Ankylosis of the temporomandibular joint caused by rheumatoid arthritis: a pathological study and review

Rie Kobayashi, Tadahiko Utsunomiya§, HIrotsugu Yamamoto§ and Hideaki Nagura

Departments of Oral Surgery and §Pathology, Nihon University School of Dentistry at Matsudo, Chiba 271-8587

(Received 9 September 2000 and accepted 12 March 2001)

Abstract: Rheumatoid arthritis (RA) of the temporomandibular joint (TMJ) in a 59-year-old Japanese woman is reported, including details of clinical, histopathological and radiological findings. The patient had been diagnosed as having RA of the right knee joint 41 years previously, and suffered from arthralgia of the right TMJ. Radiological examination showed a radiopaque lesion of the mandibular head and mandibular fossa in the right TMJ and ankylosis of the right TMJ was diagnosed on the basis of the clinical and radiological findings. Condylotomy was performed. Pathological examination of material from the joint region revealed a marked increase of collagen fibers associated with slight capillary dilatation and hemorrhage. The final diagnosis was ankylosis of the right TMJ due to RA. The literature on TMJ ankylosis secondary to RA is reviewed and discussed. (J. Oral Sci. 43, 97-101, 2001)

Key words: rheumatoid arthritis; temporomandibular joint; ankylosis; radiology; pathology.

Introduction

Rheumatoid arthritis (RA) is a systemic disease of unknown etiology and is classified as one of the so-called collagen diseases (1). It is characterized by chronic and progressive inflammation of the joints with fibrinoid degeneration. Temporomandibular arthritis, however, is not particularly common despite the fact that it is a polyarticular disease. We encountered a rare case of ankylosis of the temporomandibular joint (TMJ) due to RA. To understand the characteristics of the present case, we studied and discussed its clinical, radiological, and pathological features including the review of the literatures.

Case report

A 59-year-old woman was referred to Nihon University Dental Hospital at Matsudo on April 13, 1988, with a chief complaint of restricted mandibular opening. The maximal inter-incisal mouth opening distance was 22 mm at her first visit. Laboratory examination showed a slightly increased erythrocyte sedimentation ratio in the peripheral blood, and rheumatoid arthritis factor was positive upon serological examination. There was no contributory family history, but the patient had been diagnosed as having rheumatoid arthritis of the right knee joint in 1947, and had been physically treated for the disease. Three years later, she had noticed restricted mouth opening. Since she had little pain in the TMJs, she had not sought any therapy. In 1987, she had developed severe arthralgia in the right TMJ. She was admitted to our hospital to undergo condylectomy of the right TMJ, after a clinical and radiological diagnosis of ankylosis on February 19, 1988. However, as an electrocardiographic examination had revealed severe extrasystole, the operation was not carried out. The patient was discharged from our hospital on February 22, and readmitted for surgical treatment on March 28, 1988. Rotational panoramic radiography and posteroanterior projection showed a diffuse radiopaque lesion of the mandibular head and mandibular fossa of the right TMJ. In contrast, the left TMJ revealed no remarkable change. The axial and transorbital images revealed the radiopaque lesion more clearly than rotational panoramic radiography and posteroanterior projection (Fig. 1a-c), and suggested that the joint space had partly disappeared. Bone destruction and deformity of the right TMJ were

Correspondence to Dr. Rie Kobayashi, Department of Oral Surgery, Nihon University School of Dentistry at Matsudo, 2-870-1, Sakaecho-Nishi, Matsudo, Chiba 271-8587, Japan
Tel: +81 473609397 Fax: +81 473609398
therefore suspected (Fig. 2), and a tentative diagnosis of ankylosis of the right TMJ was made. Under general anesthesia, right condylectomy was performed, followed by placement of freeze-dried cranio dura mater on March 31, 1988, with a resulting improvement of the mandibular opening to 35 mm. Mouth opening training with a mouth gag was started 3 weeks after the operation, and this increased the opening to 39 mm. The patient was discharged from the hospital on 33rd day from the operation, and has been followed in our oral surgery clinic at routine intervals.

Results
Pathological findings
The extirpated specimen was fixed in 10% neutral formalin, and decalcified with 10% formic acid formalin. The tissue was then embedded in paraffin, and sectioned at a thickness of 4 μm. The serial sections were stained with hematoxylin-eosin (H-E) and azan-Mallory.

Macroscopically, the several pieces that comprised the specimen were small bean to large bean-sized, and contained grayish-yellow connective tissue with a bony hard mass.

Microscopically, marked fibrosis and degenerative cartilage were observed. The fibrosis showed slight capillary growth and dilatation, and the cartilage was connected to existing bone tissue. The bone marrow was composed mainly of fatty marrow with partial fibrous change (Fig. 3). Marked fibrosis stained with aniline blue was seen in the mandibular head (Fig. 4).

Discussion
Rheumatoid arthritis is a systemic inflammatory connective tissue disease. The etiology of RA has been considered to be multifactorial, involving genetic factors, abnormal immunoreaction, the endocrine system (sex
hormone), and environmental factors (infectious agents such as bacteria and viruses) (2). The general features of RA include 1) a female predominance, 2) a peak in patients 30-40 years old, 3) polyarthritis, 4) progressive change, 5) fatigue and subcutaneous nodules, 6) positivity for RA factor in the serum and 7) bone destruction demonstrated by radiography. Clinically, the onset of RA is usually insidious, with gradual progressive development of joint pain and swelling with pronounced morning stiffness. The symptoms become gradually worse, and extra-articular features also appear. RA has a variety of extra-articular features such as vasculitis, anemia, and nodules without articular features (3). However, RA is mainly represented by the articular features. Affected joints are tender on palpation, painful on movement, and swollen (3). Usually, small peripheral joints of the hands and feet are affected first, but any joint of the body may be involved in the early stage. In the late stage, secondary osteoarthritis and ankylosis may develop (3). The symptoms of arthritis occur frequently. The hand and phalangeal joints, such as the proximal interphalangeal and metacarpophalangeal joints, are affected most often, followed by the elbow, metatarsophalangeal and knee joints (3). The TMJ is affected relatively rarely in contrast with the other joints. However, it is said that the appearance of TMJ symptoms is recognized more than ten years after initial disease onset (4,5). Clinical and radiological examinations show involvement of the TMJ in about 70% of RA patients (1, 6-8). According to Ogus et al., when the duration of general disease was more than 5 years, TMJ symptoms were evident in 86 percent of patients with RA (9). In the present case, the etiology was not clear, but previous microbiological infection was denied. The feature of the disease in this patient conformed to those of RA described above. The progress of RA had occurred over a long period, and the symptoms of the right knee joint had been chronic. She had noticed restriction of mouth opening 3 years after initial diagnosis of RA, but had not sought treatment for more than 30 years because there had been no arthralgia of the TMJ.

Radiological examination is a useful and important tool for diagnosis and assessment of TMJ disease. The radiographic features of joint changes are significantly related to the disease duration. The mandibular head may reveal flattening, erosion and obliteration, and gradually the joint space may become narrow due to granulation. The diagnostic imaging techniques used for RA include extraoral radiography (contrast radiography of the joint), CT, MRI, arthrography and arthrotomography (10). In the present case, we used only plain radiography, and this clearly revealed articular destructive change. The severity of the radiographic changes is graded according to the Larsen’s classification into six grades (0-V): 0: Normal, I: Slight abnormality, joint space is slightly narrow, II: Early abnormality, joint space is narrow, with erosion (+), III: Moderate destruction, joint space is narrow and eroded (+), IV: Severe destruction, joint space is narrow, with erosion (+) and bone deformity (+), V: Mutilating abnormality, disappearance joint space, with erosion (destruction) and bone deformity (++)(7,11). The present case corresponded to grade V, since there was partial disappearance of the joint space, joint destruction and bone deformity.

Generally, the pathological findings in the TMJ affected by RA are initially slight, and progress chronically. In the early stage, synovial hyperemia, lymphocyte infiltration, fibrinoid degeneration, and pannus formation are seen
The articular cartilage may be destroyed, and reactive and regenerative granulation tissue can be seen in the articular cavity. There may be fibrosis and cicatization, and fibrous adhesion may be present. In the late stage, fibrous ankylosis is observed (3). In the present case, pathological examination revealed thickened fibrous tissue ankylosis, corresponding to the late stage of RA. In general, ankylosis of the joint can be intra-articular or extra-articular. It can also be complete or partial, and fibrous or bony from pathological view points (13). The present case corresponded to intra-articular, partial and fibrous ankylosis.

TMJ ankylosis secondary to RA is generally found in the late stage of the disease, but it is a rare finding and has not been well documented (14-19) (Table 1). Previous cases, listed in table 1, included two cases of juvenile rheumatoid arthritis, but the other patients were in their sixth to seventh decades. The average age of patients with TMJ ankylosis secondary RA was higher than the average age at which RA is diagnosed. Previous studies have suggested that ankylosis of the TMJ might occur when the TMJ is affected by RA during childhood (16), and that TMJ ankylosis is unusual in cases of adult RA (5). The present patient had no medical history of RA in childhood. The etiology of ankylosis is said to include trauma, birth injury, infection or RA (8). It is widely known that RA patients suffer TMJ symptoms, although it is rare for such symptoms to include TMJ ankylosis (8). According to Ogus, TMJ ankylosis due to RA often occurs in the late stage, because RA is often diagnosed and treated at an early stage (9). In the present case, the patient sought treatment for restriction of mouth opening 41 years after being diagnosed as having RA in the right knee joint. It is considered that the condyle showed fibrous adhesion to the mandibular fossa because the TMJ had had little movement with only weak jaw opening for a long period.

Many RA patients with TMJ involvement can be treated effectively by medication, heat, rest, and physiotherapy (15). In general, for treatment of TMJ ankylosis, mobilization of the TMJ is performed. Surgical treatment for ankylosis can be done by condylectomy, osteoarthrotomy or arthroplasty (14). In this case, we selected condylectomy, and this restored satisfactory masticatory function.

References

Table 1 Reported cases of TMJ ankylosis secondary to RA

<table>
<thead>
<tr>
<th>Authors</th>
<th>Reported year</th>
<th>number</th>
<th>Age(Years)</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seymour et al.(17)</td>
<td>1975</td>
<td>1</td>
<td>16</td>
<td>M</td>
</tr>
<tr>
<td>Sanders et al.(18)</td>
<td>1979</td>
<td>1</td>
<td>15</td>
<td>M</td>
</tr>
<tr>
<td>Fujisaki et al.(15)</td>
<td>1983</td>
<td>1</td>
<td>52</td>
<td>F</td>
</tr>
<tr>
<td>Lurie et al.(16)</td>
<td>1988</td>
<td>1</td>
<td>55</td>
<td>F</td>
</tr>
<tr>
<td>Smith et al.(19)</td>
<td>1992</td>
<td>1</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Larheim et al.(20)</td>
<td>1992</td>
<td>5</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Inamura et al.(14)</td>
<td>1993</td>
<td>1</td>
<td>64</td>
<td>F</td>
</tr>
<tr>
<td>Present case</td>
<td>1988</td>
<td>1</td>
<td>59</td>
<td>M</td>
</tr>
</tbody>
</table>


