria include Chinese ethnicity and skeletally mature age group. Exclusion criteria include ill-defined radiological landmarks, previous trauma to knee region and non - Chinese ethnicity. All images were reviewed with Orthoview™ system with measurement on the width of tibial spine and tibial plateau, horizontal distance between the two midpoints, and the mechanical axis deviation(MAD) resulted using different midpoints. The radiological simulation followed the manual of Stryker ASM knee navigation system.

Results and Analysis: In total, 40 lower limb scanograms with 80 knees were reviewed. Age ranged from 27-73 years old with male to female ratio 1:9. The average distance between the midpoints was 0.68mm. 92.5% of knees had MAD of 0-1 degree, 7.5% had MAD of >1-2 degrees and 2.5% had MAD of > 2 degrees.

Discussion and Conclusion: The use of midpoint between tibial spines will result in average MAD of 0.53 degree. 2.5% of cases will have MAD > 2 degrees.

1.10

VARIABILITY OF CEMENT MANTLE THICKNESS IN TOTAL KNEE ARTHROPLASTY

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Introduction: The optimal thickness of the cement mantle in total knee arthroplasty (TKA) has been proposed to be 3-5mm for implant stability. However, there is a paucity of studies on the capacity to obtain a constant cement mantle thickness in practice. The aim of this study was to assess whether there is a difference in the cement mantle thickness in TKA performed between different surgeons.

Methodology: The 20 most recent primary TKA performed by each surgeon were selected to make up a total of 100 patients. There is varying cementing techniques between the surgeons. For all surgeons, pulsatile lavage and cement vacuum mixing was used. Some surgeons used a technique of finger packing to pressurise the intramedullary cavity before insertion of the implant. One surgeon did not use a tourniquet. Initial postoperative anteroposterior (AP) and lateral radiographs were assessed to measure the cement penetration according to zones proposed by the Knee Society.

Results and Analysis: Between the surgeons, there were no difference in the cement thickness at the tibial tray ($p>0.05$), but there was a difference around the tibial stem ($p<0.05$). Particularly, a surgeon using a finger pressurisation technique produced a significantly thicker mantle around the stem (mean lateral 6.1mm; AP 5.1mm) compared to 2 other surgeons who didn't use this technique (mean lateral 3.5mm, 3.6mm; AP: 3.6mm, 3.2mm).

Discussion and Conclusion: Between the joint surgeons in our centre, there was no difference in cement thickness at the tibial tray, but there was a difference around the tibial stem, which may be affected by the cementing technique.

1.11

NUTRITIONAL STATUS IS A PREDICTOR OF IN-HOSPITAL POSTOPERATIVE COMPLICATIONS IN PATIENTS UNDERGOING ELECTIVE TOTAL KNEE ARTHROPLASTY

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Introduction: Malnutrition is a common and modifiable risk factor for postoperative complications and adverse outcomes in orthopaedics. The purpose of this study was to identify biomarkers of malnutrition in patients undergoing elective total knee arthroplasty (TKA) that are predictive of adverse in-hospital postoperative complications, to facilitate the identification of at-risk patients for nutritional optimization before surgery.

Methodology: A total of 626 patients who underwent elective TKA between 2013 and 2017 were evaluated; potential biomarkers of preoperative malnutrition, including hypoalbuminemia (serum albumin $<3.5\text{g/dL}$), total lymphocyte count (TLC $<1,500\text{cells/mm}^3$), and body mass index (BMI), were assessed for any association with in-hospital postoperative complications.

Results and Analysis: The prevalence of hypoalbuminemia, low TLC, overweight, obese class I, and obese class II were respectively 2.72%, 33.4%, 14.8%, 44.5%, and 26.9%. There was a significant association between obesity class II (BMI $\geq 30.0\text{kg/m}^2$) and rates of postoperative complications ($p<0.001$), and no significant association between such complications and hypoalbuminemia ($p=0.539$), low TLC ($p=0.583$), overweight ($p=0.436$), or obesity class I ($p=0.749$).

Discussion and Conclusion: Obesity class II is a reliable biomarker of preoperative malnutrition for predicting in-hospital postoperative complications after elective TKA, whereas hypoalbuminemia, low TLC, overweight, and obesity class I were not significantly associated with increased risk of such complications.

1.12

COST EFFECTIVENESS OF SIMULTANEOUS BILATERAL TOTAL KNEE REPLACEMENT OVER SEQUENTIAL BILATERAL

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1.13

IS ROUTINE SCREENING OF HEMOGLOBIN A1C IN PRIMARY TOTAL KNEE ARTHROPLASTY PATIENTS WORTHWHILE

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Introduction: Peri-prosthetic joint infection (PJI) is a devastating complication after total knee arthroplasty (TKA). Diabetes and postoperative hyperglycemia is risk factor for PJI. Hemoglobin A1c (HbA1c) is a glycemic marker and correlates with diabetic complications. As dysglycemia are frequently asymptomatic, it is plausible to screen TKA patients with HbA1c. We aim to evaluate results of routine HbA1c screening in identifying undiagnosed pre-diabetes and diabetes and compare prevalence of PJI with historical data.

Methodology: Primary TKA from 2009 to May 2018 were reviewed. American Diabetes Association defined pre-diabetes and diabetes as HbA1c 5.7% to 6.4% and $\geq 6.5\%$ respectively. Routine HbA1c screening and Diabetes Optimization program was started in March 2017, newly diagnosed patients or HbA1c $\geq 7.5\%$ were referred for optimization before TKA. All PJI within the studied period were identified and defined according to Musculoskeletal Infection Society working group in 2011.

Results and Analysis: Routine HbA1c screening and no screening group consisted of 693 TKAs (576 patients) and 2724 TKAs (1990 patients) respectively. In routine screening group, prevalence of known pre-diabetes and diabetes was 2% and 26.2% respectively, while 36.1% and 1.4% had undiagnosed pre-diabetes and diabetes. Therefore, 37.4% have undiagnosed dysglycemia undergoing TKA and the number needed to screen was 3. Overall prevalence of PJI in routine screening and no HbA1c screening group was 0.3% and 1.0% respectively and was marginally insignificant ($p = 0.068$).

Discussion and Conclusion: Routine HbA1c screening in TKA patients can identify significant proportion of undiagnosed pre-diabetes and diabetes, which provides an opportunity for early treatment and prevention of hyperglycemic complications.

1.14

INTRAOPERATIVE FEMORAL CONDYLE FRACTURE IN PRIMARY TOTAL KNEE ARTHROPLASTY – A RARELY REPORTED COMPLICATION

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Introduction: Intraoperative femoral condyle fracture is a significant but rarely reported complication during primary total knee arthroplasty (TKA). Clinical data has so far been lacking in identifying major causative factors of its occurrence. This study attempts to identify the incidence, risk factors, location and outcome of these fractures.

Methodology: We reviewed 2682 consecutive primary TKAs performed between 2011-2017 in a single centre. 231 cases were performed as bilateral surgery in a single operative session. 28 intraoperative fractures were identified, giving an incidence of 1.04%. Amongst these cases there were 23 femoral condyle fractures (17 medial condyle, 6 lateral condyle), 3 medial tibial plateau fractures, 1 tibial tuberosity fracture and 1 patella fracture.

Results and Analysis: Mean age of occurrence for femoral condyle fracture was 69.4 (range 56-85). There were 4 men and 19 women. 17 cases were discovered intraoperatively and 6 cases postoperatively. 7 cases were managed conservatively, 15 were immediately fixed with screws, and one case required revision arthroplasty. All patients achieved bone union and good functional outcome. Possible risk factors identified for intraoperative fracture femoral condyle include patient factors (Female gender, small size), implant factors (box cut dimension, location of cutting pin tracts or peg holes) and technical factors (eccentric box cut, eccentric trial removal, excessive force).

Discussion and Conclusion: Intraoperative femoral condyle fracture is a preventable complication in TKA with early identification of risk factors and a rigorous surgical technique.

1.15

KINEMATIC AND NEUROMUSCULAR CHANGES IN PATIENT WITH PREOPERATIVE KNEE FIXED FLEXION DEFORMITY(FFD) BEFORE AND AFTER TOTAL KNEE ARTHROPLASTY(TKA)

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Introduction: FFD are common in osteoarthritic knees. Residual FFD after TKA have been associated with poorer functional outcomes. Muscle co-contraction, Quadriceps-Hamstrings, is one of the factors potentially associated with residual FFD after TKA. This study aimed to review the changes in static, dynamic knee kinematics and electromyography (EMG) before and after TKA in patients with preoperative FFD.

Methodology: 13 patients (age 73.5 ± 8.7 ; 13 females) with preoperative FFD ($14.6 \pm 4.3^\circ$) with full correction of FFD during TKA were included. Data on knee kinematics and gait analysis were measured before TKA, and at 6 weeks, 3 months and 6 months postoperatively. The primary outcome measures are knee range at static and dynamic conditions, and co-contraction index (CCI) (Rectus Femoris-medial Hamstrings) measured by EMG.

Results and Analysis: In static assessment, knee FFD was statistically significantly improved ($16.4 \pm 6.9^\circ$ (preop) to $0.6 \pm 1.7^\circ$ (6 month), $p=0.000$). In gait analysis, knee flexion angle during mid-stance and terminal stance were reduced (43.8%, $p=0.027$; 47.2%, $p=0.041$) at 6 months after TKA. However, patient still had $13.5 \pm 8.2^\circ$ and $12.1 \pm 9.3^\circ$ of residual knee extension lag during mid-stance and terminal stance. CCI was 34.5 ± 7.4 pre-operatively. It persisted during 3 months follow up (31.3 ± 9.3) but reduced after 6 months (27.0 ± 10.6).

Discussion and Conclusion: Patients showed improving in passive knee extension range, but still had residual knee extension lag during walking, and muscle co-contraction still persisted 3 months postoperatively. Neuromuscular re-education emphasis on reduction in co-contraction may be considered to enhance recovery, and to prevent recurrence FFD.

1.16

ABSENCE OF A TOURNIQUET DOES NOT AFFECT QUALITY OF CEMENTATION IN TKA : A CONCISE RADIOLOGICAL REVIEW AT A MINIMUM OF 2 YEARS

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Introduction: Application of tourniquet in total knee arthroplasty is postulated to improve cement penetration, but its effect is not proven. Tourniquet also affect rehabilitation due to muscle inflammation and pain. We aim to evaluate the effect of tourniquet on cement penetration and long-term functional outcome. We hypothesize that the effect is insignificant.

Methodology: This is a case-controlled study involving patients who underwent TKA between 2014-2017 in a public hospital. Patients were divided into tourniquet and non-tourniquet group. Surgeon, surgical technique and implant types are controlled. X-ray measurements of cementation depth and presence of radiolucent lines were recorded. Pre and post-operative functional scores KSKS and KSFA were compared. Analysis of covariance (ANCOVA) was used for statistical analysis.

Results and Analysis: 76 patients were included. X-Ray measurements of cement depth showed no significant difference between the two groups at day 1 and 2-years ($p=0.219-0.668$). There was no significant difference in the presence of RLL ($p=0.187-0.868$). There was however better KSKS (93.12 ± 3.73 vs 89.97 , $P=0.014$) and KSFA (76.80 ± 20.46 vs 62.07 ± 13.40 , $P=0.005$) in the tourniquet group.

Discussion and Conclusion: There is no benefit of tourniquet usage on cementation in TKA. Tourniquet group had better functional outcome, which may be accountable to better pre-op parameters such as range of motion in the tourniquet group. A better study design is needed for conclusive evidence.

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EARLY RESULTS OF KNEE ARTHROPLASTY IN A PRIVATE TEACHING HOSPITAL

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Introduction: Gleneagles Hong Kong Hospital was established in 2017 as a private teaching hospital of the University of Hong Kong and provides high-end and sub-specialist level arthroplasty service. In contrast to usual private practice in Hong Kong which surgeon-dependent and surgeon-specific, arthroplasty service in GHK follow a multi-disciplinary clinical pathway, with standardized protocol in all aspect to achieve optimal care for patient.

Methodology: This is a retrospective review of all knee arthroplasty performed in a private teaching hospital since its establishment in 2017. All patient demographic, clinical data, post-operative course, X-Ray analysis and rehabilitation outcome were reviewed. Clinical parameters during post-operative clinic assessment were also reviewed.

Results and Analysis: A total of 55 unilateral total knee replacement, 7 bilateral total knee replacement and 7 mobile bearing Unicompartmental knee replacement have been performed in a 1-year period. All patient discharged in 5-7 days as per respective protocol. Around 20% of patient require regular postoperative physiotherapy. All patient showed satisfactory clinical and radiological outcome upon postoperative assessment. Other than two cases of suspected allergic reaction and skin rash, no other major complication developed in the study period.

Discussion and Conclusion: The use of clinical pathway and protocol driven care model is feasible in private setting and leads to excellent clinical outcome. The concept of Joint Replacement Centre with standardized care can be implemented in private sector in the long run.

1.18

APPLICATION OF ANTHROPOMETRIC DATA OF CHINESE KNEES FOR THE DEVELOPMENT OF PERSONALISED TOTAL KNEE REPLACEMENT PROSTHESIS

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Introduction: Total knee replacement is a common orthopaedic surgery for the patients suffering from severely damaged knees. As most of the prosthesis in the market are designed according to Caucasians, a number of reports have shown that Chinese TKR patients do not match with available prostheses.

Methodology: 52 knees were included in this study for anthropometric measurements. Correlation analysis was performed to identify key parameters and ratios from the preliminary measurement results. Formulae of each parameter were generated from linear regression. Prosthesis was designed according to the formulae. Surface matching analysis and biomechanical analysis were conducted to validate the proposed prosthesis design.

Results and Analysis: The root-mean-square point-to-surface (PS) distances of the reconstructed femoral condylar surface among all data was 1.1 ± 0.18 mm which was comparable to statistical shape modeling literature results. The surface matching results of our design was the highest compared to two commercial prosthesis (Weigao Alpha Motion and Weigao Posterior Stabilizing). The amount of average resected bone volume using our design was the smallest (27412 mm^3) compared to the two commercial products. Comparing with literature, the stress distribution areas and the peak stress (22.5 MPa) in the tibial plateau of our designed prosthesis were similar.

Discussion and Conclusion: Incorporating the shapes of Chinese knees and biomechanical analysis, a brand new TKR prosthesis based on Chinese anatomy was developed. More precise implantation and bone preservation for patients was resulted.

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A CASE CONTROL STUDY COMPARING MECHANICALLY ALIGNED AND KINEMATICALLY ALIGNED TOTAL KNEE ARTHROPLASTY IN CHINESE - RADIOGRAPHIC ACCURACY AND PATIENT-REPORTED OUTCOMES

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Introduction: We designed a prospective case-control study to compare the radiological and clinical outcomes between MA TKA and KA TKA in Chinese patients.

Methodology: 50 patients undergone unilateral TKA were allocated either to MA TKA group (n=18) or KA TKA group (n=32). All surgeries were performed by the same surgeon. Patients were assessed at 6 weeks, 3 months and 6 months post-operatively. Pre-operative patients' demographics were analyzed. Post-operative lower limb long radiographs were used to assess the lower limb alignment and individual component position. We documented Knee Society Score (KSS), Knee Society Function Assessment (KFA), Knee Injury and Osteoarthritis Outcome Score (KOOS) and Forgotten Knee Score (FKS) at each follow-up.

Results and Analysis: All patients completed 6 months follow-up. There is no significant difference in patients' pre-operative demographics between the MA and KA groups. In the KA group, the post-operative coronal component position accurately matched to pre-operative anatomy ($p>0.5$). The mean surgical time of KA TKA was 52 ± 8.6 minutes. There is no significant difference found in the knee range of motion, KSS, KFA, KOOS and FKS at pre-op, 6 weeks, 3 months and 6 months post-op between the MA and KA groups. No complication occurred in any patients.

Discussion and Conclusion: One can accurately restore the coronal alignment and articular surface anatomy using conventional instruments in KA TKA. The surgical technique is easy to master for an experienced arthroplasty surgeon. We could not demonstrate a significant benefit of KA TKA in early post-operative function and patient-reported outcomes over MA TKA.

1.20

THE EFFECT OF LOCAL INFILTRATION ANALGESIA IN PRIMARY TOTAL KNEE ARTHROPLASTY

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Introduction: Local infiltration analgesia (LIA) has become popular in relieving postoperative pain in total knee arthroplasty (TKA). It contains a mixture of an anaesthetic drug, a non-steroidal anti-inflammatory drug and adrenaline. This study aims to evaluate the efficacy of LIA in TKA in terms of morphine consumption and postoperative pain score.

Methodology: This is a single-centred cohort study based in Yan Chai Hospital. Patients with primary total knee arthroplasty (TKA) were recruited. Those with chronic inflammatory joint disease, conditions precluding the use of LIA and dementia were excluded. Patients in LIA group were given single dose LIA intraoperatively while those in control group were not. Primary outcomes were postoperative pain score and morphine consumption; Secondary outcomes were degrees of active flexion, quadriceps power and post-operative length of stay.

Results and Analysis: A total of 136 patients were recruited with 68 in LIA group and 68 in control group. There was reduction in morphine demand ($P<0.001$) and consumption ($P<0.001$) as well as pain score from postoperative day 1 to 4 in LIA group compared with control group ($P=0.001$). The degree of active flexion in LIA group was greater ($P<0.05$). Quadriceps power and reduced length of stay between groups were not statistically significant. There was no difference in post-operative complications between two groups.

Discussion and Conclusion: Intraoperative single dose LIA can safely and effectively decrease the intensity of postoperative pain and reduce both the demand and consumption of morphine. The use of LIA in TKA is recommended.

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1.21

COMBINING OF INTRAVENOUS AND PERIARTICULAR CORTICOSTEROID INJECTION IN TOTAL KNEE ARTHROPLASTY. A PAIRED-RANDOMIZED CONTROLLED STUDY

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Introduction: Addition of corticosteroid to local infiltration analgesia (LIA) was shown by our group to enhance pain control and rehabilitation after TKA. On the other hand, high dose intravenous corticosteroid was found to reduce pain, in addition to its effect on postoperative nausea and vomiting after TKA. We aim to evaluate any combination effect of intravenous and periarticular steroid in TKA.

Methodology: This is a paired-randomized controlled study involving one-stage bilateral TKA patients. All received 16mg dexamethasone intravenously before TKA. LIA containing ropivacaine, ketorolac, adrenaline with or without 40mg triamcinolone was given. Each knee of same patient was randomized to receive LIA with or without steroid. Knee pain, rehabilitation progress, Southampton wound scores, functional scores and complications were documented up to 3 months. Results were compared between knees of same patient.

Results and Analysis: 27 patients (54 TKAs) were included. Knees receiving combined intravenous and periarticular steroid showed significant lower visual analogue scale score during activity from day 1 to 7 ($p < 0.05$), shorter time to achieve active straight leg raise (1.7 vs 2.5 $p = 0.027$) and larger passive knee range on day 5 and 7 ($p < 0.05$). All wounds healed with no differences in Southampton scores. No differences in Knee Society knee Score and Oxford Knee Score up to 3 months.

Discussion and Conclusion: Combining intravenous and periarticular steroid can improve pain control and recovery after TKA with no increase in adverse effects. This has important clinical significance in setting of fast-track arthroplasty.

1.22

PRE-OPERATIVE INTRAVENOUS STEROID IMPROVES PAIN AND RANGE OF MOVEMENT AFTER TOTAL KNEE ARTHROPLASTY IN CHINESE POPULATION, A DOUBLE-BLIND RANDOMIZED CONTROLLED TRIAL

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1.23

SINGLE SHOT VERSUS CONTINUOUS SAPHENOUS NERVE BLOCK FOR POSTOPERATIVE MOBILIZATION AFTER TOTAL KNEE REPLACEMENT: A RANDOMISED, DOUBLE-BLIND TRIAL

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Introduction: Total knee replacement is associated with pain. Traditionally, continuous femoral nerve block is used. However, it reduces muscle strength and compromises ambulation. Conversely, saphenous nerve is a pure sensory branch of the femoral nerve. In addition to single shot nerve block, continuous blockade can be achieved with insertion of a perineural catheter next to the saphenous nerve. Recent studies have demonstrated effective analgesia can be delivered by saphenous nerve block while preserving motor function thus improving early mobilization after operation. However, there is no consensus on the ideal mode of administration of SNB for post-TKR pain relief.

Methodology: This is a single-centered, randomized, parallel-group, placebo-controlled, double-blinded trial, we aim to investigate and compare the effect of single shot versus continuous saphenous nerve blockade on pain control and mobilization in the early postoperative period for patients undergoing unilateral primary total knee replacement.

Results and Analysis: A total of 60 subjects will be recruited. This sample size is calculated based on an unpublished retrospective review of previous post-TKR pain survey in Pok Oi Hospital. Range of movement, walking distance and knee score will be compared using t test for independent samples. The length of stay, will be compared using the Mann-Whitney U-test. Pain score will be compared using t test for independent samples.

Discussion and Conclusion: One shot versus continuous saphenous nerve root blocking showed no significant difference on post op mobilization in the two arms of patients.

1.24

CLINICAL BENEFITS AND SAFETY OF SYSTEMIC DEXAMETHASONE IN TOTAL KNEE ARTHROPLASTY: A PROSPECTIVE DOUBLE-BLINDED RANDOMISED CONTROLLED STUDY WITH 1-YEAR FOLLOW-UP

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1.25

POST ARTHROPLASTY EXCESSIVE KNEE PAIN, COULD IT BE NEUROPATHIC PAIN OR COMPLEX REGIONAL PAIN SYNDROME TYPE 1? A PRELIMINARY STUDY

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Introduction: Persistent knee pain (PKP) post arthroplasty remains a problem for a subgroup of patients despite serological investigation and diagnostic imaging shown no obvious cause for their signs & symptoms. The infrapatellar branch of the saphenous nerve (IPS) that crosses the inferior knee from medial to lateral and the anterior inferior knee capsule may be injured during surgery. This may potential cause IPS neuropathic pain syndrome or query as Complex Regional Pain Syndrome (CRPS). Preliminary study to differentiate between them.

Methodology: Nine PKP patients referred to occupational therapy department for pain management were recruited between October 2017 and May 2018 at Queen Mary Hospital. Budapest Criteria of CRPS, Knee Sensitization Assessment (hot, cold & light touch) & PainDETECT neuropathic pain questionnaire were adopted.

Results and Analysis: Nine female patients, mean age 75, post operation 12.5 weeks. Budapest Criteria shown 44% patients were CRPS. Knee Sensitization Assessment results shown hypoalgesia 55%, hyperalgesia 33% & allodynia 33%. Among those sensitization problems, 22% were medial & 78% were lateral to surgical incision & below joint line. PainDETECT on neuropathic pain (NP) with mean score: 13.44. "Unlikely NP" 44%, "May Have NP" 33%, "Definitely NP" 23%. Budapest Criteria CRPS correlated with PainDETECT score ($r=0.767$, $p<.05$). Among CRPS patients, 50% had "Definitely NP" & 50% "May have NP".

Discussion and Conclusion: Criteria diagnosed CRPS Type 1 patients highly correlated to NP and from knee sensory assessment revealed the surgical incision injured IPS. Treatment should more focus on IPS neuralgia & function restoration.