

Arthroscopic Management of Pigmented Villonodular Synovitis of the Knee Joint

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What to Learn from this Article?

Arthroscopic synovectomy can achieve good clinical outcome in cases of pigmented villonodular synovitis.

Abstract

Introduction: Pigmented Villonodular Synovitis (PVNS) of knee joint is a rare disorder of Synovium. Hip and knee joint are commonly affected joints. The knee PVNS presents as a localized or diffuse form. Diagnosis is often delayed and permanent joint damage occurs with advanced disease. Ultrasound examination shows fluid collection and synovial hypertrophy. Magnetic resonance imaging helps in clinching the diagnosis. Final confirmation of PVNS is done with histopathological examination of synovial tissue removed. Post operative radiation has shown to reduce the rate of recurrent disease.

Case Report: 25 years male presented to us with painless swelling of left knee joint of 3 months duration. Radiographs were normal. MRI showed synovial hypertrophy with changes suggestive of PVNS. We did arthroscopic six portal synovectomy. The patient regained his function and was asymptomatic at 2 year follow up.

Conclusion: We want to emphasize that early diagnosis and well done arthroscopic Synovectomy gives good clinical outcome with low recurrence rate. Radiotherapy should be reserved for recurrent disease.

Keywords: Pigmented Villonodular synovitis, arthroscopy, radiotherapy.

Introduction

Pigmented villonodular synovitis is an uncommon disease that remains a therapeutic challenge. Jaffe, Lichtenstein and Sutro first described the disease in 1941 [1]. P.V.N.S is a rare condition with incidence of 1:1 million. Very few cases have been reported in India. In the original description of the disease, the term "pigmented villonodular synovitis" [1] was applied to a lesion that occurred in the synovial membrane of joints and tendon sheaths and was characterized by fibrous stroma, hemosiderin deposition, histiocytic infiltrate and giant cells [2,3,4]. Subsequently, two

forms of the disease were identified: a localized subtype characterized by a pedunculated lesion and a subtype with diffuse joint involvement. Presenting complaints commonly involve one joint, most often the knee or hip. Symptoms of pain and swelling characteristically have an insidious onset and are slowly progressive.

The etiology of pigmented villonodular synovitis remains controversial [5,6]. The most widely held theory is that the disease is an inflammatory reaction of the synovium. However, some evidence exists that it is a benign neoplastic process. Now the

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Figure 1: Knee swelling.

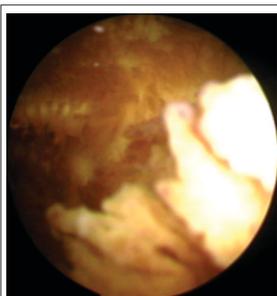


Figure 2: Arthroscopic picture showing orange colored hypertrophied synovium.

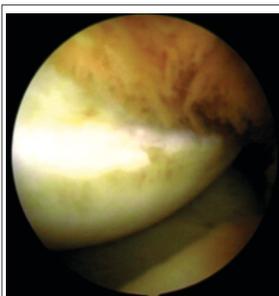


Figure 3: Arthroscopic picture showing orange colored hypertrophied Synovium.

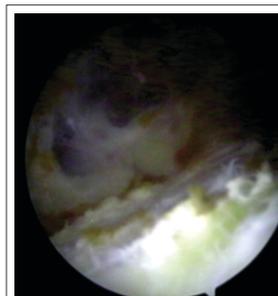


Figure 4: Arthroscopic picture after synovectomy.



Figure 5: Histopathologic slide showing pigmented Villonodular synovitis

localized form is suggested to be granulomatous hypertrophy of synovium and the diffuse form as benign neoplastic process [4]. High rate of recurrence were observed after synovectomy in patients with diffuse form of disease.

Case report

This case of P.V.N.S is reported for its rarity of incidence and a good result obtained with minimal open intervention.

A 25 yr old male presented with chronic painless swelling of left knee joint of three month duration, to our orthopedic department. He did not report any history of injury. There was no locking and giving away sensation. Clinically effusion and synovial thickening was noted. Skin was stretched but without any signs of inflammation. No dilated veins. No ligament laxity was observed. Plain radiograph was not showing any changes. M.R.I of knee joint showed effusion, low signal intensity on both T1 and T1 weighed images with diagnosis of hyperplastic synovium. These findings were suggestive of pigmented villonodular synovitis. Arthroscopy was done under spinal anaesthesia. Dark red colored fluid drained from the joint with introduction of arthroscopy canula. Synovium was hypertrophic with villi formation with characteristic orange color. Widespread affection of synovium noted. Cruciate ligaments were covered with Synovium but were intact. Femoral and tibial articular surfaces were normal. Arthroscopic synovectomy was done using four anterior and two posterior portals to ensure maximum removal of affected synovium. Supra patellar pouch was having maximum amount of hypertrophic Synovium. Haemostasis was achieved with electrocautery. Sterile compression dressing was applied to prevent haemarthrosis. The synovial tissue was sent for histopathological examination. Suture removal was done on day 12. Range motion exercises were started as pain decreased.

Histopathological examination showed a mononuclear stromal cell infiltrate in the synovial membrane. Hemosiderin-laden macrophages were observed giving the characteristic brown color. Additional cell populations included foam cells and multinucleated giant cells. These findings were consistent with diagnosis of PVNS. The patient returned to his job after 4 months. No recurrence was seen at the end of two years. The radiographs taken at 2 years showed no signs of degenerative changes.

Discussion

PVNS is still is a diagnostic and therapeutic challenge world over. Many joints may be involved but knee joint is the commonest.

PVNS of knee joint presents with pain, swelling of long duration. Usually no significant injury is reported. Average delay between complaints and diagnosis of PVNS was found to be 24 months. Total duration of symptoms in this case was 3 months.

Even with present day imaging modalities the diagnosis is often delayed [7, 8, 9]. Radiographs in early stages are usually negative.[3] Advances stages show bone erosions and changes of osteoarthritis. Extra articular involvement and bone erosions are seen in many cases on MRI in early cases. Ultrasound shows hypertrophic synovium and helps in differentiating solid and liquids. But it does not confirm the diagnosis of PVNS. MRI is helpful in making a diagnosis [10]. PVNS has low to intermediate signal intensity in all pulse sequences. The gradient-echo pulse sequences confirms the presence of hemosiderin, which is manifested by the presence of a prominent low signal-intensity “blooming” artefacts. It identifies the extent of synovial disease in patients with diffuse intra-articular involvement (PVNS), for demonstrating the relationship to the tendon sheath in PVNS, and for revealing its bursal involvement in PVNB. Definition of disease location and extension is important for diagnosis and for treatment planning

Knee and hip joints are most commonly involved but bursa, tendon sheath may be involved. Simultaneous occurrence of PVNS and synovial chondromatosis is reported in knee and temporomandibular joint [11,12]. PVNS is often diagnosed late. Cartilage destruction is noted in diffuse PVNS at the time diagnosis in many cases. Coutinho et al [8] found study they delay between the onset of symptoms and diagnosis of PVNS was 24 months.

Various treatment modalities were tried with recurrence rate of 25% at the end of 60 months. Recurrence is usually seen in first year but they can be seen as late as seventeen years after the initial treatment [13]. [Excision of involved synovium is the aim of treatment. Excision of synovium in patients with localized form has shown good results with no incidence of recurrence [14], whereas with diffuse form high rate of recurrence of disease is documented. For diffuse PVNS in knee joint open anterior synovectomy followed by second stage posterior open Synovectomy is recommended for ensuring complete removal of Synovium. Clen et al [15] did simultaneous anterior and posterior arthroscopic synovectomies with postoperative radiotherapy found the rates of residual or recurrent tumor and knee function recovery comparable to that with staged synovectomies reported in the literature. Well done

arthroscopic synovectomy gave equally good results as open synovectomy [16]. In this particular patient, a 36 month follow up showed no evidence of recurrence.

They also found that even though postoperative MRI was showing residual Synovium in 5 cases the recurrence rate was very low. Recurrence can be seen in cases where complete removal of diseased Synovium has not been achieved. In post operative period, some inflammatory tissue may be seen within the joint, this inflammation usually subsides on follow up studies. Recurrent disease usually has the same signal characteristics as the original process [10].

Zhongguo et al [16] in review of 97 cases of PVNS of knee also had similar results with arthroscopic synovectomies. Post operative radiotherapy is used in diffuse PVNS to prevent recurrence. The exact dose and type of radiation remain controversial. Zhongguo et al emphasized proper dosage of radiation to ensure low recurrence rate. Role of postoperative was further confirmed by Koca et al [17]. They used adjuvant yttrium-90 radiosynovectomy after operative Synovectomy. In review of 19 cases S Radha et al [18] selectively used radiotherapy with intraarticular Yttrium in cases with recurrent disease only. In this case due to unavailability of radiotherapy at our place we offered this patient arthroscopic synovectomy followed by radiotherapy

if recurrence occurs. Radiotherapy was not given in this case as no recurrence of knee swelling was noted in two years. We still need to follow this patient as recurrence may be noted many years after synovectomy [13].

Currently for knee diffuse PVNS arthroscopic simultaneous anterior and posterior synovectomies with post operative radiotherapy is recommended as treatment of choice. Joint replacement is reserved for advanced cases of joint destruction. At the time of joint replacement, care to be taken to remove synovium completely to avoid recurrence.

Conclusion

Arthroscopic synovectomy is the modality of treatment of PVNS of knee joint. In this particular patient we had good result without post operative radiotherapy. MRI is useful for diagnosis of recurrent disease and can be treated with radio synovectomy.

Clinical Message

Although rare, pigmented Villonodular synovitis must be kept as differential diagnosis of patients with chronic synovitis of knee. Imaging modalities helps us to confirm the diagnosis. Arthroscopic synovectomy with or without post operative radiotherapy is the treatment of choice.

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