



## Case Report

# Arthroscopic surgical treatment of pigmented villonodular synovitis of the elbow: case report<sup>☆</sup>



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### ARTICLE INFO

#### Article history:

Received 22 August 2015

Accepted 23 September 2015

Available online 12 July 2016

#### Keywords:

Pigmented villonodular synovitis

Arthroscopy

Elbow

#### Palavras chave:

Sinovite vilonodular pigmentada

Artroscopia

Cotovelo

### ABSTRACT

This case concerns a male patient complaining of pain and discomfort in his right elbow, associated with decreased range of motion. Elbow radiography showed an osteolytic lesion in the metaphyseal region of the distal humerus and magnetic resonance imaging showed intra-articular tumor formation with swelling that suggested pigmented villonodular synovitis. Arthroscopic treatment was performed in order to obtain a synovial biopsy and then to carry out total synovectomy. Anatomopathological examination confirmed the diagnosis. The patient presented excellent progress through the physiotherapeutic rehabilitation proposed and continued to be asymptomatic 12 months after the operation.

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### Tratamento cirúrgico artroscópico de sinovite vilonodular pigmentada de cotovelo: relato de caso

### RESUMO

O caso diz respeito a um paciente do sexo masculino com queixa de dor e desconforto no cotovelo direito associados a diminuição da amplitude de movimento. Apresentava radiografia do cotovelo com lesão osteolítica da região metafisária do úmero distal e ressonância magnética que mostrava tumoração intra-articular com aumento de volume que sugeria sinovite vilonodular pigmentada. Foi feito tratamento artroscópico para biópsia sinovial e sinovectomia total. O estudo anatomopatológico confirmou o diagnóstico. O paciente apresentou ótima evolução com reabilitação fisioterápica proposta, até 12 meses de pós-operatório apresentava-se assintomático.

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<http://dx.doi.org/10.1016/j.rboe.2016.07.001>

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## Introduction

Pigmented villonodular synovitis (PVNS) is a rare lesion that appears as a proliferative process, affecting the synovial joints, tendon sheaths, and bursal membranes. In 1852, it was described by Chassaignac *apud* Byers et al.<sup>1</sup> at the flexor tendons of the middle and index fingers. It presents mainly as a single-joint form; it is more prevalent in the knee joint and has different prognoses.

Elbow involvement is uncommon, with 24 cases reported in the literature<sup>2,3</sup>; there is no consensus regarding treatment, which can be conservative, open or arthroscopic surgical synovectomy, and synovectomy by radiotherapy.<sup>2,4</sup>

Open synovectomy has been associated with risk of infection, suture dehiscence, and joint stiffness due to the difficulty of rehabilitation caused by pain or instability. The authors used a fully arthroscopic method for the diagnosis of elbow PVNS and treatment with synovectomy.

## Clinical case

Male patient, 43 years old, white, businessman, sought treatment for pain and movement limitation of the right elbow that had initiated six months prior. Clinical examination showed no deformities, 30° of extension and 120° of flexion (contralateral 0–140°), pain on palpation of the lateral epicondyle and olecranon, and a negative Cozen test. Valgus and varus maneuvers showed no ligament instability and a Tinel sign was negative for the ulnar nerve.

Radiographs (RX) were made on first presentation, followed by magnetic resonance imaging (MRI). RX in anteroposterior and lateral views (Fig. 1) indicated an osteolytic lesion of the distal metaphyseal region of the humerus. MRI showed

extensive tissue with hyposignal on the T1-weighted image and sharp hyposignal on the T2-weighted intra-articular image that increased after contrast injection (gadolinium). Marginal erosions in the radius, ulna, and humerus were observed, as well as elbow joint irregularity (Fig. 2).

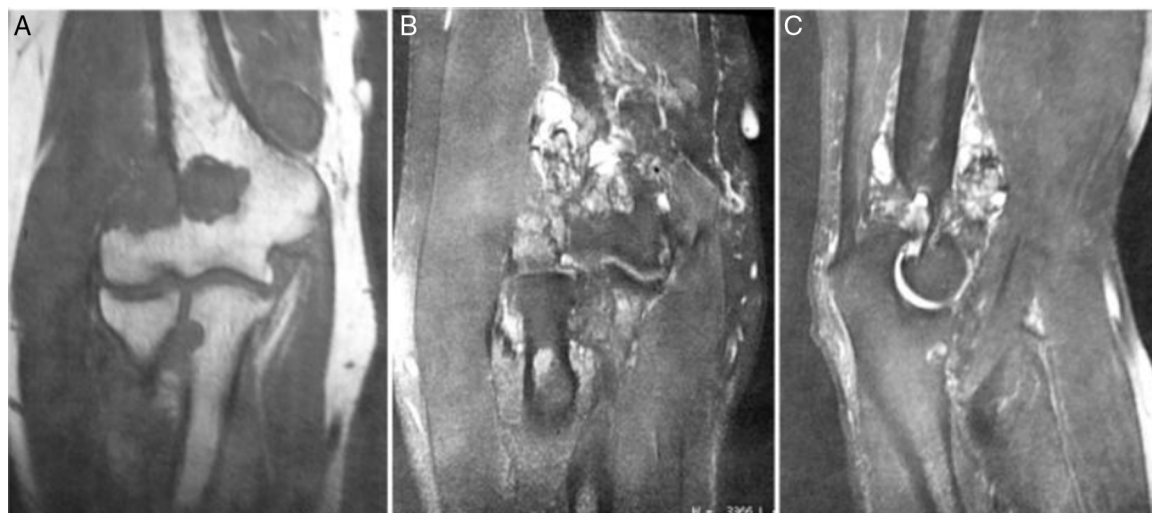
The characteristics of the images led to suspicion of PVNS. The video arthroscopic method was indicated for direct evaluation, fragment collection for analysis, and total synovectomy, in a single procedure.

Thus, the patient underwent right elbow arthroscopy. He was positioned in the prone position with the elbow supported and loosen for mobilization; the anteromedial, anterolateral, posterior, and posterolateral portals were used. The anterior and posterior compartments were assessed. The synovium had a nodular characteristic, with spongy texture and brownish-yellow color (Fig. 3); a free body was removed in the posterior compartment. Material for pathological analysis was harvested; a synovectomy and a capsulotomy were performed aiming gain of range of motion (Fig. 4). Then, skin suturing was performed with mononylon and dressing; immobilization was not used. The collected material was sent to histologic analysis, which confirmed the pre-established diagnosis of PVNS.

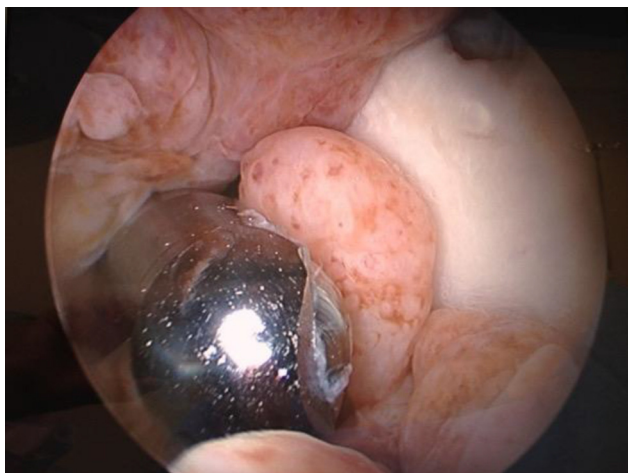
The post-operative rehabilitation was initiated in the first week, focusing on gain of passive range of motion.<sup>5</sup> Patient evolved with little pain, but showed local swelling that persisted for two weeks. Range of motion in the third postoperative day was 15° degrees of extension and evolved to 5° at the end of the sixth week postoperatively. In the twelfth week after surgery, the patient presented range of motion of 3° of extension and 140° of flexion; he was asymptomatic and performed his professional activities without deficits. An elbow MRI was performed 14 months postoperative, and presented no evidence of pathological synovial tissue neof ormation, suggesting lack of recurrence.



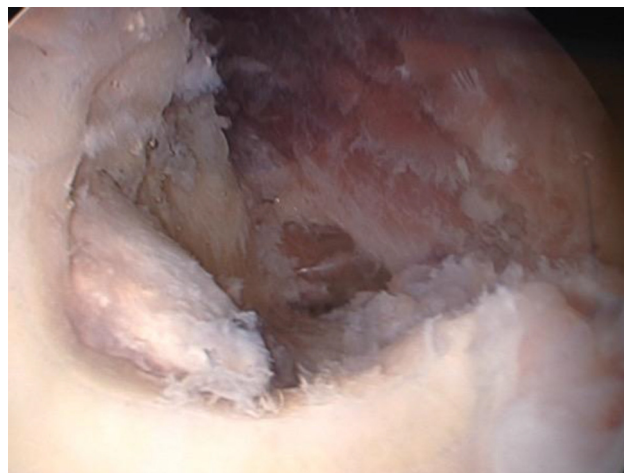
Fig. 1 – Elbow radiograph in anteroposterior and profile, with no alterations.



**Fig. 2 – Magnetic resonance imaging of the right elbow. (A) coronal plane in T1; (B) coronal plane in T2; and (C) sagittal plane in T2.**



**Fig. 3 – Arthroscopic image of the elbow showing villonodular synovitis aspect.**



**Fig. 4 – Arthroscopic image of the elbow after synovectomy. Presence of bone erosion in the metaphyseal region of the distal humerus.**

## Discussion

The origins of PVNS are still unclear. There are several theories that aim to explain it, including recurrent hemarthrosis, inflammatory response to an unknown agent, cancer, lipid metabolism disorder, or a response to repeated trauma. None have been proven or are undisputed.<sup>6</sup>

It can be divided into two major types: the diffuse form, which is monoarticular and affects the knee, hip, ankle, or rarely the elbow; and the localized form, which is restricted to the tendons of the fingers.<sup>4</sup>

Its incidence is 1.8 cases per 1,000,000, and affects primarily the knee. There are 24 cases described in the literature involving the elbow.<sup>2,3</sup>

Symptoms described are pain, swelling and joint effusion, decreased range of motion, and even palpable mass, depending on the extension and volume of synovitis. These signs and symptoms present a slow and progressive development.<sup>6,7</sup>

The treatment principle is based on the removal of pathological synovial tissue by total synovectomy, which may be surgical or through radiotherapy treatment. In more advanced cases with joint damage, arthroplasty or arthrodesis may be necessary.<sup>8</sup>

In studies of the knee joint that compared arthroscopic synovectomy with open technique for treating diffuse PVNS, the recurrence results are equivalent: 16.1% for arthroscopic synovectomy, 22.6% for open synovectomy, and 25% for combined synovectomy (arthroscopic and open).<sup>9</sup>

In the present case, according to the MRI, the patient had small joint alteration and its involvement was restricted to the intra-articular space. The authors opted for a completely arthroscopic synovectomy for diagnosis and treatment, not associated with radiotherapy methods.

The macroscopy examination is characterized by papillary synovial lining with numerous finger-like villous projections and synovial folds that fuse to form sessile and pedunculated

nodular masses. The color varies from brownish-red (secondary bleeding) to yellow-orange (secondary to the presence of lipids).<sup>7</sup> The definitive diagnosis is by histology, which features infiltrated polyhedral histiocytic cells, fibroblasts, giant cells, and macrophages filled with hemosiderin or lipids (foam cells). Hemosiderin is observed among cells, synovial lining cells, and histiocytes. Although PVNS is considered a benign inflammatory process, mitotic figures are easily found in proliferating fibroblasts, macrophages, and synovial lining cells.<sup>6,7</sup>

In conclusion, an extremely rare case of PVNS of the elbow was diagnosed and treated using a fully arthroscopic method. Total synovectomy and capsulotomy were performed; the patient progressed with favorable evolution, full range of motion, and without pain. A follow-up with MRI will be conducted every six months for local recurrence control.

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### Conflicts of interest

The authors declare no conflicts of interest.

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