Varus Mechanism Is Associated With High Incidence of Popliteal Artery Lesions in Multiligament Knee Injuries

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BACKGROUND

• Popliteal artery injuries can be a devastating complication in multiligament knee injuries.
• Approach to diagnosis is widely variable and clinical signs of ischemia can be insufficient to rule out vascular injuries.

PURPOSE

• To assess the incidence of popliteal artery injuries in Multiligament Knee injuries (MLKI)

• To correlate Popliteal Artery Injury with the presence of ligament tears and multiligament injury classification in order to identify high-risk patterns of vascular injury.
METHODS

Design: Retrospective case series

Inclusion Criteria:
- ≥18 years
- Multiligament knee injury (≥2 ligaments)
- January 2012 – August 2016
- Computed tomography angiogram (CTA)
- MRI

Exclusion Criteria:
- Follow up <3 months
- Significant injury in the same limb
METHODS

MRI (1.5 T)
- Ligament tears
- Schenck Classification

Medical Record
- Demographic data
- Vascular surgery
- Complications

Statistics
- Odds Ratio
- $p < 0.05$
- STATA (StataCorp LP. STATA v12)
80 MLKI

32 included (30 men)
41 years (18-82)

6 Popliteal artery injury

2 Amputees

Incomplete imaging workup (CTA or MRI)
Different injury in the same limb

83% Schenck III

83% Schenck III
RESULTS

LIGAMENT TEAR

- ACL
- PCL
- PLC
- PMC
RESULTS

SCHENCK CLASSIFICATION

Anatomic Classification of Knee Dislocations
Schenck 1992

<table>
<thead>
<tr>
<th></th>
<th>Anatomic Description</th>
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<tbody>
<tr>
<td>I</td>
<td>single cruciate + collateral</td>
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<tr>
<td>II</td>
<td>ACL / PCL</td>
</tr>
<tr>
<td>III M</td>
<td>ACL / PCL / MCL</td>
</tr>
<tr>
<td>III L</td>
<td>ACL / PCL / LCL+PLC</td>
</tr>
<tr>
<td>IV</td>
<td>ACL / PCL / MCL / LCL+PLC</td>
</tr>
<tr>
<td>V</td>
<td>fracture dislocation</td>
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</tbody>
</table>
• 18% (6/33) Politeal artery injury
  – 83% (5/6) Schenck III L
  – 17% (1/6) Schenck III M

• 2/6 Amputees: 7,5 days (6-9)

• The risk of having popliteal injury was increased 11 times when having a KD III L injury (p=0.02)

• No other significant association was found
• High incidence (38%) of vascular injuries in KD-III-L lesions
• Previous reports:
  – 28-43% Schenck III-L


• Mechanism of injury:
  – Tibiofemoral translation
  – **Hyperextension**
    • 50 degrees of hyperextension has been shown to cause the rupture of the artery

DISCUSSION

• Limitations:
  – Retrospective analysis
  – Large number of patients excluded --> overestimation of vascular injury incidence?
CONCLUSION

• A multiligamentous knee injury involving the PLC, ACL, and PCL is related to a significant increase in the incidence of popliteal artery injury.
• This finding should increase awareness for vascular injuries whenever detecting gross varus instability