



## **Diffuse Pigmented Villonodular Synovitis: A Rare Complication Following ACL Reconstruction**

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**Received Date: April 24, 2023**

**Published Date: May 01, 2023**

**Abstract**

*This case report describes a 35-year-old male who was diagnosed with diffuse pigmented villonodular synovitis in the left knee following ACL Reconstruction. Patient had undergone ACL reconstruction in the same knee following which he developed recurrent episodes of hemarthrosis. This prompted a series of investigations which included blood tests for bleeding disorders, radiological scans such as CT Angiogram to rule out the etiology for bleeding. When none of the tests were conclusive, patient underwent complete synovectomy of knee and histopathology sample of synovium lead to the diagnosis of diffuse pigmented villonodular synovitis. After surgery and 6 months postoperative, patient remained asymptomatic and have no fresh episodes of hemarthrosis of knee and he was able to resume his work and carry on with his daily activities. In this case, PVNS proved to be a rare complication after ACL reconstruction. The patient remains at risk for developing degenerative arthritis in the future.*

**Introduction**

Pigmented Villonodular Synovitis is a rare benign disease of synovium where it causes proliferation of the synovial membrane [1]. It can be further classified as either localized in the form of nodules or diffuse. It is limited to either the joint capsule, bursae or tendon sheath. It can affect any joints of the body with diffuse form affecting the large joints such as hip, knee and ankle [1]. While the etiology remains a mystery [3], the histopathology features describe proliferation of synovial villi with hemosiderin accumulation[2].

Treatment for pigmented villonodular synovitis range from pharmacotherapy to radiotherapy and surgery. While localized pigmented villonodular synovitis can be treated by arthroscopy method, there is a consensus that diffuse pigmented villonodular requires open synovectomy so as to remove all diseased synovium [4,5].

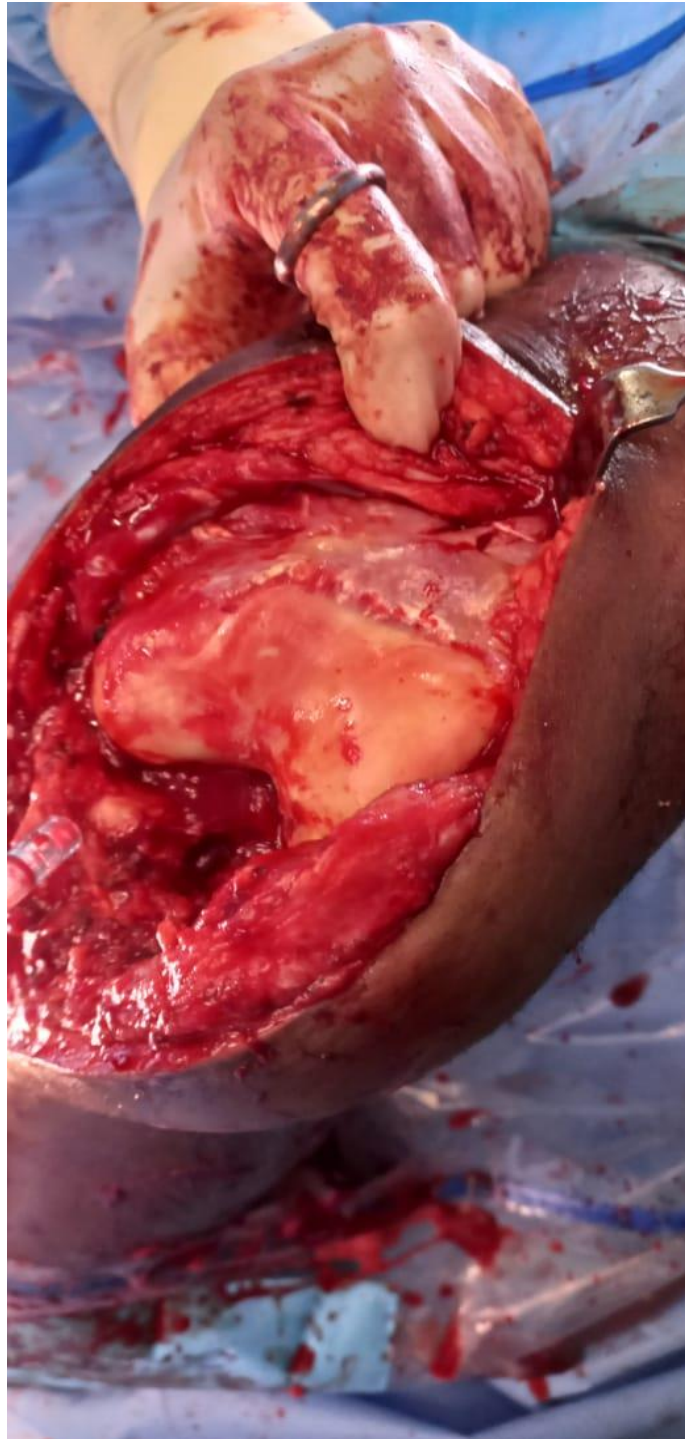
## Case Presentation

A 35 year old male presented with chief complaints of left knee instability following which MRI was done which showed ACL tear. He underwent ACL reconstruction with bone-patellar tendon-bone (BPTB) graft and started physiotherapy for a period of 12 weeks following he regained his range of movement and was able to resume his job. However 6 months postoperative, he complained of left knee swelling and pain and difficulty to move about. Local examination of knee revealed effusion of knee in the suprapatellar pouch and an aspiration of left knee under aseptic conditions was done which showed frank blood. It was sent for culture and sensitivity but culture was negative for growth of bacteria. 1 week post procedure, patient presented again with recurrent swelling and another aspiration of knee joint revealed another episode of hemarthrosis. Blood investigations were ordered to rule out bleeding disorders such as Von Willebrand Disease, Hemophilia but blood parameters were normal and negative for coagulopathies.

MRI of left knee was inconclusive while a CT Angiogram was done to rule out any bleeding vessels but showed no active bleeding. In the meantime , patient had another 5 episodes of hemarthrosis and the same protocol was followed . Patient underwent open synovectomy of left knee and intraoperatively, greyish discoloration of synovium was noted as shown in Figure 1.

The synovium was removed and sent for biopsy. Histopathological examination of synovium revealed proliferation of synovial villi with hemosiderin accumulation.

Postoperative, patient underwent physiotherapy and was able to resume his job 2 weeks postoperative. A follow up at 6 months show no episodes of hemarthrosis and range of movement was restored.



**Figure 1** shows greyish discoloration of synovium following open synovectomy of knee. Diseased synovium was sent for histopathological examination which revealed Diffuse form of Pigmented Villonodular Synovitis

## Discussion

Pigmented Villonodular Synovitis is a rare disease with annual incidence of 1.8 cases per million persons<sup>6</sup>. It can either be localized or diffuse form. While it can affect any synovial joint, the knee joint is commonly affected. Diffuse form of pigmented villonodular synovitis occurring post ACL reconstruction is a rare entity. While the etiology remains unclear, causes such as chronic inflammation, trauma have been associated [7]. Histopathological examination remains the golden standard for diagnosis of PVNS. It has been reported that there is a higher incidence of diffuse PVNS in ACL graft failure [8] but in this case, the ACL was intact as confirmed by MRI and intraoperative findings.

The treatment for PVNS range from pharmacotherapy to Surgery. Due to high recurrence of diffuse PVNS, finding more effective therapies remains a debate. In a retrospective review of the patients who accepted surgical treatment between 1990 and 2022 [9,10,11,12,13,14] there is higher recurrence rate with arthroscopic synovectomy compared to open synovectomy.

Removal of diseased synovium provide relief and avoid further risks of hemarthrosis. However, there is a risk of degenerative arthritis in the future.

Adjuvant therapies such as radiotherapy can be provided to prevent recurrence of hemarthrosis; However, we did not feel the need to resort to it as patient symptoms improve postoperative.

## The Uniqueness of this case

This case report demonstrates the possibility of diffuse pigmented villonodular synovitis as a rare complication following ACL reconstruction. Recurrent hemarthrosis which do not show bleeding disorders as cause of etiology should be investigated for PVNS.

## Conclusion

Pigmented Villonodular Synovitis is a rare disease and rare complication following ACL reconstruction. Due to its non specific presentation, there may be a delay in diagnosis. Histopathological examination remains golden standard for diagnosis. Diffuse form of PVNS require open synovectomy of knee to avoid recurrence. However, there is a risk of degenerative arthritis of knee in the future following synovectomy.

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