Pigmented villonodular synovitis in temporomandibular joint is a rare condition that affects patients with pre-auricular painful nodule. The patient was a 52-year-old female suffering from progressive right pre-auricular pain and limitation in open mouth for 2 years. Physical examination revealed a palpable nodule in the right pre-auricular area. Computed tomography showed a peripherally enhancing nodular lesion adjacent to the neck of right mandibular condyle with bony erosion. Magnetic resonance imaging disclosed this nodular lesion slightly hyperintense on proton density-weighted images and hypointense mixed with some hyperintense regions and some foci of dark signal intensity on T2-weighted images. Peripheral enhancement on Gadolinium-enhanced T1-weighted images was also noted. Surgical excision was performed and pathology confirmed the diagnosis of pigmented villonodular synovitis. Even though pigmented villonodular synovitis in temporomandibular joint is a rare condition, it should be included in differential diagnoses for patients with pre-auricular painful nodule.
1.3 cm nodular lesion adjacent to the neck of the condylar process of right mandible. It was slightly hyperintense on proton density-weighted images (Fig. 2a), and hypointense mixed with some hyperintense regions and some foci of dark signal intensity on T2-weighted images (Fig. 2b). On Gadolinium-enhanced T1-weighted images, peripheral enhancement of this nodule was noted (Fig. 2c). The right TMJ disc was unremarkable. Sonographic-guided fine-needle aspiration was performed, and cytological examination disclosed negative finding. The patient was then admitted to our hospital and underwent surgical excision with arthroplasty of right TMJ. During operation multiple discrete nodules were found over the anterolateral area of the head of right mandibular condyle, near the lateral pterygoid muscle region with destruction of inferior and lateral area of condyle. The excised lesion was 1.5x1.5x0.8 cm in size. Grossly, the specimen consisted of multiple brownish tissue fragments. Histologically, this tumor arose from synovial membrane with nodular growth pattern and villous projections into joint space. At higher magnification, the tumor was composed of nesting synovial-like mononuclear cells and osteoclast-like giant cells surrounding well-differentiated chondroid islands (Fig. 3). Lace-like calcification was discerned within the chondroid islands. From the radiologic and histological features, the diagnosis of pigmented villonodular synovitis with chondroid metaplasia was rendered. The patient did well postoperatively and was then discharged 5 days later.

**DISCUSSION**

Pigmented villonodular synovitis (PVNS) is a benign proliferative disorder of synovium. PVNS in the TMJ is very rare. The first case was described by Lapayowker et al. in 1973 [4]. Only 39 cases have been reported in the English literature [5-12]. There was no sex predilection among these reported cases (Male: Female = 20:19), in contrast to a 2:1 predilection for females of PVNS in other joints [3]. The age of patients with PVNS in TMJ ranges from 10 to 70 years of age, with the peak incidence in the third and fourth decades, which is similar to PVNS in other joints [3].

Clinical features of PVNS in TMJ are usually pre-auricular swelling, parotid mass, or soft mass in the TMJ area [6]. On CT scan, the attenuation value of PVNS mass lesion are generally lower than that of muscles. However, it has also been noted that areas of PVNS may show high attenuation because of extensive iron deposition [13]. In addition, CT clearly depicts areas of bone erosion, cyst formation, and the extent of tumor [8]. On contrast-enhanced

![Figure 1.](image1a.png)  **Figure 1.**  
(a) Contrast-enhanced axial CT scan showed a lobulated nodular lesion with peripheral enhancement adjacent to the neck of the right mandibular condyle (arrow).  
(b) Bone window image of CT scan revealed bony scalloping erosion of anterolateral aspect of the neck of the right mandibular condyle (open arrow).
CT scan, peripheral enhancement, like our case, had been mentioned in two cases of previous studies [6, 9]. The appearance of PVNS in TMJ on MR images can be variable, depending on the relative proportion of the histologic composition [13]. The most characteristic finding is areas of low signal intensity on T2-weighted images corresponding to loculated cysts and joint fluid. In addition, the accumulation of lipid in foamy macrophages may produce areas of high signal intensity on T1-weighted images similar to subcutaneous fat. In our case, the areas of low signal intensity were not abundant, with only presence of some small foci of dark signal intensity on T2-weighted images. On Gadolinium-enhanced MR images, peripheral enhancement, like our case, was seen in three cases of previous studies [9, 13].

The differential diagnoses of PVNS in TMJ include synovial chondromatosis, chondroblastoma, synovial hemangioma and calcium pyrophosphate dihydrate deposition disease. Synovial chondromatosis is a benign condition in which there is a metaplastic synovial proliferation. On radiographic studies, multiple calcified loose bodies within the joint space are characteristic. However, plain films may not suffice in the diagnosis of TMJ synovial chondromatosis. CT and MR may be more helpful in demonstrating loose bodies and their positioning within the joint space [14]. On T2-weighted images, calcified loose bodies are usually low signal intensity and easily appreciated against the high fluid signal intensity. Some loose bodies may contain fatty marrow and are easily identified on T1-weighted images [15]. In fact, Oda et al. [5] described the possibility that PVNS is actually a reactive synovial lesion to the primary synovial chondroma-

Figure 2. a. Sagittal sections of proton density-weighted (TR/TE:1800/43.51 ms) images demonstrated a lobulated nodule with slightly high signal intensity, adjacent to the neck of condylar process of the right mandible (arrow). b. Sagittal sections of T2-weighted images (TR/TE:3216.66/110.23 ms) showed this nodule was heterogeneously hypointense mixed with some hyperintense regions and some foci of dark signal intensity (open arrow). c. Sagittal sections of Gadolinium-enhanced T1-weighted images (TR/TE:416.66/13.53 ms) showed peripheral enhancement of this lesion (open arrow).

Figure 3. Microscopic examination reveals the tumor is composed of nesting synovial-like mononuclear cells and osteoclast-like giant cells surrounding well-differentiated chondroid islands. (H&E, 400x)
tosis, and Pignatti et al. [16] considered that PVNS with chondroid metaplasia has the possibility of an intermediate form of PVNS associated with synovial chondromatosis. Chondroblastoma is a benign lesion, usually present in the epiphyses of long bones. Chondroblastoma of the TMJ region is rare. Radiographically, it presents as an osteolytic lesion. On CT scan, chondroblastoma typically appears as a high-density mass with mildly homogeneous enhancement and central, small, unenhanced areas. Calcifications may also be identified within the mass. The appearance of chondroblastoma on MRI is variable but is usually low-to-intermediate signal intensity on T1 and T2-weighted images. The cystic or fluid-filled areas may show areas of hyperintensity on T2-weighted images [17]. The histological features of chondroblastoma resembled those of PVNS with chondroid metaplasia, except the villous pattern of the latter [5]. Calcium pyrophosphate dihydrate deposition disease (CPPD) is a metabolic disease associated with peri-articular and intra-articular calcification, known as chondrocalcinosis. The name “tophaceous pseudogout” is given to masses with CPPD. It occasionally affects the TMJ. Patients with CPPD at TMJ may present with degenerative articular changes of the condyle and temporal bone. CT usually demonstrates a calcified mass involving the joint space with degenerative changes of the surrounding bones. On MR images, it usually shows intermediate signal intensity on T1-weighted images and low signal intensity on T2-weighted images. Postcontrast T1-weighted images demonstrate inhomogeneous enhancement of the articular mass, probably linked to a foreign body granulomatous inflammation due to periarticular crystal deposits [18]. Synovial hemangioma is a rare benign lesion that most commonly affects the knee joint. Phleboliths and fibrofatty septa in the mass are common findings. CT is effective for demonstrating phleboliths. On MRI, it isointense or slightly higher in signal intensity than surrounding muscles on T1-weighted images (related to variable amounts of adipose tissue in the lesion), and much brighter than subcutaneous fat on T2-weighted images and fat suppression sequences. After intravenous injection of gadolinium, there is evidence of enhancement. Phleboliths and fibrofatty septa usually show low-signal characteristics [3]. Only one case of synovial hemangioma at TMJ has been reported [19]. Reviewing our case, some small foci of dark signal intensity found on T2-weighted images could be considered as calcified bodies, phleboliths or hemosiderin deposition and had the possibility of synovial chondromatosis, CPPD, synovial hemangioma and PVNS. However, radiography and CT revealed no evidence of calcification, so synovial chondromatosis, CPPD and synovial hemangioma were less likely.

In conclusion, although PVNS in the TMJ is a rare disorder, it should be considered for patients with pre-auricular painful nodule. CT and MRI can help in diagnosis of this disease and define the extension of the lesion.

**REFERENCES**

1. Jaffe HL, Lichtenstein L, Sutro CJ. Pigmented villonodular synovitis, bursitis and tenosynovitis. Arch Pathol 1941; 31: 731-765
therapeutic embolization of a rare head and neck tumor. AJNR Am J Neuroradiol 1999; 20: 159-162
色素沉著絨毛結節性滑液膜炎於顳下頜關節：影像特徵及鑑別診斷

陳建宇 1 侯其禎 1 曾文盛 1 李健逢 2
奇美醫學中心 放射診斷科 1 病理科 2

色素沉著絨毛結節性滑液膜炎於顳下頜關節是一個少見的疾病。在英文文獻中只有 39 個病例。我們再提出一個此種病例。這是一位 52 歲女性，她從兩年前開始出現右耳前疼痛及張開嘴巴受限制的情形。理學檢查在右耳前摸到一個結節。電腦斷層發現一個周邊顯影的結節在右下頜髁突頸部並有骨頭腐蝕。核磁共振下，這個結節在質子密度加權影像呈現輕微高訊號，在 T2 加權影像呈現混合高低訊號及部分暗訊號病灶。在加顯影劑的 T1 加權影像呈現周邊顯影。經外科切除後，病理確認了色素沉著絨毛結節性滑液膜炎的診斷。雖然色素沉著絨毛結節性滑液膜炎於顳下頜關節是一個少見的情形，對於耳前疼痛性結節的病人仍應該將它列入鑑別診斷。