Bilateral Total Knee Arthroplasty

By Thanaphot Channoom MD
Objective

- What is bilateral total knee arthroplasty (BTKA)?
- What benefits and cautions?
- Who want or can’t do?
- How long to recovery?
- Why we do BTKA
- BTKA in the future
Who want total knee arthroplasty?

- Pain from knee arthritis
- Symptoms occur in one or both knees
- Knee pain interfering with daily activities & quality of life
- Age >55 years
Total Knee Arthroplasty
Who want BTKA?

- Severe arthritis both knees
- Significant deformity of both knees
- Suggest double knee replacements
- Physically fit
- Overall good health
- Motivated to do surgery & rehabilitation
- Correct both deformity allow patient can walk straighter & easier rehabilitation
Who want BTKA?

- Severe arthritis both knees
- Significant deformity of both knees
- Suggest double knee replacements
- Physically fit
- Overall good health
- Motivated to do surgery & rehabilitation
- Correct both deformity allow patient can walk straighter & easier rehabilitation
Who want BTKA?
Type of BTKA

• Simultaneous BTKA
  – One operation, one anesthesia, one hospitalization & one recovery period

• Staged BTKA
  – Separated surgical events, two episodes of anesthesia, two hospital stays & two rehabilitation periods
<table>
<thead>
<tr>
<th><strong>Staged or simultaneous TKA</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Simultaneous BTKA</strong></td>
<td><strong>Staged BTKA</strong></td>
</tr>
<tr>
<td>• One hospital stay &amp; rehabilitation</td>
<td>• Two admissions &amp; recoveries</td>
</tr>
<tr>
<td>• Difficult to use both knees, may need assistant at home</td>
<td>• Quicker knee weight bearing</td>
</tr>
<tr>
<td>• Three or four hours of operative time</td>
<td>• Two hours in operating room</td>
</tr>
<tr>
<td>• Less latent cost</td>
<td>• Consume more resources</td>
</tr>
</tbody>
</table>
Bilateral but different

• Depend on
  – Deformity
  – Disease progression
  – Muscle strength
  – Other musculoskeletal problems
  – Underlying

• Patient expectation
What happen if do BTKA?

- Walk with walker at 1st day
- Sit on chair near the bed
- Some assistance
- Simple activity of daily living
- Hospital stay: 3 nights
- Discharge 4th day
- Full leg raise
- Knee flexion 90 degrees
Bilateral Story #1

• A 72-year-old woman has severe pain and deformity of both knees.
• She has single care giver. She lives alone at home while her daughter works outside.
• She wants to take care herself fast as soon as possible.
Bilateral Story #2

• A 53-year-old single woman performed bilateral simultaneous unicompartmental knee replacement.
• She is a teacher. She lives alone and want to do her best in career.
Bilateral Story #3
Simultaneous BTKA in Ramathibodi

Ortho SD | SD
---|---
2559 | 9 | 9
2560 | 13 | 11
2561 | 16 | 22
Bilateral Simultaneous Operations

- Unicondylar knee Arthroplasty
- Revision knee replacement
- Patellar replacement + total knee replacement
- TKA + arthroscope
Simultaneous BTKA

- Save cost $43,401 vs. $72,233
- Quality-adjusted life years 9.21 vs. 9.31

Susan MO, at el. JBJS(Am) 2013 Aug 21; 95 (16): 1441
Simultaneous BTKA

- Periarticular injection improve pain control & less nausea
  

- Systemic steroid: decrease fever, pain & increase range of knee motion
  
  Kethy MJ, et al. JBJS(Am) 2012 Dec 5; 94 (23): 2120
Simultaneous BTKA

- Simultaneous BTKA 11,445 and staged BTKA 23,715 procedures
- Odd ratio MI 1.6, PE 1.4, death 1.3, stroke 1.0, infection 0.6 & mechanical malfunction 0.7 in 30 days
- MI >3.2/1,000 but infection & mechanical malfunction <10.5/1,000

John PM, et al. JBJS 2011 Dec 7; 93 (23): 2203
Simultaneous BTKA

- BTKA decrease rate of stiffness with manipulation under anesthesia
  

- Combine intravenous & intra-articular tranexamic acid (TXA) reduced blood loss and rate of transfusion

  Sachiyuki T, et al. JBJS 2017 Apr 18;2(2): e0002
• Enhanced Recovery After Surgery
• Protocols of multimodal perioperative care
• Early recovery, maintaining preoperative organ function & reducing stress response after surgery
• Preoperative counselling, optimization of nutrition, standardized anesthetic regimens & early mobilization
ERAS

- “Optimized patient care” or “fast-track surgery”
- Improved outcomes, reduced rate of complications, shorter inpatient stays & cost-saving
- Initiated by Professor Henrik Kehlet in Denmark 1990s
Mid-thoracic epidural anesthesia/analgesia
No nasogastric tubes
Prevention of nausea and vomiting
Avoidance of salt and water overload
Early removal of catheter
Early oral nutrition
Non-opioid oral analgesia/NSAIDs
Early mobilization
Stimulation of gut motility
Audit of compliance and outcomes

Preadmission counseling
Fluid and carbohydrate loading
No prolonged fasting
No/ selective bowel preparation
Antibiotic prophylaxis
Thromboprophylaxis
No premedication

ERAS

Postoperative

Preoperative

Intraoperative

Short-acting anesthetic agents
Mid-thoracic epidural anesthesia/analgesia
No drains
Avoidance of salt and water overload
Maintenance of normothermia (body warmer/warm intravenous fluids)
ERAS

- Shorter hospital stay 30% - 50%
- Faster recovery & rehabilitation
- Reduced complications, & readmission
- Save cost
- Patient & staff satisfaction
Complications

• Fall after BTKA
  – Rupture quadriceps tendon
  – Periprosthetic fracture
• TB arthritis after TKA
Complications

• Wound care
Complications

- Sound of artificial joint
- During joint motion
- Occasionally occur
Complications

• Bleeding
  – Anticoagulant: NOAC
• Cold pack
• Prevent falling
• Pressure dressing
• Re-suture
## Complications

### Table 2. Caprini Risk Assessment Model*

<table>
<thead>
<tr>
<th>1 Point</th>
<th>2 Points</th>
<th>3 Points</th>
<th>5 Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 41-60 y</td>
<td>Age 61-74 y</td>
<td>Age ≥75 y</td>
<td>Stroke (&lt;1 mo)</td>
</tr>
<tr>
<td>Minor surgery</td>
<td>Arthroscopic surgery</td>
<td>History of VTE</td>
<td>Elective arthroplasty</td>
</tr>
<tr>
<td>BMI &gt;25 kg/m²</td>
<td>Major open surgery (≥45 min)</td>
<td>Family history of VTE</td>
<td>Hip, pelvis, or leg fracture</td>
</tr>
<tr>
<td>History of major surgery (&lt;1 mo)</td>
<td>Laparoscopic surgery (≥45 min)</td>
<td>Positive factor V Leiden</td>
<td>Multiple trauma (&lt;1 mo)</td>
</tr>
<tr>
<td>Varicose veins</td>
<td>Cancer (past or present)</td>
<td>Positive prothrombin 20210A</td>
<td>Acute spinal cord injury (&lt;1 mo)</td>
</tr>
<tr>
<td>Swollen legs</td>
<td>Patient confined to bed (&gt;72 h)</td>
<td>Elevated serum homocysteine</td>
<td></td>
</tr>
<tr>
<td>Acute myocardial infarction</td>
<td>Immobilizing plaster cast (&lt;1 mo)</td>
<td>Positive lupus anticoagulant</td>
<td></td>
</tr>
<tr>
<td>Congestive heart failure (&lt;1 mo)</td>
<td>Central venous access</td>
<td>Elevated anticardiolipin antibodies</td>
<td></td>
</tr>
<tr>
<td>Sepsis (&lt;1 mo)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serious lung disease, such as pneumonia (&lt;1 mo)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical patient on bed rest</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


*BMI = body mass index; VTE = venous thromboembolism.*
## Complications

<table>
<thead>
<tr>
<th>Total risk factor score</th>
<th>Incidence of DVT</th>
<th>Risk level</th>
<th>Prophylaxis regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1</td>
<td>&lt;10%</td>
<td>Low</td>
<td>No specific measures, early ambulation</td>
</tr>
<tr>
<td>2</td>
<td>10 - 20%</td>
<td>Moderate</td>
<td>ES, IPC, LDUH or LMWH</td>
</tr>
<tr>
<td>3 - 4</td>
<td>20 - 40%</td>
<td>High</td>
<td>IPC, LDUH or LMWH</td>
</tr>
<tr>
<td>≥5</td>
<td>40 - 60% (1 - 5% mortality)</td>
<td>Highest</td>
<td>Pharmacological; LDUH, LMWH, warfarin or Exa inhibitor alone or in combination with ES or IPC</td>
</tr>
</tbody>
</table>

ES/GCS = elastic stockings/graduated compression stockings; IPC = intermittent pneumatic compression; LDUH = low-dose unfractionated heparin; LMWH = low molecular weight heparin.
Complications

- **DVT 13%**
- **Screening**
  - Scoring: Caprini & Well
  - Doppler u/s
  - D-dimer
- **Prophylaxis**
  - Mechanical
  - Pharmacological

### Clinical characteristics

<table>
<thead>
<tr>
<th>Clinical characteristics</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active cancer</td>
<td>1</td>
</tr>
<tr>
<td>Paralysis, paresis, or recent cast immobilization of the lower extremities</td>
<td>1</td>
</tr>
<tr>
<td>Recently bedridden &gt;3 days or major surgery within 4 weeks</td>
<td>1</td>
</tr>
<tr>
<td>Localized tenderness along the distribution of the deep venous system</td>
<td>1</td>
</tr>
<tr>
<td>Swelling of entire leg</td>
<td>1</td>
</tr>
<tr>
<td>Calf swelling by &gt;3 cm compared to the asymptomatic leg (measured 10 cm below tibial tuberosity)</td>
<td>1</td>
</tr>
<tr>
<td>Pitting edema (greater in the symptomatic leg)</td>
<td>1</td>
</tr>
<tr>
<td>Swollen unilateral superficial veins (nonvaricose)</td>
<td>1</td>
</tr>
<tr>
<td>Alternative diagnosis as likely as or more likely than deep vein thrombosis</td>
<td>-2</td>
</tr>
</tbody>
</table>

Total score 8. Low probability ≤0, moderate probability 1-2, high probability ≥3. Positive Wells’ score ≥2, negative Wells’ score <2
Just Only one TKA

- Severe co-morbidity
- Infection
- DVT
- CVA
- CAD
- Renal insufficiency
- Liver impairment
- Fear
Take home messages

- BTKA useful procedure in selected cases
- Strict to indication of surgery for better physical, mental, financial & social status
- Multimodality team approach
- Save cost, resource & time
- Patient safe & happy
THANK YOU FOR ATTENTION