Posterolateral Corner and Mechanism of Injury; Are there Important differences between Sporting Injuries and Road Traffic Accidents

Jonathan M Warnock FRCS, United Kingdom
George Jacob FaOrthA, India
Harbeer Ahedi PhD, Australia
Brett Fritsch FRACS, Australia
David A Parker FRACS, Australia

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Landmark Orthopaedics
The (Knee) Institute
Sydney Orthopaedic Research Institute

Faculty Disclosure

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Introduction

- Postero-lateral corner (PLC) injuries are potentially devastating in nature for patients [1]
- They commonly occur as part of a Multi-ligament knee Injury (MKLI) [2]
- Challenge of treating and reporting on PLC injuries is the heterogenicity with which they occur[1]
- The two most common mechanism of injury for PLC are [3];
  - Sporting injuries
  - Road Traffic Accidents
- In this study we sought to assess if any difference between these two mechanisms, in particular looking at;
  - Patient Reported Outcome Measures
  - Pattern of injury

Methods

- A prospective database of all MKLI was created in 2002
- This was interrogated to identify all patients with confirmed PLC surgery until January 2022
- Minimum 12 months follow-up with complete surgical data and PROMs
- Patients divided into 3 categories based on MOI
  - Group A; Sporting injury
  - Group B; Road Traffic Accident
  - Group C; other (eg work accident, fall)

Patient demographics

- Age
- Gender
- Body Mass Index (BMI)

- Timing of surgery
  - Acute; 0-28 days
  - Delayed; 28-180 days
  - Chronic; >180days
  - Revision

Methods

Knee specific data

- Concurrent Ligament injury
  - Modified Schenck Classification
- Meniscal injury
- Common Peroneal nerve injury and recovery
- PLC repair/reconstruction
- Reconstruction technique used

Patient reported Outcomes

- Knee Injury and Osteoarthritis Outcome Score (KOOS)
- International Knee Documentation Committee (IKDC)
- Tegner Activity Score

Statistical Methods

- Student t tests for continuous variables
- Chi-squared for categorical variables
- All statistical tests 2-sided
- P value <0.05 considered significant

Results: Patient demographics

- 68 patients included, 34 right knees
- Mean age 32.9 (SD 12.3)
- Mean BMI 27.7 (SD 9.92)
- 59/68 male (86.7%)

- Group A (Sports): 33 patients
- Group B (RTA): 24
- Group C (other): 11

- Mean follow up 4.22 years (SD 0.18)
- No significant difference in KD classification across the groups

Modified Schenck classification	
I(L)	35
I(L) N	5
III (L)	11
III (L) N	3
IV	4
V	5
V (N)	5

Table 1. Modified Schenck knee dislocation classification, distribution of patients, N; associated common peroneal nerve injury

Nerve injury

- 14 patients (20.6%)
- 2 nerve transections (one grafted without success)
- 10 (71%) patients reported a good clinical recovery

- Significantly more nerve injuries in group A than group B (30% vs 8%, p0.04) but not than group C (20%)

Meniscal Injuries

- 21 (31%) patients had a meniscal injury
- 12 isolated medial injuries
- 6 isolated lateral injuries
- 3 medial and lateral meniscal injuries

- Group A more commonly injured their meniscus than group B (42% vs 17%, p0.04) but not group C (30%)

Surgical Reconstruction

Timing of surgery

- Acute: 35
- Delayed; 11
- Chronic; 15
- Revision; 7

Significantly more acute surgeries in group A

No significant difference in reconstruction technique across the groups

The most common surgery was a fibular based anatomic reconstruction (Arciero) (48.5%)

Table 2 demonstrates the heterogenicity of the cohort

PLC technique/ Concurrent ligament reconstruction	Total	Fibular based anatomic (Arciero)	Fibular based non-anatomic (Larson)	Tibial based (LaPrade)	Fibular head avulsion	Ligament repair
Total		33	7	12	5	8
ACL	38	21	3	6	3	5
PCL	11	5	0	5	1	0
ACL and PCL	15	5	5	1	1	3
Isolated	3	2	0	0	0	1

Table 2. Range of PLC surgeries with associated ligament reconstructions

Outcomes

IDKC

Mean pre-operative 40.6 (4.15)

Mean post-operative 67.9 (1.0)

Group A 76.8(1.0) had significantly higher post op IDKC than group B 60.5 (21.2) p0.002 and group C 55.7 (12.6) p0.003

KOOS

Overall cohort post-operative mean

- Symptoms 70.0 (19.7)
- Pain 68.7 (21.5)
- Daily living 75.9 (23.2)
- Sports 60.3 (31.5)
- Quality of life 52.6 (25.7)

Group A had significantly better pain, daily living, sports and quality of life scores than group B. They also had significantly better pain, daily living and sports than group C

Tegner

Group A 6.04 (2.01), significantly higher than group B 4.55 (1.85) p0.02 and group C, 5.14 (1.85)

Discussion – Pattern of Injury

- Group A suffered significantly more nerve and meniscal injuries
- This is similar to Niall et al who assessed 14 nerve injuries - 10 of which were caused by sporting injuries and only one by an RTA [4]
- It has previously been demonstrated that the typical mechanism of injury to the PLC is either a direct blow to the anteromedial tibia, or a hyperextension, non-contact varus stress injury [5].
- This study suggests that sports injuries are more likely to be caused by hyperextension injury with varus and a likely pivot that tractions the CPN and produces shear forces that tear the menisci and one or both cruciate ligaments
- RTA injuries are higher energy but potentially caused by a more uni-directional force such as in a dashboard injury with a direct blow to the anteromedial tibia in the flexed knee position

Discussion- Patient reported Outcomes

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- Despite nerve and meniscal injuries Group A had higher post-operative PROMs
- This is similar to Kyrch et all who showed that nerve injury did not impact on PROMS [6]
- Dean et al separated MLKI into high and low energy injuries and demonstrated higher Tegner scores but not Lysholm or IDKC scores, their low energy cohort was 80% sports injury but also included injuries such as falls [3]

- Patient factors such as motivation to return to sport may explain these improved PROM in the sports cohort
- Similarly on-going litigation claims in the RTA cohort may also explain poorer outcomes [7]

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Conclusion

- PLC injuries are highly complex and heterogenous in nature
- There are differences in both pattern of injury and patient reported outcomes between the two most common mechanisms of injury
- Future studies should seek to separate these patient cohorts to see if treatment principles apply equally to all

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