Perioperative management of patient with late rheumatoid arthritis and post-bone tuberculosis with genu contracture undergoing tenotomy

Asri Insanur Rahma¹, Awalia Awalia¹*  

ABSTRACT

Background: Rheumatoid arthritis (RA) is an autoimmune and inflammatory disease that potentially attacks all parts of the human body. Despite the use of disease-modifying anti-rheumatic drugs (DMARDs), the rate of total knee arthroplasty (TKA) remains high. Critical complications such as infection, dislocation, and readmission following TKA are also reportedly high and therefore, appropriate management during perioperative period is critical. We reported the perioperative management of a patient with late RA and genu contracture underwent tenotomy.

Case Presentation: A 22-year-old male was referred to Dr. Soetomo General Hospital with a chief complaint of pain in the right and left groin. He also complained of immobilization and stiffness in both knees. He had been diagnosed with bone tuberculosis in 2014 and underwent a total knee replacement of both knees in 2015 due to stiffness and inability to walk. Radiography examination indicated erosion and loss of joint spaces in the joints of the hip, fingers, and toes. Laboratory investigation showed positive anti-mutated citrullinated vimentin (anti-MCV), confirming RA. The patient underwent tenotomy surgery and was treated with methylprednisolone 4 mg peroral daily, chloroquine 250 mg peroral daily, and natrium diclofenac peroral to reduce pain. Tenotomy was performed. Considering the disease activity, conventional DMARDs (chloroquine 250 mg peroral and low dose steroid, methylprednisolone 1x4mg peroral) were prescribed.

Conclusion: The case highlights the complexity of perioperative management of late RA and genu contracture underwent tenotomy that required multiple disciplines. Therefore, interdisciplinary collaborative team is critical to be able to achieve optimal results of the patient.

Keywords: Perioperative management, rheumatoid arthritis, genu contracture, tenotomy.


INTRODUCTION

Rheumatoid arthritis (RA) is an autoimmune disease whose etiology remains unknown. Symmetrical erosive synovitis is a common feature of the disease, sometimes also accompanied by extraarticular tissue involvement. Painful and swollen joints, which can severely impair physical function and quality of life, are other characteristics of RA. Compared to the general population, patients with RA are at greater risk for serious infection, respiratory diseases, osteoporosis, cardiovascular diseases, cancer, and mortality. Therefore, long-term treatment and control are required. RA affects up to 1% of the global population with an estimated annual incidence of 12.0–54.0 per 100,000 population depend on gender. RA includes polyarticular inflammatory arthritis of the small joints such as on hands and feet, morning stiffness, and positive for rheumatoid factor (RF) and anti-citrullinated protein antibody (ACPA). Diagnosis of RA should be performed early, along with the initiation of disease-modifying anti-rheumatic drug (DMARD) therapy. Early diagnosis and initiation of appropriate therapy could help reduce the severity of disease and its late sequelae. RA treatment is based on the disease activity and methotrexate is often utilized as initial DMARD and is widely considered the cornerstone of RA therapy for most patients. In addition, combinations of DMARDs with other biological agents sometime required to achieve the target of disease activity.

The use of DMARD and biological agents has improved the patient quality of life, but the incidence of total knee arthroplasty (TKA) remains high. In addition, complications such as infection, dislocation, and readmission following TKA are reportedly high. This underlines the importance of appropriate management during the perioperative period of patients with RA. This case discusses the perioperative management of a patient with late RA and genu contracture undergoing tenotomy.

CASE PRESENTATION

A 22-year-old, single, and employed male was referred to Dr. Soetomo General
Hospital with a chief complaint of pain in the right and left groin starting a year ago. The patient also complained of immobilization since the middle of 2018, pain in both knees and ankles since 2015, and difficulty of walking (Figure 1A and B). Other complaints included intermittent fever and pain in the joints of fingers and toes. The little finger of the right hand as well as the second and the third toes of the right foot could not be straightened since the last six months prior to the hospital admission (Figure 1C). Stiffness in the finger joints of the right hand also complained (Figure 1D and E). There was a decrease in appetite and weight loss (10 kg) in the past year. No complaints of nausea and vomiting. There was no headache, blurry vision, oral ulcer, hair loss, and swollen joints. Long history of cough and night sweats was denied.

In 2014, the patient experienced pain in both knees and ankles and was diagnosed with bone tuberculosis, for which he was treated with tuberculosis medicine for a year. In 2015, the patient underwent a total knee replacement of both knees due to stiffness and inability to walk. No other family members were reported to experience these conditions.

Physical examination indicated general weakness and Glasgow Coma Scale (GCS) compost mentis. Blood pressure was 120/70 mmHg, heart rate 99x/minute, respiratory rate 22x/minute, and temperature 37°C. Anemic conjunctiva was found. Limited range of movement (ROM) was observed when the mouth was open. There were non-jaundice sclera, no cyanotic lips, and no oral ulcer in the oral cavity. No malar rash was found on the face and no discoid lesions in the ear or alopecia. No enlargement of lymph nodes. Increased jugular venous pressure (JVP) was not detected. The result of chest examination was within normal limits and symmetrical. Lungs movement was symmetrical. Sonor sound was obtained in percussion and vesicular breath sounds were heard during auscultation. No cracking and wheezing were heard. The chest x-ray showed large cast and normal shape (lungs looked normal) (Figure 1F). Cardiac examination revealed cords in the intercostal space (ICS) V mid clavicular line sinistra. Auscultation of a single heart sound found no murmurs, gallops, or extrasystole. Abdominal examination showed normal bowel sounds and no dullness shifting. Liver and lien are not palpable.

Examination of the upper and lower extremities showed a warm dry red acral. No edema was found in both of the lower limbs. Both knees bent, were stiff and difficult to straighten. Limited ROM of both shoulders (extension and endorotation) and both wrists (flexion and extension) were observed. Squeeze test was negative and muscle hypotrophy was found. Initial laboratory examination showed high level of erythrocyte sedimentation rate (ESR) (43 mm/hour), normal liver function, and non-reactive for hepatitis B surface antigen (HbsAg) (Table 1). Radiography examination indicated erosion and loss of joint spaces in the joint of hip, fingers, and toes (Figure 2A-D).

The patient was then transferred from the Department of Orthopedic to the Department of Internal Medicine with diagnosis of flexion contracture genu dextra et sinistra with post-total knee replacement bilateral. The patient received diclofenac for pain reduction. Based on anamnesis, physical examination, laboratory, and radiographic findings, the patient was initially diagnosed with prolonged immobilization with flexion contracture genu bilateral ec autoimmune disease with suspected rheumatoid arthritis with post total knee replacement bilateral. The patient was then suggested to take anti-mutated citrullinated vimentin (anti-MCV) test to check for rheumatoid factor.

On the 3rd day of the admission, the patient complained of pain in groin, immobilization, and stiffness in both knees with a pain visual analog scale (VAS) score of 3. Head and neck examination showed limited ROM when the mouth was open. Extremities examination indicated limited ROM of both shoulders (extension and
endorotation) and both wrists (flexion and extension). Squeeze test was negative and muscle hypotrophy was found. Laboratory examination showed positive rheumatoid factor (positive anti-MCV). After consultation with Rheumatology Division, the patient was diagnosed with late RA with post-total knee arthroplasty bilateral with flexion contracture of genu bilateral and prolonged immobilization. The patient was treated with methylprednisolone 1x4 mg peroral and chloroquine 1x250 mg peroral. Further consultation in medical rehabilitation department leaded to the diagnosis of prolonged immobilization with contracture right upper and lower extremities dextra ec rheumatoid arthritis and post total knee arthroplasty bilateral. Several therapies were suggested including icing in the painful tender-joint area (could be repeated after 15-20 minutes), mobilization to sitting, breathing exercise (active-diaphragm exercise), ROM exercise according to tolerance, hip-strengthening exercise, core-strengthening exercises (supine abdominal draw in and abdominal draw in with double knee to chert).

On the 7th day of the admission, the patient still complained of, but less frequently, pain in groin, immobilization, stiffness in both knees (VAS score 3). Limited ROM when mouth was open and limited ROM of both shoulders (extension and endorotation) and both wrists (flexion and extension) were still observed. Laboratory still indicated high ESR (37 mm/hour) (Table 1). The patient was planned for tenotomy surgery and the treatment with methylprednisolone 4 mg and chloroquine 250 mg peroral daily was continued.

The patient underwent tenotomy surgery on the 16th day of admission. Physical examination showed blood pressure of 130/80mmHg, heart rate 92x/minute, and respiratory rate 18x/minute. Limited ROM when mouth was open and limited ROM of both shoulders (extension and endorotation) and both wrists (flexion and extension) were still noted. Squeeze test was negative and there was muscle hypotrophy. ROM of lower limb could not yet be evaluated.

Some progressions were observed on day 25th that the patient no longer complained of pain in groin and both knees, and could walk with assistance. In addition, stiffness in both knees also showed improvement. Blood pressure was 120/80mmHg, heart rate 89x/minute, and respiratory rate 18x/minute. However, there was still limited ROM when mouth was open and limited ROM of both shoulders (extension and endo-rotation) and both wrists (flexion and extension). Squeeze test and muscles hypotrophy still showed the same results. ROM of the lower limb showed progression after the surgery. A decreased ESR value was noted (Table 1). The patient was scheduled for discharge the next day and was planned to undergo outpatient control. The patient was prescribed with methylprednisolone 1x4 mg peroral daily, chloroquine 1x250 mg peroral daily, and natrium diclofenac 2x50 mg peroral to reduce pain.

**DISCUSSION**

RA is a systemic inflammatory disease characterized by inflammatory reactions and activation of the synovial lining tissue and associated structures. The peak age of onset occurs between the ages of 45

<table>
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<tr>
<th>Lab parameters</th>
<th>Initial test</th>
<th>Day 7th</th>
<th>Day 25th</th>
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<tbody>
<tr>
<td>Hemoglobin</td>
<td>16.7 g/dL</td>
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<td>13.7 g/dL</td>
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<td>Hematocrit</td>
<td>28.1%</td>
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<td>9170/μL</td>
<td>8240/μL</td>
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<td>Granulocytes</td>
<td>45.6%</td>
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<td>Lymphocytes</td>
<td>45.4%</td>
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<td>97.2 fl</td>
<td>99.2 fl</td>
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<td>Mean corpuscular hemoglobin concentration (MCHC)</td>
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<td>35.5g / dL</td>
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<td>Platelets</td>
<td>438,000/μL</td>
<td>328,000/μL</td>
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<td>Erythrocyte sedimentation rate (ESR)</td>
<td>43mm/hour</td>
<td>37 mm/hour</td>
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<td>Glucose</td>
<td>86 mg/dL</td>
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<td>Blood urea nitrogen (BUN)</td>
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<td>SK</td>
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<td>Serum glutamic oxaloacetic transaminase (SGOT)</td>
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<td>Serum glutamic pyruvic transaminase (SGPT)</td>
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<td>Albumin</td>
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<td>Partial thromboplastin time (PPT)</td>
<td>9.2 seconds</td>
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<tr>
<td>Activated partial thromboplastin time (APTT)</td>
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<td>Sodium</td>
<td>141 mmol/L</td>
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<td>Potassium</td>
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<td>Chloride</td>
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<tr>
<td>HBsAg</td>
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<tr>
<td>Anti-mutated citrullinated vimentin (MCV)</td>
<td>Positive</td>
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</table>
and 65 years. The etiology of RA remains unknown, but seems to be multifactorial. According to ACR guidelines, RA is divided into early RA (duration of disease < 6 months) and late RA (≥ 6 months). Our case was unique since the patient still very young who had late RA.

Symmetrical pain and swelling of polyarthritis (in particular of the hands, wrists, feet, and knees) are the most prominent feature, although other joints may be affected. Sometimes RA can start at the knee such as chronic monoarticular synovitis, but sooner or later other joints will be affected. In our case, the patient experienced severe pain in both knees and a limited range of movement, based on which was diagnosed with bone tuberculosis and received TB medicine for a year. A few months later, the patient complained of pain and stiffness in both knees. A total knee replacement was then performed on both knees after a further examination. The patient then complained of pain in the joints of both fingers and toes. Both knees stiffened and were difficult to move. Six months before admission, the little finger of the right hand could not be straightened, and so did the second and third toes of the right foot. The patient was suspected of RA and the disease was confirmed upon further examination at Dr. Soetomo General Hospital.

Early diagnosis of RA is critical to prevent possible irreversible joint damage. The American College of Rheumatology (ACR) and the European League Against Rheumatism 2010 developed classification criteria for RA to identify patients with early disease on a scale of 0-10. These criteria include joint (large and small) involvement, sera RF or anti-cyclic citrullinated peptide (ACPA) positivity, symptom duration ≥ 6 weeks, and abnormal C-reactive protein (CRP) or ESR. ARC score ≥ 6 is considered a confirmed RA. In the present case, the patient's ESR value was high (43 mm/hour) and RF (anti-MCV) was positive. Anti-MCV is sensitive to diagnosis of RA but it is less specific than anti-cyclic citrullinated peptide (anti-CCP) in RA. The total score of ACR classification criteria of the patient was 7, indicating confirmed RA.

In addition, radiographic findings also serve as important for classification criteria of RA. It provided information on bone and cartilage damages and can be used to follow the progression of structural damage. In our present case, the radiography examination showed erosion in both knees, finger joints, both hips, and loss of joint spaces (Figure 2B-D). Furthermore, using Larsen scoring to determine radiographic staging of RA, the patient was found to suffer from moderate severity of RA (score 2). Some radiographic changes were detected in the patient, including joint space narrowing and erosion. The Larsen is used to score the radiographic progression of based on the erosive destruction and cartilage loss of the individual joint where the score for each joint is 1-5.

Treatment guidelines recommend a treat-to-target of low disease activity or remission based on a validated disease activity measure. In this case, the Simplified Disease Activity Index (SDAI) was used to determine the disease activity in the patient and the result showed moderate severity of RA. SDAI is one of the disease activity measurement tools recommended by ACR to determine RA disease activity. SDAI is utilized more frequently than DAS28 since it is easier to apply and more stringent if remission occurs.

RA management depends on the disease's phase and response to treatment. Initial treatment focuses on symptom control with analgesics and physical therapy, and disease control with DMARD as monotherapy. According to the 2015 ACR guideline, DMARD monotherapy (methotrexate preferred) should be given to patients with moderate or high disease activity who have never taken a DMARD. When the disease is getting worse and the patient has difficulty moving, surgery therapy such as synovectomy, osteotomy, and arthroplasty can be performed. Total joint replacement can be beneficial if joint damaged severely and can be the best way to cure pain and restore range of motion. Nevertheless, this procedure must be done

Figure 2. The radiology examinations of the patient showing: erosions at the acetabulum dan femoral head (arrows) (A); erosions at the distal ulnar and the distal radius and narrowing joint spaces of the right carpals, joint narrowing, and erosions of the tibia-femur joints (B-D). Panel E and F showing both genu with total knee replacement.
carefully to prevent osteoporotic fractures or perforations of the bone. RA patients have a greater risk of postoperative infection than other patients, especially if the patient is receiving corticosteroid therapy. Considering that the patient has a high level of ESR (43 mm/hour) and had never taken any DMARD medication, low dose methylprednisolone and chloroquine (conventional DMARD) were given until the surgery (tenotomy) was carried out. According to ACR/EULAR guideline (2017), chloroquine and methylprednisolone can be given as part of perioperative management for patients with RA until the elective arthroplasty is conducted.

Tenotomy surgery on the hip was performed on the patient rather than total hip replacement considering fibrosis appearance in both knees after previous surgery (total knee replacement). A previous study showed that continuing methotrexate during perioperative period of RA patients for arthroplasty, did not show an increased risk of infection rate compared to those stop methotrexate (continue 2% vs stop 15%). A decreased complication rate and decreased number of flares were also observed in the patients who continued taking the methotrexate. Therefore the methotrexate was provided to the patient during perioperative period.

CONCLUSION

We reported the case of a 22-year-old man with complaints of immobilization, pain in groin, and stiffness in both knees. He had a history of bone tuberculosis seven years ago and underwent total replacement of both knees. He started to suffer from knees stiffness and immobilization since more than a year following the previous surgery. Diagnosis of RA was confirmed after several anamnesis, physical examination, laboratory and radiographic findings. Initially, total knee arthroplasty had been planned for the patient, but later was changed to tenotomy surgery. Considering the patient’s disease activity, chloroquine and methylprednisolone peroral were prescribed.

PATIENT CONSENT

The patient had agreed and signed written informed consent regarding publishing this clinical case in an academic journal without exposing the patient’s identity.

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DISCLOSURE OF CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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None.

AUTHOR CONTRIBUTION

All authors contributed significantly to the study.

REFERENCES


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