ABSTRACT

Background: There are inconsistencies in the reported rates of second anterior cruciate ligament (ACL) injuries per limb, patients' sex and graft types after primary ACL reconstruction (ACLR). There are also inconsistencies regarding the influence of these factors on the occurrence of second ACL injury after primary ACLR.

Purpose: To determine the rate of second ACL injury, to either the ipsilateral graft or contralateral healthy ACL, as influenced by sex, age, and graft types and to determine the influence of sex, age, and graft types on the occurrence of second ACL injury after primary ACLR.

Study design: Systematic review and meta-analysis

Methods: A computerized search of MEDLINE, CINAHL, and SPORTDiscus was conducted using combinations of these terms: ACL, ACLR, re-injury, re-rupture, revisions, contralateral tear, ipsilateral graft tear, and second injury. Articles were required to report the number or percentage of sex, graft type, ipsilateral graft and contralateral ACL injuries after ACLR. Rates of second ACL injuries and pooled dichotomous data were calculated using random-effect proportion meta-analysis.

Results: The pooled rate of second ACL injuries (ipsilateral graft and contralateral ACL) was 6.11%. A slightly higher rate of ipsilateral graft injuries (3.29%) than contralateral ACL injuries (2.82%) (OR: 1.09 [95%CI: 0.89, 1.34]) was reported. Ipsilateral graft injuries occurred earlier (median: 20 months) than contralateral ACL injuries (median: 36.3 months). Men had lower rate of second ACL injuries (5.67%) than women (6.84%) (OR: 0.92 [95%CI: 0.70, 1.20]). Significantly higher rate of ipsilateral graft injuries (3.40%) occurred in men compared to contralateral ACL injuries (2.26%) (OR: 1.53 [95%CI: 1.33, 1.77]), while women had significantly higher rate of contralateral ACL injuries (3.75%) compared to ipsilateral graft injuries (3.09%) (OR: 0.73 [95%CI: 0.55, 0.96]). The rate of second ACL (ipsilateral graft and contralateral ACL) injuries was higher in patients with hamstring tendon (HT) autograft (5.83%) than bone-patella tendon-bone autograft (BPTB) (5.10%) (p=0.04) and allografts (3.12%) (p<0.0001). The rate of ipsilateral graft injuries was significantly higher than contralateral ACL injuries in all graft types (p<0.001).

Conclusion: Injuries to the ipsilateral graft are more common than contralateral ACL, with ipsilateral graft injuries occurring nearly 16 months earlier after ACLR. More women sustain second ACL injuries compared to men, with men incurring more injuries to the ipsilateral graft and women to the contralateral ACL. Furthermore, second ACL injuries are more common in patients with HT autograft, BPTB autograft, and then allograft; with ipsilateral graft injuries higher than contralateral ACL injuries regardless of graft types.

Levels of Evidence: 2a

Key words: Autograft injury, contralateral ACL injury, ipsilateral graft injury, second ACL injury, women re-injury