



A Case of Pigmented Villonodular Synovitis after Total Knee Replacement

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Abstract

We describe a case of diffuse pigmented villonodular synovitis in the knee presenting 5 years after total knee replacement. The abnormal synovial proliferation was noted at arthroscopy, and histological analysis of the resected tissue confirmed the diagnosis. The purpose of this article is to give an overview of this unusual complication and also add a note on the methods of management.

Keywords: Recurrent Haemarthrosis, Megaprosthesis, Pigmented Villonodular Synovitis, Total Knee Replacement.

Introduction

Total knee replacement (TKR) is a well-established treatment for osteoarthritis with increasing numbers performed each year. Recurrent haemarthrosis is a relatively rare complication following TKR being reported in up to 0.1% - 1.6% of patients^{1,2,3-8}. While some causes are related to direct trauma to blood vessels, others are more obscure and may be difficult to diagnose. The diagnosis is made with histological examination but can be suggested by magnetic resonance imaging appearances^{1,6}. Treatment is with complete resection of all the diseased synovial tissue; however, recurrence is

common, and adjuvant intra-articular radiation therapy can be effective in certain cases^{1,6}. The article here relates to the other possible management of diffuse pigmented villonodular synovitis which has not been discussed in any literature, up to our knowledge.

Case Report

A 76years old woman was referred to our center with a history of recurrent swelling and pain in left knee since 3years, post bilateral TKR 5years. Patient had third episode of left knee joint swelling at the time of presentation to our center. According to the referral letter and patients history the first episode was 2 years post-op. All the episodes were acute onset not preceded by trauma.

During first episode, left knee joint aspiration was done followed by cold compression, the symptoms subsided immediately and patient was discharged. Similar symptoms recurred 2 years after the first episode hence, diagnostic and therapeutic arthroscopic washout for left knee swelling was performed. Post-operative symptoms resolved. Heavy pigmentation with inflamed and abnormal synovial proliferation noted on arthroscopic findings suggestive of pigmented villonodular synovitis. Post-operative uneventful hence, patient was discharged

with antibiotics, rest and cold compression. Due to recurrence for the third time with similar symptoms in left knee, 1 year after the second episode; patient was referred to our center for further management. Knee was swollen, warm and tender with restricted and painful movements of the joint, other joints were asymptomatic. Immediate knee joint aspiration was done, approximately 100 millilitres of hemorrhagic dark brownish synovial fluid noted. And microbiology revealed blood constituents, synovial and inflammatory cells, more in favour of PVNS. On investigation there was neither clear clinical, physical, biochemical nor radiological findings suggestive of infection. This patient was reviewed by our orthopaedic oncology unit and surgery was performed by extra-articular wide excision of the left knee lesion (Fig – 1) with endo-prosthesis reconstruction. Intra-operatively we noted the extension of the lesion into the posterior compartment surrounding the posterior cruciate ligament. Histological analysis of the resected tissue revealed typical appearances of diffuse pigmented villonodular synovitis (Fig – 2). Post-operative (Fig – 3) patient was uneventful. IV antibiotics, analgesia, physiotherapy and wound care was given and patient had good functional range of movements on follow-up.



Fig. 1: Wide excision of the tumor and comparison of replacement mega prosthesis

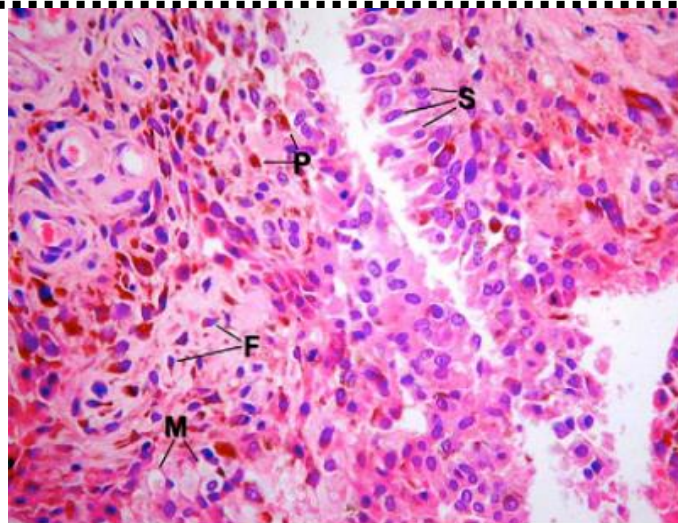


Fig. 2: Hematoxylin & eosin-stained section of resected synovium showing Synovial cell proliferation (S), hemosiderin pigment deposition (P), Fibroblasts (F) and Macrophage/histiocyte cells (M).

Discussion

Recurrent haemarthrosis is a relatively rare complication after total knee replacement. Some causes are not well understood and present as a diagnostic and therapeutic challenge. If not dealt with appropriately it can cause joint stiffness, lead to poor post-operative function and occasionally lead to deep joint sepsis and wound breakdown^{10,11}. Kindsfater and Scott⁵ have published the largest series to date, in 1995. The interval between knee replacement and the first episode of bleeding is highly variable (1 month–12 years) as are the causes^{3-6,10-13}. This condition is poorly understood in many cases and the exact causes have not been fully elucidated.

But there are 3 theories¹⁴: neoplasia, a process derived from a disorder of the lipidic metabolism, and chronic inflammation secondary to repeated trauma and hemorrhage. Jaffe et al¹⁵; suggested that PVNS was an inflammatory reactive process with a proliferation of elements of histiocytic origin. The inducing agent is not known. This is the theory that has been most commonly accepted. Rao and Vigorita¹⁶ considered it a benign

tumor of the synovium of histiocytic or fibroblastic origin. Some recent cytogenic studies have demonstrated the existence of chromosomal disorders. These suggest that the lesion originates as a monoclonal proliferation and is, therefore, a benign tumour. Sackers and De Jong¹⁹ however, observed that PVNS cells had a polyclonal origin. This supports the thesis that the process is inflammatory. Although the diffuse and localized forms have the same histological characteristics, they have different clinical presentations and prognoses. The diffuse forms are characterized by synovitis and a long history of diffuse pain with swelling and restricted movement of the joints and occasional hemarthrosis^{2, 16}. The localized form is characterized by a history of knee locking, which facilitates early diagnosis and provides a differential diagnosis with meniscal lesion, loose body, synovial plica, or patellofemoral pain^{2,16,17}. However non-pigmented villonodular synovitis may be found after total knee arthroplasty and is thought to represent a reaction to polyethylene, metal, and cement wear^{20,21}. Various methods of management have been proposed for PVNS in post TKR; Arthroscopic or Open Synovectomy, Radiotherapy and Combined therapy, TNF- α blockade therapy, and Joint reconstruction has been discussed in the literature^{1-8,12-18,20-23}. But our patient presented with recurrent PVNS Post TKR with tumor surrounding the posterior cruciate ligament. Hence for better results, tumor was excised and reconstructed with megaprosthesis, which has not been discussed in any literature, up to our knowledge.

Conclusion

Recurrent haemarthrosis after total knee replacement is fortunately rare. The clinician reviewing the patient who presents with this condition must be aware of its possibility otherwise there may be a delay to diagnosis with significant consequences. Expert help from

Haematologists, Vascular surgeons, Orthopaedic oncologist, Pathologist and Interventional radiologists is important to establish the diagnosis most appropriate method of managing this condition.

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