Case Report

Diffuse-type giant cell tumor: Pigmented villonodular synovitis of patellar fat pad

ABSTRACT

Pigmented villonodular synovitis (PVNS) is a rare, relatively benign intra-articular lesion characterized by slowly progressing proliferation of the synovial tissue. It is most commonly observed in the knee joint. Localized and diffuse types are two types of PVNS depending on the synovial involvement. Arthroscopic and excisional resections are recommended as the treatment methods for the PVNS. Radiotherapy or chemotherapy can be adjuvant therapeutic options for the widespread masses. In this study, we presented a case of diffuse PVNS originating from the patellar fat pad.

KEY WORDS: Excision, patellar fat pad, pigmented villonodular synovitis, trauma

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INTRODUCTION

Pigmented villonodular synovitis (PVNS) is a rare, proliferative villous, nodular, or villonodular disease of the synovial tissue. It can originate from the synovia, tendon sheath, and bursa tissue of the joints. However, it rarely causes erosion of the surrounding tissues. Its prevalence is 1.8%/1 million, with 67% being observed in the knee joint, and the majority of cases are benign.[1]

It has two types as localized PVNS (LPVNS) and diffuse PVNS (DPVNS), depending on the width of the involved synovial tissue. Both can be intra-articular or extra-articular, and some cases may be seen in both regions.[2,3]

In this study, we present a trauma-induced DPVNS, originating from the infrapatellar fat pad.

CASE REPORT

A 27-year-old male presented to our outpatient clinic with pain and swelling around the left knee joint. His medical history revealed trauma 1 year prior to his complaints. Physical examination was remarkable, with a palpable cystic structure at the lateral border of the patellar tendon. It was painful and restricting his range of motion (ROM). The overlying skin was normal, with no signs of inflammation [Figure 1]. There was no abnormality found in hematologic and biochemical blood tests, and no relevant pathological findings were observed in conventional radiography. However, magnetic resonance imaging (MRI) revealed an approximately 33 mm × 19 mm contoured cystic lobule with a hypointensity in T1-weighted images [Figure 2].

Open surgery involving excisional resection was planned and performed. Longitudinal incision from anterolateral part of the patellar tendon was used to reach the cyst, and brown–yellow-colored mass was observed originating from the infrapatellar fat pad. The cyst was dissected from the surrounding tissues and sent for the histopathological examination [Figure 3]. No erosion of the joint cartilage, meniscus, or cruciate ligaments was detected.

In the histopathological evaluation, PVNS was diagnosed based on the observation of proliferated and hyperplastic synovial papillary projections and hemosiderin-loaded macrophages with foam cells [Figure 4].

Postoperative 1-month evaluation of the patient revealed a normal ROM. Moreover, there were no abnormal pathological findings at the 3rd-, 6th-, 12th-, and 24th-month follow-ups, postoperatively.

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Figure 1: Clinical image showing the swelling on lateral border of the patellar tendon

Figure 2: Magnetic resonance imaging: Sagittal section of the knee joint

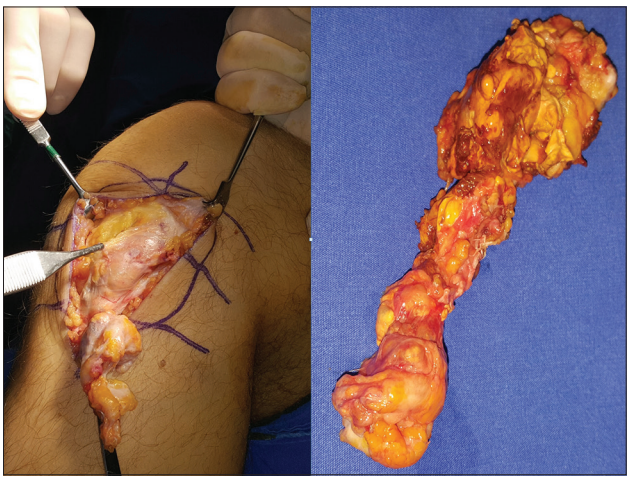

Figure 3: Peroperative photograph showing the appearance of the resected cyst

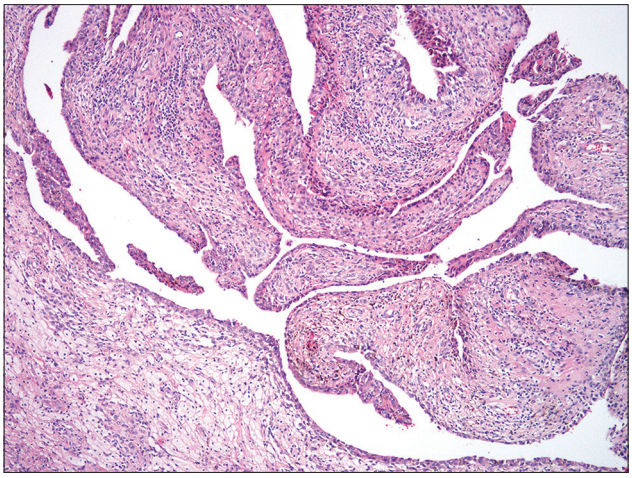

Figure 4: Microscopic evaluation of the cyst. Papillary projections of proliferating and hyperplastic synovia

DISCUSSION

PVNS was first defined by Chassaignac in 1852 as a nodular mass originating from the flexor tendon sheaths of the middle and index fingers. All types and subtypes of PVNS were defined by Jaffe in 1941.[4]

PVNS is most commonly observed in the 30–50-year age group and in large joints. Although the history of trauma is emphasized as the most common etiological factor, it is rare in the intra-articular localized type; hence, it is considered that the primary factor may be different.[4,5] Seventy-five percent of the cases were diagnosed in the knee joint and hip; ankle, shoulder, and elbow joints are the other common regions.[6-8] Despite the intercondylar area, tibial eminence, and peripatellar region are the most common regions of the cyst in the knee joint, it can be observed in the posterior compartment of the knee or in the patellar fat rarely.[9-11] The first case of PVNS originating from the patellar fat pad was reported by Palumbo *et al*. in 1994.[11]

The emergence of nonspecific symptoms such as swelling, pain, and limitation of ROM in its clinical presentation over a long period may delay accurate diagnosis. In particular, in the past 30 years, the number of identified cases has increased with the prevalent use of MRI and arthroscopic methods. In MRI, a low signal increase is detected with the increase in the levels of hemosiderin in the nodule, and a high signal increase is detected with the increase in the amount of fat in the nodule.[12]

These tumors are divided into two groups according to their localization and behavior. DPVNS is typically located in a joint but shows invasion toward the extra-articular soft tissues. Although the localized type has the same pattern histologically as DPVNS, it is smaller and well delineated. Moreover, it causes less damage to the surrounding soft tissue. High recurrence rates have been reported for LPVNS (0%–44%) and DPVNS (8%–56%), and residual pathological tissue retained during surgery is the most common cause of it.[13,14]

Synovial sarcoma, giant cell tumor, intra-articular loose body, amyloidosis, rheumatoid arthritis, and meniscus pathologies

should be considered in the differential diagnosis of the disease.[12]

Although arthroscopic resection is one of the treatment options, excisional resection must be performed for DPVNS particularly. Adjuvant chemotherapy and radiotherapy can be applied preoperatively for widespread cysts, in which complete surgical resection is impossible. In recent years, important results have been obtained for the reduction and regression of tumors with the use of imatinib, infliximab, and yttrium-90.[15,16]

In our case, excisional resection with open surgery was performed on DPVNS tissue that originated from the infrapatellar fat pad after trauma, and adjuvant chemotherapy was not applied. The recurrence was not encountered in our case during the postoperative 2-year follow-up.

In conclusion, PVNS is characterized by low malignancy and high recurrence rate with large joint involvement in the middle-aged group. The main objective of its treatment should be excision without leaving any residual pathological tissues. Adjuvant therapies are recommended for recurrent cases.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Patel KH, Gikas PD, Pollock RC, Carrington RW, Cannon SR, Skinner JA, *et al*. Pigmented villonodular synovitis of the knee: A retrospective analysis of 214 cases at a UK tertiary referral centre. Knee 2017;24:808-15.
2. Dwidmuthe S, Barick D, Rathi T. Arthroscopic management of pigmented villonodular synovitis of the knee joint. J Orthop Case Rep 2015;5:15-7.
3. Shekhar A, Patil SS, Dixit C, Tapasvi SR. Localized pigmented villonodular synovitis of posterior compartment of the knee. J Orthop Surg (Hong Kong) 2017;25:1-6.
4. Stephan SR, Shallop B, Lackman R, Kim TW, Mulcahey MK. Pigmented villonodular synovitis: A comprehensive review and proposed treatment algorithm. JBJS Rev 2016;4. pii: 01874474-201607000-00005.
5. Ogilvie-Harris DJ, McLean J, Zarnett ME. Pigmented villonodular synovitis of the knee. The results of total arthroscopic synovectomy, partial, arthroscopic synovectomy, and arthroscopic local excision. J Bone Joint Surg Am 1992;74:119-23.
6. Rydholm U. Pigmented villonodular synovitis. Acta Orthop Scand 1998;69:203-10.
7. Flandry F, Hughston JC, McCann SB, Kurtz DM. Diagnostic features of diffuse pigmented villonodular synovitis of the knee. Clin Orthop Relat Res 1994;298:212-20.
8. Fałek A, Niemunis-Sawicka J, Wrona K, Szczypiór G, Rzepecka-Wejs L, Cięszczyk K, *et al*. Pigmented villonodular synovitis. Folia Med Cracov 2018;58:93-104.
9. Muscolo DL, Makino A, Costa-Paz M, Ayerza MA. Localized pigmented villonodular synovitis of the posterior compartment of the knee: Diagnosis with magnetic resonance imaging. Arthroscopy 1995;11:482-5.
10. Lee BI, Yoo JE, Lee SH, Min KD. Localized pigmented villonodular synovitis of the knee: Arthroscopic treatment. Arthroscopy 1998;14:764-8.
11. Palumbo RC, Matthews LS, Reuben JM. Localized pigmented villonodular synovitis of the patellar fat pad: A report of two cases. Arthroscopy 1994;10:400-3.
12. Lang N, Yuan HS. Computed tomography and magnetic resonance manifestations of spinal pigmented villonodular synovitis. J Comput Assist Tomogr 2015;39:601-6.
13. Murphey MD, Rhee JH, Lewis RB, Fanburg-Smith JC, Flemming DJ, Walker EA. Pigmented villonodular synovitis: Radiologic-pathologic correlation. Radiographics 2008;28:1493-518.
14. Ottaviani S, Ayral X, Dougados M, Gossec L. Pigmented villonodular synovitis: A retrospective single-center study of 122 cases and review of the literature. Semin Arthritis Rheum 2011;40:539-46.
15. Kotwal PP, Gupta V, Malhotra R. Giant-cell tumour of the tendon sheath. Is radiotherapy indicated to prevent recurrence after surgery? J Bone Joint Surg Br 2000;82:571-3.
16. Shabat S, Kollender Y, Merimsky O, Isakov J, Flusser G, Nyska M, *et al*. The use of surgery and yttrium 90 in the management of extensive and diffuse pigmented villonodular synovitis of large joints. Rheumatology (Oxford) 2002;41:1113-8.