

Cyclops Lesions after Anterior Cruciate Ligament Reconstruction: Clinic-pathological Correlation

Introduction: Cyclops syndrome is an uncommon but potentially debilitating complication after arthroscopic reconstruction of the anterior cruciate ligament (ACL). Since it was first described by Jackson et al. in 1990, several studies have been published regarding the clinical characteristics, risk factors, and treatment of cyclops lesions; however, the pathology and underlying mechanisms of pathogenesis have not been fully determined.

Methods: We searched our pathology archives from a period between 1/1/2018 to 12/31/2021 and identified all cases of ACL reconstruction that had a pre-operative and/or post-operative diagnosis of cyclops lesion. The clinical, radiological, arthroscopic, and pathological features of these cases were reviewed.

Results: We identified 58 cases with pre-operative diagnosis of ACL reconstruction with cyclops lesion. The patients include 24 females and 34 males, aging 14-59 years. These patients underwent primary ACL reconstruction at 6-51 months before the cyclops removal procedure. Clinical symptoms included pain, swelling, discomfort, and stiffness. Pre-operative MRI studies demonstrated nodular tissue formation anterior to the ACL graft. Pathology material is available for review for 46 cases. The lesional tissue shows significant subsynovial fibroblastic cell proliferation and neovascularization. One case shows fibrin thrombi in the vessels of the scar tissue. Two cases show prominent tissue necrosis, hemorrhage and fibrin. In addition to the cyclops lesion, three patients also had intraarticular loose bodies removed and two patients also developed particle reaction to the bioabsorbable screw in the tibial tunnel. All the patients were followed for 6 weeks to 40 months after cyclops removal and all recovered well with re-establishment of full knee extension and just minor pain and discomfort.

Discussion: In this pilot study, pathological review demonstrated that the formation of cyclops lesions is due to both chronic and acute injuries. The presence of fibrosis, sclerosis, and mucoid degeneration suggests chronic repetitive injury. Fibrin thrombi and tissue necrosis in the cyclops lesions are evidence of acute injury and impingement. Our next step is to further investigate the underlying molecular pathogenesis and key regulators of fibrosis in cyclops lesions by using gene expression and immunohistochemistry assays.

References:

1. Jackson DW., Schaefer R. Cyclops syndrome: Loss of extension following intra-articular anterior cruciate ligament reconstruction. *Arthroscopy*, 1990, 6(3): 171-8.

Figure 1. Radiographic, arthroscopic, and microscopic features of a Cyclops lesion, developed 6 months after ACLR in a 15-year-old male patient.

