Effect of Local Periarticular Steroid Injection on D-dimer in Total Knee Arthroplasty

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I have no financial conflicts to disclose.
Background

- Venous thromboembolism (VTE) is a serious complication after total knee arthroplasty (TKA).  
  \(^1\)Watanabe H, et al. Thromb Res 2011

- Inflammation initiates coagulation cascade and causes hypercoagulable state.  

- Intraoperative local periarticular corticosteroid injection (LPCI) in TKA reduces local inflammation.  
  \(^3\)Ikeuchi, et al. KSSTA. 2014
Hypothesis & Purpose

Hypothesis
LPCI suppress inflammation and hypercoagulable state after TKA.

Purpose
To evaluate the influence of LPCI on serum C-reactive protein (CRP) and D-dimer in TKA.
Materials

• Retrospective study

• 360 consecutive patients who underwent primary TKA between April 2015 and March 2017

163 injection group vs 197 control group

exclusion:
Rheumatoid Arthritis
Diabetes Mellitus
Bilateral Knee Arthroplasty within one year
Methods

• Serum CRP and D-dimer at two weeks before (baseline) and 7 days after TKA were measured and compared between the two groups.

Operation
• Implant: Attune (DePuy, Warsaw, IN)
• Use of tourniquet
• Measured resection technique
• Local tranexamic acid injection
• Femoral nerve block
• No drainage tube
• Edoxaban Administration

Statistical analysis
• Student’s t test
• Chi-square test
P < 0.05 being regarded as significant
LPCI

- **contents**
  150 mg/20 mL of 0.75% ropivacaine
  40 mg/1 mL of triamcinolone acetonide
  39 mL of normal saline

- **injection timing**
  After completion of all femoral and tibial osteotomy

- **injection cite**
  All soft tissues around the knee joint
## Result 1: Demographic Data

<table>
<thead>
<tr>
<th></th>
<th>TKA without LPCI (Control)</th>
<th>TKA with LPCI (Injection)</th>
</tr>
</thead>
<tbody>
<tr>
<td>male</td>
<td>32 knees</td>
<td>33 knees</td>
</tr>
<tr>
<td>female</td>
<td>157 knees</td>
<td>130 knees</td>
</tr>
<tr>
<td>age</td>
<td>75.7±6.0 y.o.</td>
<td>75.3±7.3 y.o.</td>
</tr>
<tr>
<td>height</td>
<td>151.3±7.9 cm</td>
<td>150.1±7.1 cm</td>
</tr>
<tr>
<td>weight</td>
<td>61.5±10.5 kg</td>
<td>58.2±9.2 kg</td>
</tr>
</tbody>
</table>

*no significant differences between two group
Result 2: CRP

![Graph showing CRP levels at baseline and post-7 days (PO 7D) for injection and control groups. The graph indicates a significant increase in CRP levels at PO 7D.]

* : p < 0.01
Result 3: D-dimer

![Graph showing D-dimer levels at baseline and PO 7D with a significant increase marked by an asterisk (*).](image)

**µg/ml**

- **Baseline**
  - Injection: [value]
  - Control: [value]

- **PO 7D**
  - Injection: [value] (p<0.01)
  - Control: [value]

* : p<0.01
Discussion

• This study indicated LPCI reduced serum CRP and D-dimer levels significantly.

Systemic steroid administration reduced serum IL-6 levels in patient undergoing TKA.

LPCI reduced serum CRP and IL-6 levels in drainage fluid collected 24 hours after TKA.

3) Ikeuchi, et al. KSSTA. 2014

LPCI reduces local and systemic inflammation.
Discussion

- Inflammation activates coagulation by cytokine, mainly IL-6, so keeping a lower IL-6 level after TKA by administration of low-dose corticosteroid inhibits thrombosis generation.

- Low-dose systemic steroid injection may influence thrombin activation and has a clinical application in postoperative VTE prevention.


LPCI is expected to be useful in postoperative VTE prevention after TKA.
Conclusion

- LPCI decrease serum D-dimer levels associated with a decreased CRP levels.
- This result may suggest that suppression of the systemic inflammatory response following surgical stress by using LPCI reduce the hypercoagulable state after TKA.

Reference


