ACL Tunnel Cyst following ACL reconstruction

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Case 8131

Clinical History:

42-year-old Caucasian male, with a history of right ACL reconstruction. The patient presents with a painless mass over his right proximal anterior tibia.

Imaging Findings:

Initial ultrasound showed a well-defined, mixed hypoechoic to anechoic mass measuring 2.6 x 1.4 x 3.2 cm. It was located inferior to the tibial tubercle and patellar tendon insertion, with an anechoic neck which abuts the tibial cortex. No flow was present on colour Doppler imaging. It was not compressible.

Subsequent MRI shows a cystic lesion in the tibial tunnel, extending through the distal aspect of the tunnel into the subcutaneous tissues. The lesion extends proximally in the tibial tunnel to the level of the tibial plateau. There was no evidence of ACL graft failure.

Discussion:

An ACL tunnel cyst is a known complication of an ACL repair [1-9]. It is a cystic lesion that usually communicates with the tibial tunnel. Patient's typically present with a palpable mass if the cyst protrudes through the tunnel into the thin subcutaneous tissues of the anterior shin. The estimated incidence is 1.4-2.2% of patients with ACL reconstruction [2, 6]. The time of onset following surgery has ranged between 1-44 months [6].

The aetiology of ACL tunnel cysts is also unknown, with several possible theories.

The first theory is that a traumatic event leads to graft tear or graft necrosis, with subsequent formation of a synovialised tract in the tunnel, followed by cyst formation [2, 5]. A second theory suggests that micromotion within the graft leads to incomplete remodelling, which then leads to a synovialised tract. Finally, a third theory proposes that the tunnel is simply too large for the graft, which leads to a direct connection between the anterior shin and the knee 5.

A small prospective study of 22 people found that 64% of patients had tibial tunnel fluid in the first post-operative year. Most collections resolved by 18 months. None of the fluid filled tunnels progressed to cysts [5].

On ultrasound, a thin walled hypoechoic cyst anterior to the bony cortex is the most common appearance. No flow should be present on colour Doppler imaging.

On MRI, a cystic structure is present, typically with a communication to the tibial tunnel. MRI is the optimum imaging modality as it can demonstrate communication of the cystic lesion with the tibial tunnel, as well as detect potential communication with the knee joint.

No consensus for management of tibial tunnel cysts exists in the literature. Cyst excision is done on a case by case
basis, with an emphasis on removal if the patient is symptomatic or if the graft has failed. It is important to determine if the cyst communicates with the knee joint.

Non-communicating cysts are thought to be due to local necrosis of the graft underneath the hardware. These can be treated by cyst excision. Communicating cysts require more thorough debridement and bone grafting [6].

**Differential Diagnosis List:** ACL tunnel cyst following ACL reconstruction.

**Final Diagnosis:** ACL tunnel cyst following ACL reconstruction.

**References:**


Description: Sagittal ultrasound demonstrating a subcutaneous mixed hypoechoic to anechoic lesion anterior to the proximal tibia. There is a tract extending to the tibial cortex. Origin:

Description: Sagittal ultrasound demonstrating the subcutaneous portion of the tibial tunnel cyst. Origin:
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Description: Colour Doppler imaging demonstrates absence of flow. Origin:

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d

Description: Sagittal ultrasound demonstrates that the mass is non-compressible. Origin:
**Description:** Sagittal gradient recalled echo image: Tibial tunnel with associated tunnel cyst extending into subcutaneous tissues. **Origin:**
Description: Coronal gradient recalled echo image: Tibial tunnel with associated tunnel cyst extending into subcutaneous tissues. Origin:
Description: Sagittal T1 weighted image: Tibial tunnel with associated tunnel cyst extending into subcutaneous tissues. Origin:
Description: Axial Proton Density image: Subcutaneous portion of ACL tunnel cyst. Origin:
Description: Coronal T2 weighted fat-saturated image: Tibial tunnel with associated tunnel cyst extending into subcutaneous tissues. Origin:
Description: Sagittal T2 weighted image: Tibial tunnel with associated tunnel cyst extending into subcutaneous tissues. Origin: