Free Paper Session X — Adult Joint Reconstruction II

10.1

Effect of Drain Pressure in Total Knee Replacement — A Preliminary Study

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Introduction: To study the effect of drain suction pressure on haemoglobin level drop, the need for blood transfusion, and wound complications in patients undergoing total knee replacement.

Materials and Methods: This is a retrospective cohort study. Primary total knee replacement surgery was performed in 208 patients from September 2014 to March 2015. In all, 118 patients received 200 mm Hg suction drainage and 90 patients received 300 mm Hg suction drainage postoperatively. The postoperative haemoglobin level was measured. Blood transfusion and wound complications were documented.

Results: The high-pressure group had a significant drop in haemoglobin level and a significantly higher blood transfusion rate than the low-pressure group. No wound infection or complication was detected.

Discussion and Conclusion: Low-pressure suction drainage (200 mm Hg) results in less blood loss and less blood transfusion rate without a significant increase in wound complications.

10.2

Progression of Health Status and Health-related Quality of Life of Hong Kong Population with Osteoarthritis Awaiting Total Knee Replacement

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Introduction: Knee osteoarthritis is a painful and disabling condition which significantly impairs the daily activities and health-related quality of life (HRQoL) of the elderly population. Regarding the long waiting time of total knee replacement (TKA) in Hong Kong (3-5 years), this study aimed to investigate the changes of self-perceived health outcomes and HRQoL of Hong Kong population with end-stage osteoarthritis (OA) while they are waiting for TKR.

Methods: A prospective longitudinal study using Western Ontario and McMaster University Osteoarthritis Index (WOMAC) and the Medical Outcomes Study 36-item Short-form Health Survey (SF-36) was conducted in patients with end-stage OA who were on the waiting list of TKA. Patients were interviewed at baseline and followed up after 1 year (n=66).

Results: Subjects whose waiting time of <1 year showed statistically significantly increased pain level (measured by WOMAC) and decreased functioning (measured by WOMAC and SF-36). Subjects having waited for 1 year demonstrated statistically significant improvement in SF-36 roles limitations due to physical functioning. Subjects having waited for >2 years showed statistically and clinically significant increase in pain and stiffness (measured by WOMAC) and decrease in functioning (measured by WOMAC and SF-36). Education was correlated with better patient-perceived vitality and mental health.

Discussion and Conclusion: Total knee replacement waiting time of >2 years has a significant negative impact on pain, function, and HRQoL. It is recommended that the waiting time of TKR should not exceed 2 years so as to prevent further deterioration of preoperative status.

10.3

Cementless Acetabular Component without Using Supplemental Screws — Immediate Full Weight-bearing has no Adverse Effect with a Minimum 10-Year Follow-up

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Introduction: Total hip arthroplasty using cementless acetabular component had excellent survivorship. It is controversial whether supplemental screw fixation is mandatory and immediate weight-bearing should be allowed. This study aimed at reviewing the clinical and radiological outcomes of patients receiving cementless acetabular component without supplemental screws with a minimum of 10-year follow-up.

Materials and Methods: This is a prospective study of patients using the same model of cementless acetabular component without supplemental screws from June 1999 to March 2003. Immediate full weight-bearing walking exercise was allowed. The degree of lateral opening angle and migration of the acetabular component were compared in the early postoperative period and in the last follow-up.

Results: A total of 70 hips in 58 patients had a minimum of 10-year follow-up (mean ± standard deviation, 13.2 ± 1.3 years). There was no revision of acetabular cup. The mean lateral opening angle was 47.2 ± 7.3 degrees in the early postoperative radiographs (range, 27-70 degrees) and 47.8 ± 7.5 degrees in the final follow-up radiographs (range, 28-71 degrees). The mean change in the lateral abduction angle was 0.6 ± 1.9 degrees (range, -3 to 7 degrees). The vertical distance decreased by a mean of 0.1 ± 1.9 mm (range, -3.0 to 3.0 mm), and the horizontal distance decreased by a mean of 1.3 ± 1.6 mm (range, -3.0 to 3.0 mm).

Conclusion: Immediate weight-bearing walking did not result in the migration of the cementless acetabular component without screw fixation.

10.4

Can Multimodal Periarticular Injection Plus Continuous Femoral Nerve Block Provide Better Pain Control after Total Knee Arthroplasty? A Prospective, Crossover, Randomised Clinical Trial

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Introduction: Postoperative pain control after total knee arthroplasty (TKA) is a major concern of patients and affects rehabilitation. This study compares the efficacy of pain control using multimodal periarticular injection plus continuous femoral nerve block (Method A) and multimodal periarticular injection alone (Method B).

Materials and Methods: This was a randomised, crossover, clinical trial. Patients having scheduled for staged TKA were randomised to receive either Method A or Method B in the first stage. In the second stage, they received opposite treatment. The primary objective outcome measure was morphine consumption by patient-controlled analgesia in the first 72 hours postoperatively. Visual analogue scale (VAS) of pain at rest and that of during movement was compared.

Results: Cumulative morphine consumption was lower in Method A (mean ± standard deviation, 16 ± 14 mg) than Method B (28 ± 4.9 mg) in the first 72 hours ($p=0.16$). The VAS rest pain score using Method A (day 1, 2; day 2, 1.8; day 3, 1.2) were similar as Method B (day 1, 2.1; day 2, 1.6; day 3, 0.6) [$p>0.05$]. The VAS motion pain score using Method A (day 1, 4.3; day 2, 5.2; day 3, 4.1) were also similar as Method B (day 1, 5.1; day 2, 4.2; day 3, 3.5) [$p>0.05$].

Discussion and Conclusion: Multimodal pain control using periarticular injection plus continuous femoral nerve block provides better objective pain control than periarticular injection alone. Subjective pain control did not differ in these 2 methods.

10.5

Total Knee Replacement can be Safely Performed in Octogenarian — A Review of Data from 2009 to 2014

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Introduction: Hong Kong octogenarian population is growing. In 2013, the life expectancies at birth for males and females were 81.1 and 86.7 years, respectively. There was an increase in the demand in octogenarians asking for total knee replacement (TKR) surgery. In 2014, 9.2% of primary TKRs were performed for patients >80 years in the Hospital Authority. This study aimed to report the clinical outcomes of TKR performed from 2009 to 2014.

Materials and Methods: Patients >80 years at the time of TKR were included. The clinical results and complications were reported. The clinical outcomes were compared with sex-matched patients in the same period.

Results: From 2009 to 2014, 266 TKRs were performed in 191 patients. Their mean age was 82.3 years (range, 80-91 years). The 30-day mortality was 0.4%. The incidence of pulmonary embolism (1.1%) and postoperative acute retention of urine (2.9%) were higher than the matched group. The incidence of deep infection was 1.1%, which was comparable with the matched group. The mean length of stay was significantly longer than the matched group. The trend showed a steady decrease in length of stay. Knee Society Knee Score and Knee Society Functional Assessment score were lower at 6 weeks. These became comparable from 3 months onwards.

Discussion and Conclusion: Total knee replacement can be safely performed in the octogenarian patient group. The functional improvement is expected to be slower.

10.6

Primary Total Hip Arthroplasty Using Secur-Fit Max: A Minimum of 10-Year Follow-up, Regional Hospital Experience

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Introduction: The Secur-Fit Max (Stryker) stem is a cementless stem, which is designed for promoting better metaphyseal filling for immediate stability fixation and the hydroxyapatite-coated surface for promotion of bone ingrowth. We reviewed its clinical and radiological results with a minimum of 10-year follow-up.

Methods: A total of 15 hips in 12 patients (mean age [range], 54 [43-71] years) received primary total hip arthroplasty using the Secur-Fit Max cementless stem from 1997 to 2005. In all, 14 cases used metal-on-polyethene bearing surface (the remaining one used alumina ceramic head). Secur-Fit acetabulum shell was applied for the cementless acetabulum component (with or without screw fixation). The mean follow-up period was 10.5 years (range, 10-14.8 years).

Results: The mean Harris Hip Score was 89. No stem or cup was revised. One hip was complicated with recurrent posterior dislocation and was managed conservatively. No stem subsided for >2 mm. The survival rate was 100% at 10 years postoperatively.

Conclusion: The Stryker Secure-Fit Max cementless stem has a satisfactory clinical and radiological outcome.

10.7

Acute Renal Impairment after Primary Total Knee Replacements: A Retrospective Analysis

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Introduction: Acute renal impairment (ARI) after primary total knee replacement (TKR) has been reported to be uncommon (incidence 0.55%) but may increase morbidity and mortality. Our study aimed at investigating the local incidence of and predisposing factors for ARI after TKR.

Materials and Methods: Patients who met the RIFLE (Risk, Injury, Failure, Loss of kidney function, End-stage kidney disease) classification for ARI after receiving TKRs in our institution between 1 January 2013 and 3 March 2015 were retrospectively identified by the Clinical Data Analysis and Reporting System and review of medical records. Demographic and perioperative data were analysed.

Results: A total of 705 patients received TKRs (594 unilateral vs. 111 1-stage bilateral TKRs). The incidence of ARI was 2.55% (n=18). Patients having 1-stage bilateral TKRs (6.3% vs. 1.3% unilateral TKR cases) and patients taking angiotensin-converting enzyme inhibitors / angiotensin II receptor blockers (ACEI / ARB) [4.7% vs. 1.5% patients not taking either ACEI / ARB] had statistically significantly higher risk of ARI ($p<0.05$). Furthermore, 61% (11/18) patients had hypotensive episodes (systolic blood pressure <100 mm Hg) in the early postoperative period. All patients with ARI were managed conservatively but 1 patient required intensive care unit admission for monitoring without the need for renal replacement therapy.

Discussion and Conclusion: Our incidence of ARI was 2.55%. The most significant risk factors were the use of ACEI / ARB and 1-stage bilateral TKRs. Precautions should be taken for these at-risk groups preoperatively to prevent ARI.

10.8

Primary Versus Revision Total Hip Arthroplasty — An Assessment of Disease-specific Quality of Life Outcomes

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In this cohort retrospective study, disease-specific quality of life after revision total hip arthroplasty (THA) was compared with primary THA and missing gaps in literatures are highlighted. Data were analysed from 3 different hospitals with outcome, function improvement, and patient satisfaction in 2 demographically matched cohorts of patients (156 cases each) undergoing primary THA for idiopathic osteoarthritis against revision THA for aseptic loosening, and a 10-year follow-up at subsequent intervals with assessment by Charnley Disability Index (CDI), Harris Hip Score (HHS), its function, and pain components, and complications was conducted. The CDI was matched in both groups preoperatively but after surgery more co-morbid conditions were found in revision THA group. The HHS showed maximum improvement from preoperative score to 1-year follow-up. Overall mean satisfaction was more than 90% in both groups. There were more readmissions due to complications were greater in the primary THA group. Survival analysis using Kaplan-Meier method and revision as end status reported mean survival in primary THA being 18.88 years, whereas for revision group the figure was 19.88 years. Revision THA provides good-to-excellent disease-specific quality of life, however overall function, pain, and satisfaction were better in primary THA than revision THA because of more co-morbid conditions found in the latter group.

10.9

Sleep Disturbance after Primary Total Knee Arthroplasty

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Introduction: Literature reported that patients experienced pronounced change in sleep architecture and quality after major surgery. This pilot study aimed to measure the incidence of sleep disturbance after primary total knee arthroplasty (TKA).

Materials and Methods: Patients undergoing TKA in our institution between 11 June 2015 and 10 July 2015 were recruited. A questionnaire was used to evaluate patients' self-reported sleep quality and quantity in hospital before and after TKA. Smart wristbands with wearable technology were worn to determine the sleep quantity and quality if patients agreed.

Results: A total of 19 patients (17 female, 2 male) with a mean age of 70.1 (range, 57-81) years were recruited. In all, 73.7% (n=14) reported worsened self-rated sleep quality (Likert score decreased from 3.79 to 2.53, $p<0.05$), and 57.9% (n=11) had increased sleeping hours after TKA (mean sleeping hours increased from 6.31 to 7.21 hours, $p=0.14$). Reasons for sleep disturbance included wound pain (n=11) and sleep posture (n=10). Data from wristbands shared similar results as questionnaire with increase in both mean awake time (43.6 to 62 minutes) and the sleeping hours (7.1 to 7.4 hours) after TKA.

Discussion and Conclusion: This pilot study showed that 73.7% patients had worsened sleep quality after TKA despite longer sleeping hours. Measures should be considered to minimise sleep disturbance, which potentially affects patient's compliance in rehabilitation.

10.10

Does Barbed Suture Lower Cost and Improve Outcome in Total Knee Arthroplasty? A Randomised Controlled Trial

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Introduction: Recently introduced barbed suture allows continuous knotless suturing, provides faster closure, and distributes tension evenly. Research on barbed sutures in total knee arthroplasty (TKA) is limited and yield conflicting results. The primary objective of this study was to compare barbed and traditional sutures in terms of wound closure time and cost. The secondary objective was to compare differences in wound complications, cosmesis, and clinical outcomes.

Materials and Methods: This was a randomised controlled study approved by Institutional Review Board. Patients with osteoarthritis requiring primary TKA were randomised into 2 groups. For traditional group, interrupted and continuous suturing of Vicryl was used for arthrotomy and subcutaneous closure, respectively. For barbed group, continuous knotless suturing of Stratafix was used for arthrotomy and subcutaneous closure. Wound closure time, leak test, and any other intra-operative events were recorded. Wound complications, cosmesis rating, Knee Society Score (KSS), and range of motion (ROM) were measured at 2 weeks, 6 weeks, and 3 months.

Results: A total of 24 TKAs in barbed group and 23 in traditional group were included. Both arthrotomy and subcutaneous closure time were significantly shorter in barbed than traditional group (arthrotomy 309.8 vs. 467.4 seconds [$p<0.01$]; subcutaneous 277.3 vs. 398.7 seconds [$p<0.01$]). Four positive leak test in traditional group, while none in barbed group were noted ($p<0.05$). No significant difference was noted in wound complication, cosmesis, ROM, and KSS.

Discussion and Conclusion: Our study demonstrated that bidirectional barbed suture shortens arthrotomy and subcutaneous closure time, reduces cost, and improves efficiency of TKA. We also showed that barbed suture provides a more robust arthrotomy closure, with comparable wound complications and clinical outcomes.

10.11

Radiographic Assessment of Limb-length Discrepancy after Total Hip Arthroplasty

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Introduction and Methods: A radiographic review was undertaken to evaluate technical causes for limb length discrepancy (LLD) after total hip arthroplasty. A sample of 60 primary total hip arthroplasties performed between January 2011 and May 2014 were identified. Preoperative and 1-year postoperative radiographs were reviewed. Preoperative and postoperative LLD as well as the respective acetabular and femoral contribution to any postoperative LLD (if present) were measured.

Results: Forty-five (75%) patients had postoperative limb lengthening. The mean (± standard deviation) postoperative lengthening was 5.15 ± 6.93 mm. For the lengthened group, the mean lengthening was 8.1 ± 4.62 mm. Besides, 22 (36.7%) patients had significant limb lengthening (>8 mm). There was mean lowering of femoral stem of 8.14 ± 6.38 mm and mean upward placement of acetabular component of 3.04 ± 5.67 mm. Lengthening and femoral placement of the stem (r=0.435, p=0.003), and lengthening and low cup placement (r=0.453, p=0.002) were significantly correlated. The difference between preoperative horizontal offset of the affected hip and the contralateral hips did not show significant correlation with limb length discrepancy (r=0.159, p=0.226).

Conclusions: Limb lengthening results from a combination of low acetabular implant and high femoral stem placement. However, there was no significant correlation between horizontal offset and limb length discrepancy.

10.12

Length of Stay after Primary Total Knee Arthroplasty in Hong Kong: A Retrospective Review

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Introduction: There was variation in the length of hospital stay (LOS) after total knee arthroplasty (TKA) in different countries. This study aimed to review the mean LOS after TKA in public hospitals in Hong Kong.

Materials and Methods: Data on the mean LOS of patients undergoing primary TKA between 1 January 2011 and 31 December 2014 in public hospitals in Hong Kong were retrospectively retrieved and analysed from the Clinical Data Analysis and Reporting System of the Hospital Authority (HA).

Results: A total of 8818 patients underwent primary TKA, and their mean LOS was 13.6 days (range, 7.7-23.9 days) in 15 HA hospitals over the study period. The mean LOS was decreasing over the study period (15.8 days in 2011, 14.1 days in 2012, 12.6 days in 2013, and 12.2 days in 2014). Only 2 hospitals had a mean LOS of <10 days, 9 hospitals ranged from 10 to 20 days, and 4 hospitals had that >20 days.

Discussion and Conclusion: Our study showed the mean LOS after TKA was 13.6 days, although in decreasing trend, which was still higher than that reported in western literature, and there was also high variation in mean LOS. With limited resources, but higher demand for TKA because of ageing population in Hong Kong, it is important to review present perioperative care so as to improve the clinical efficiency and enhance patient's recovery without jeopardising patient's safety and clinical outcomes after TKA.

10.13

Patellofemoral Joint after Attune Posterior Stabilised Fixed Bearing Total Knee Replacement

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Introduction: Patellofemoral outcome in total knee arthroplasty is variable. The DePuy Attune total knee replacement (TKR) system claims to have a more anatomical patellofemoral design. This case-control study aimed to evaluate the early patellofemoral joint symptoms after either the newer designed Attune TKR or the DePuy press-fit condylar (PFC) TKR.

Methods and Materials: A case-control study in the form of telephone questionnaire was conducted by a single orthopaedic surgeon to 26 patients with 30 DePuy PFC TKR and 30 patients with 31 DePuy Attune posterior stabilised fixed bearing TKR. All patients did not undergo patella resurfacing but received patella preparation. All operations were performed by 1 of 4 orthopaedic surgeons specialising in joint replacement. Only patients with primary osteoarthritis for primary surgery were included. Mean age was 69 years in the PFC group and 66 years in the Attune group. Their mean follow-up time was 9 months.

Results: Statistically significantly lower incidence of constant patellofemoral joint crepitations was found in Attune TKR when compared with PFC TKR (10 vs. 3, p=0.004). No significant differences were found between the incidence of anterior knee pain, pain on stair walking and squatting, Knee Society Knee Scores or Knee Society Functional Scores. There were 4 cases of reported patella clunk for PFC group and 1 in the Attune group but was not statistically significant (p=0.15).

Discussion and Conclusion: Patellofemoral outcome depends on an interplay of factors including component positioning, Q-angle restoration, patella preparation, and component design.

10.14

Cost-benefit Analysis of Intra-articular Injection of Tranexamic Acid in Total Knee Arthroplasty

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Introduction: Recent studies reported that intra-articular administration of tranexamic acid (IaTXA) in total knee arthroplasty (TKA) reduced transfusion rate, but the optimal regimen is not yet established. This study aimed to provide a cost-benefit analysis of our regimen.

Materials and Methods: The inclusion criterion was patients undergoing unilateral primary TKA with the diagnosis of primary osteoarthritis, and exclusion criteria were patients with contra-indication of IaTXA. The patients were included into 2 groups: patients with IaTXA from July 2014 to June 2015 (TXA group: 1 gm TXA was directly injected into knee joint) and those without IaTXA from July 2013 to June 2014 as historical control (non-TXA group). All TKAs were conducted by same surgical team with standardised techniques and perioperative management. Demographics and perioperative parameters were collected for comparison. The primary (transfusion rate) and secondary (thromboembolism complications and cost) outcomes were compared between TXA and non-TXA groups.

Results: A total of 375 patients were included in this study, including 190 in TXA group and 185 in non-TXA group. Both groups were comparable in demographics and perioperative parameters. The TXA group had statistically significantly lower transfusion rate (9.4% vs. 34.6%, p=0.005). No thromboembolism complications were observed in both groups. This led to saving HKD$238.31 per patient based on transfusion cost alone after accounting for the cost of TXA.

Discussion and Conclusion: It showed that our regimen of IaTXA could reduce transfusion rate, and was cost-saving without increasing complications of thromboembolism.

10.15 ***(New Zealand Orthopaedic Association Ambassador Paper)***

Periprosthetic Fracture Torque for Short Versus Standard Cemented Hip Stems: An Experimental In-vitro Study

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In an attempt to preserve proximal femoral bone stock and achieve a better fit in smaller femora, especially in the Asian population, several new shorter stem designs have become available. We investigated the torque to periprosthetic femoral fracture of the Exeter short stem compared with the conventional-length Exeter stem in a Sawbone model. A total of 42 stems including 21 shorter and 21 conventional stems, both with 3 different offsets, were cemented in a composite Sawbone model and torqued to fracture. Results showed that Sawbone femurs broke at a statistically significantly lower torque to failure with a shorter compared with conventional-length Exeter stem of the same offset. Both standard and short-stem designs are safe to use as the torque to failure is 7 to 10 times that seen in activities of daily living.