Progress in the Diagnosis of Synovial Chondroma

PeiWen Sun

Logistics University of People's Armed Police Force, Tianjin, 300309

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Abstract: Synovial chondroma is a rare benign disease, which is formed by cartilage metaplasia, and is commonly seen in the knee joint. It usually presents intra-articular communication and sudden movement restriction. When diagnosing it, due to the predilection site and pathological structure, the usual combination of MRI and CT imaging is easily confused with other lesions, resulting in an increased false negative rate, usually after combining physical examination and synovial fluid examination. In terms of treatment, the traditional open surgical treatment has the characteristics of great trauma and prone to postoperative femoral head necrosis and long recovery time after surgery. Therefore, in recent years, it has been replaced by arthroscopy to significantly improve joint function and has less sequelae than traditional surgery. This article summarizes the research on the progress of diagnosis and treatment of synovial chondroma within five years, with a view to providing relevant help for the selection of future research directions.

1. Introduction

Synovial chondroma is a benign disease that is prone to occur in all joints. It mainly occurs in the knee and is prone to young men. Although it is a benign lesion, it is still prone to pain, which makes the patient's joints strangulated, and even osteonecrosis is likely to occur in the late stage. Therefore, it is necessary to make corresponding diagnosis and relevant treatment early in the early stage of the lesion. Imaging examination is difficult to find ossification free body under the meniscus, and fat tissue that is easy to be misdiagnosed under imaging examination, so it is easy to miss the diagnosis by imaging examination alone, and it is necessary to combine physical examination, synovial fluid examination and other laboratory examinations to make a diagnosis and reduce the false negative rate. In terms of treatment, due to the popularity of arthroscopy technology in recent years, it has the advantages of small trauma and good prognosis, which gradually replaces traditional open surgery. However, there are still some cases with poor prognosis that need to be improved on the surgical method.

2. Method

2.1 Data source

The author used a computer to search Pubmed and OVID documents for the past six years (2012-2018). The search terms were "Chondromatosis, Synovial", "Diagnosis", and "Imaging Diagnosis". The language was set to English, and 28 references were selected.

2.2 Inclusion and exclusion criteria:

Inclusion criteria:

1. The article has a novel viewpoint and a clear viewpoint. It is a clinical or basic article for the diagnosis and treatment progress of synovial chondroma.
2. Original article, clinical or basic article related to the diagnosis and treatment of synovial chondroma with reliable evidence.
3. The subject of literature is closely attached to the diagnosis and treatment of synovial chondroma
4. The literature provides guidance for the future diagnosis and treatment of synovial chondroma

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Exclusion criteria:

1. Research is repeatable
2. Not related to the diagnosis and treatment of synovial chondroma
3. The article argument has been replaced by a new institute

2.3 Literature quality assessment:

A total of 2897 English documents were retrieved by the computer. The keywords "Chondromatosis, Synovial" and "Diagnosis" were merged. "Imaging Diagnosis" was retrieved. A total of 453 articles were searched. "Chondromatosis, Synovial" and "therapy" were retrieved. 572 articles, other There are four articles, including a total of 35 articles in English. The main contents of the included articles include the research progress of synovial chondroma in diagnosis.

3. Diagnosis of synovial chondroma:

3.1 Overview

Under normal circumstances, the diagnosis of synovial chondroma is mainly based on clinical manifestations and imaging examination data. Synovial chondroma mostly occurs in 20-40 years old, with a male to female ratio of 2:1. The most common site is the knee joint, followed by hips, shoulders, and elbows. The clinical symptoms are joint pain (85%-100%), intra-articular effusion, joint mobility (38%-55%), joint capsule swelling (42%-58%), joint synovium, vesicle or tendon sheath Form benign nodular cartilage hyperplasia.

3.2 Imaging diagnosis

Mainly based on X-ray film, MRI, CT, X-ray tomography and other means to check and diagnose, through these imaging tools can be found in or around the joint round or oval nodules. In most cases, imaging examination can eliminate confusion and make a diagnosis. However, in some extremely special cases, such as synovial lesions of the knee, imaging cannot fully make a correct diagnosis. MRI is diagnosed as lipoma, but there is no fat infiltration in histopathological examination. If there is synovial chondroma under the meniscus, it is difficult to find the free ossification of the meniscus under imaging, and because the frequency of synovial chondroma under the meniscus is very low and there are few relevant data, the possibility of missed diagnosis is extremely high. At this time, some other diagnostic methods are needed for comprehensive diagnosis.

3.3 Physical examination

The diagnosis of all diseases is inseparable from physical examination. Physical examination is still a basic and indispensable examination. During routine physical examination, different sounds appear when the joint is moving, and the hard nodules are palpated around the joints. The hard nodules can move freely in the joint cavity. The diseased joints of synovial chondroma are palpated with swelling and tenderness.

3.3.1 Active and passive mobility of joints

Mainly detect the mobility of joints, let the patient perform flexion, extension, adduction, abduction, internal rotation, external rotation and other actions at the diseased joint, measure the joint mobility, diseased joint the degree of mobility is significantly different from that of non-diseased joints, and you will feel pain during passive flexion, extension, abduction, and adduction. A typical case: a 57-year-old right-handed female patient presents with uncalcified synovial chondroma at the left-hand pea triangle joint. Imaging diagnosis failed to detect calcified nodules. During physical examination, the patient's left wrist joint had a degree of flexion 50°, extension 50°, 5° ulnar deviation, 20° radial deviation, left wrist Pain occurs when the joint is passively moving. The normal right wrist joint mobility is 70° flexion, 80° extension, 20° ulnar deviation, and 30° radial deviation.

Joint mobility can also be used to evaluate the surgical effect and prognosis. An author studied the clinical manifestations and prognosis of hip synovial chondromatosis after arthroscopic surgery. The

inclusion criteria were established, and eventually 23 patients met the inclusion criteria. All patients have improved joint mobility.

Table 1. Synovial chondroma patients before and after surgery joint mobility comparison (unit degree)

	Flex	Abd	ADD	In Rotation	OUT rotation
Before surgery	108	44.6	20.6	23	38.5
After surgery	116	47	25	27.5	41.1

3.3.2 Functional scoring

There are also some scoring systems that will score according to the patient's function, such as: The Modified Harris Hip Score (mHHS), Short-Form 12 (SF-12), the Western Ontario and McMaster Osteoarthritis Index (WOMAC) And other scoring systems. mHHS and WOMAC are subjective scores, which include questions about pain, lameness, use support, walking distance, and functional activity. SF-12 is a general health score, including general health, daily activity restrictions, physical and emotional health issues, according to the score can understand the severity of the patient's condition, prognosis and recovery.

3.4 Pathological examination

The clinical manifestation of synovial chondroma lacks specificity. Imaging diagnosis can help to diagnose calcified free bodies, but the final diagnosis of synovial chondroma depends on the histopathology of typical synovial nodules in the synovium. diagnosis. Histopathological examination can reveal the metaplasia of synovial mesenchymal cells, which may even calcify or harden over time9. The calcified free body cartilage nodules are irregular, pearly white, different in shape, and 3-10mm in diameter. The nodules are porous hyaline cartilage, covered by thin fibrous layers or synovial lining cells formed without focal bone-like.

Based on histopathological examination, Milgram described three stages of synovial chondroma. According to his description, in the first stage, the synovial sac has not metabolized calcified free bodies, in the second stage, the synovial sac metabolized calcified free bodies, and in the third phase, the calcified free bodies have been completely metabolized. Wait. A recent research report on synovial chondroma indicated that the first stage of synovial chondroma occurred most frequently, accounting for 65%. Followed by the second stage of synovial chondroma, accounting for 25%. The third stage of synovial chondroma accounts for 10%. The stage of synovial chondroma has guiding significance in clinical treatment.

3.5 Synovial fluid analysis

Synovial fluid is secreted by the synovial membrane of the joint bursa and tendon sheath. It is an important secretion of human organs and plays an important role in the human body. By analyzing synovial fluid, we explore the important inflammatory mediators of synovial chondromatosis. Synovial fluid was collected from 10 patients with synovial chondromatosis of the temporomandibular joint. A controlled trial was conducted on 11 patients with asymptomatic temporomandibular joint. In synovial fluid samples, the proteoglycans, interleukins IL-2, IL-4, IL-5, IL-6, IL-8, IL-10, interferon (IFN), tumor necrosis factor (TNF) and vascular endothelial growth factor (VEGF)-A content, and the results of the two groups were compared. Histological and immunohistochemical examination of the affected TMJ tissue. Through the analysis of these indicators, the concentration of proteoglycan, IL-6 and vascular endothelial growth factor-A was significantly increased in people with synovial chondromatosis. Immunohistochemical analysis showed that synovial cells around bone nodules actively expressed VEGF-A. The increase in proteoglycan is due to the release of synovial cells that have differentiated into cartilage in the diseased joint. IL-6 and VEGF-A are thought to play an important role in the pathology of synovial chondromatosis.

3.6 Differential diagnosis of primary and secondary

Synovial chondroma has two kinds of primary and secondary. Primary synovial chondroma does not have obvious cartilage or synovial damage, usually a large amount of cartilage or osteochondral free bodies are formed in the joint cavity, while secondary synovial chondroma is caused by articular cartilage or osteophyte Separated from joint diseases, such as osteochondroitis, osteoarthritis and bone and cartilage fractures. Further diagnosis of primary and secondary synovial chondroma can be examined by histopathology. In primary synovial chondromatosis, the calcified free bodies are nodular, the chondrocytes are full, and the calcifications are irregular. The free bodies contain proliferating cell nuclear antigen positive chondrocytes. The calcified free bodies in secondary synovial chondromatosis showed uniform calcification around the chondrocytes and tissues. According to histopathological examination of calcified free bodies, primary and secondary synovial chondroma can be diagnosed

3.7 Differential diagnosis with other diseases

Synovial chondrosarcoma may worsen the lesion as synovial chondrosarcoma. Synovial chondrosarcoma appears in the joint cavity. The clinical manifestations and imaging findings of the two are very similar. It is difficult to find the difference between synovial chondroma and synovial chondrosarcoma with traditional diagnostic methods, and it is impossible to judge whether the synovial chondroma has deteriorated. The lesion is synovial chondrosarcoma. However, if histopathological examination is used, the difference between the two can be found, and synovial chondrosarcoma can find necrotic areas, which is also a sign of worsening lesions. On the contact surface of healthy bone and tumor, synovial chondroma begins to erode the bone, and synovial chondrosarcoma typically erodes from the bone marrow. The sooner the synovial chondrosarcoma is diagnosed, the more helpful it is for clinical treatment.

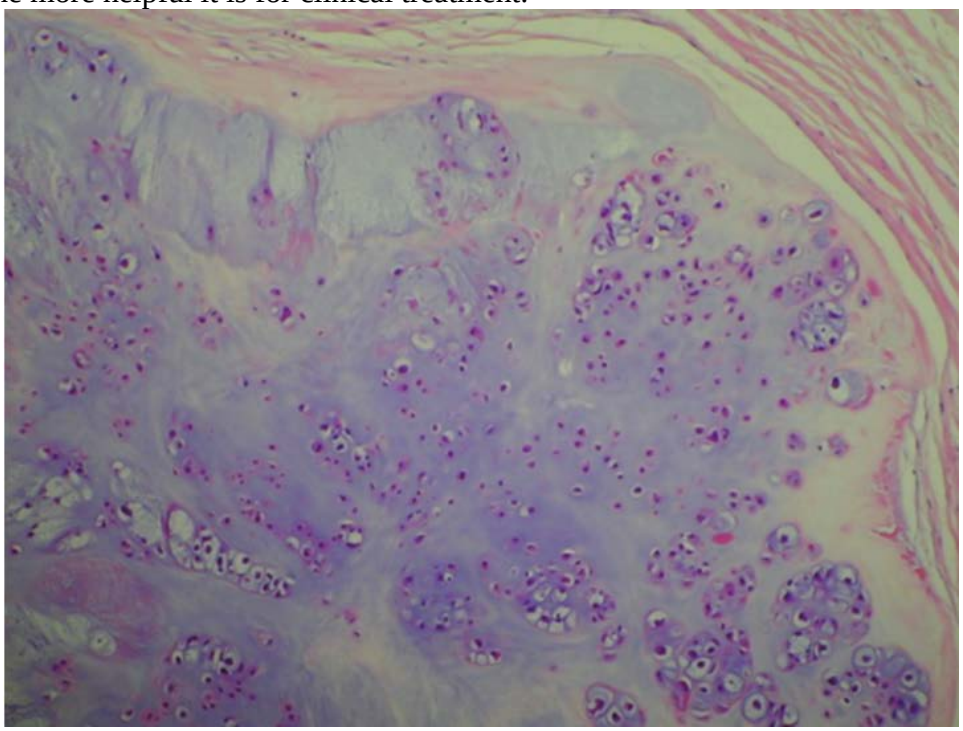

Fig 1 Benign nodules embedded in fibrous tissue are synovial chondroma

As mentioned above, imaging studies are of great benefit for the clinical diagnosis of synovial chondroma, but the final diagnosis must wait until the histological examination shows evidence that the synovium has cartilage metaplasia. In addition, physical examination, neurovascular examination, synovial fluid analysis, etc. can also play a role in the diagnosis of synovial chondromatosis. The inspection method is flexibly selected according to the specific conditions of the disease.

3.8 Treatment of synovial chondroma

In the treatment of synovial chondroma, surgery is the most effective way. According to the staging method of synovial chondroma disease proposed by Milgram16: the typical first stage of synovial chondromatosis is synovial hyperplasia, inflammation and swelling, and there is no obvious free body in the joint cavity. At this stage, pathological synovectomy is performed; second At this stage, the synovium continued to proliferate, the nodules in the synovium gradually fell off, and free bodies appeared in the joint cavity. At this stage, free body removal and diseased synovectomy were performed. In the third stage, the inflammation of the synovium disappeared, manifested as a large amount of joint cavity the free body. At this stage, free body dissection is performed. At present, the commonly used surgical methods are open surgery and arthroscopic surgery. These two surgical methods have their own advantages. They are suitable for different lesions according to the actual situation, and are sometimes used together.

4. Conclusion

For the diagnosis of synovial chondroma, it is mainly carried out through a combination of physical examination, laboratory examination and imaging examination, which improves the specificity, but there are still cases of missed diagnosis, and the accuracy of each examination index needs to be improved. For treatment, through different stages of synovial chondroma, different parts of the disease, and different pathological manifestations of the disease, traditional open surgery and arthroscopy or a combination of the two are used. Separate open surgery is mainly suitable for severe lesions. Large-scale resection, narrow joint gap around the depth of the lesion, resulting in inability to extend the arthroscopy.

In the future, it is necessary to propose specific examination indexes for synovial chondroma by improving the efficiency of diagnosis. The excellent prognosis of surgical treatment and minimally invasive are the research directions of such diseases.

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