### Rheumatoid Arthritis Assessment Use Case

The purpose of this use case is to describe the process for assessment of patient suspected of rheumatoid arthritis (RA) based on standardized RA assessment protocols leading to diagnosis (and management of the condition – Note: comprehensive RA management is out of scope for this use case)

Use Case Sequence of Steps

1. A 45 yo female patient presents to General Practitioner/Primary Care Provider (GP/PCP) with complaints of arthritis signs and symptoms suggestive of rheumatoid arthritis.
2. GP/PCP conducts clinical observations (including examination of the patient, ordering of diagnostic tests) and collects clinical data, which include the following:
   1. Anthropometric data which include, but are not limited to, the patient’s date of birth (age), sex, height, weight, and body mass index (BMI). [**o**bjective]
   2. Medical history which includes, but not be limited to, medical and surgical problems, surgical procedures, medications [**o**bjective] and any allergies/intolerances [**s**ubjective/**o**bjective]; previous episode(s) of similar/same complaints.
   3. Family history of genetic relatives, especially history of auto-immune and rheumatic diseases.
   4. Clinical examination findings (observations):
3. *Constitutional features*: fever, rash, weight loss [**o**bjective], fatigue [**s**ubjective]
4. *Join pain*: three or more joints; symmetrical involvement [**s**ubjective]
5. *Swelling and soft tissue involvements*: three or more joints [**o**bjective]
6. *Local erythema and warmth* [**o**bjective],
7. *Morning stiffness*: duration (>30min) [**s**bjective],
8. *Symmetric involvement of hands and feet*: (especially metacarpophalangeal and metatarsophalangeal joints [**o**bjective]
   1. Diagnostic tests: [**o**bjective]
9. *Laboratory*: C-Reactive Protein (CRP) or Erythrocyte Sedimentation Rate (ESR); Rheumatoid Factor (RF); Rheumatoid Factor (IgA, IgG, IgM); Antinuclear Antibody (ANA); anti-cyclic citrullinated peptide (anti-CCP) antibodies, 14-3-3 eta protein (elevated during joint inflammation); dsDNA, C3, C4, immunoglobulins, HLA-DRB1, HLA B27, joint aspirate (if infection or crystal arthropathy is suspected)
10. *Imaging*: X-ray/serial x-rays (Diagnostic erosions rarely seen in disease of <3 months duration)
11. A medical diagnosis may be identified. If the clinical findings from the clinical data obtained supports the diagnosis of rheumatoid arthritis, the diagnosis will be entered into the patient’s medical record.

This process is followed by recommendations/interventions, a care plan, other procedures, and/or a referral.

**The Clinical Assessment Process:**

The clinical assessment process involved targeted collection of pertinent clinical data, the reasoning process to come to an understanding of the patient’s health issues/problems, and to arrive at a clinical judgment and decision which include:

* A problem/diagnostic statement
* A management/care **p**lan for the identified problem/diagnosis (and any relevant co-morbidity), which may include goals/milestones, interventions (medical, surgical, patient education), recommendations to patient, outcome assessment, and/or referral

**Rheumatoid Arthritis Assessment** – Clinical Scenarios/Script

**First GP/PCP visit**

Presenting complaints:

A 45 yo Caucasian female patient presents to her General Practitioner/Primary Care Provider (GP/PCP) with complaints of recent episode of fatigue, malaise, morning stiffness, arthralgia, myalgias, weakness, weight loss, and low-grade fever for approximately 6-7 months and intermittent in nature.

Medical and family history:

After listening to the patient’s presenting complaints, the GP/PCP then proceeds to take a full medical and family history from the patient.

*Medical history* to discern:

* Any recent or past injury or infection to the affected joints:
* this patient has past injuries to both knee joints from skiing 5 years ago but denies any history of injury or infection to the affected joints (hands and wrists)
* Age at onset and how long symptoms have been present and whether there has been any pattern to them:
  + This patient started to experience the symptoms at 45 years of age
* How symptoms have affected patient’s daily activities of living, driving, and working
  + The arthralgia, myalgias , weakness and stiffness increasingly affect her activity of daily living functionality dependent on the use her use of hands, e.g.: dressing, personal hygiene, preparing foods and cooking
* [For patients with a longer history of rheumatoid arthritis: to discern whether the course of the disease is monocyclic (have one episode which ends within 2-5 years of initial diagnosis and did not reoccur – this may result from early diagnosis and/or aggressive treatment), polycyclic (the levels of disease activity fluctuate over the course of the condition) or progressive (RA continues to increase in severity and is unremitting)]
* Smoking history: risk of RA increases as more cigarettes are smoked, and ever-smoking is associated with older onset RA in both men and women[[1]](#footnote-1).
  + This patient denies that she ever smokes.

*Family history* includes:

* Whether any genetic relatives were/are affected by the condition

(Patients possessing high-risk HLA-DRB1 alleles predisposes to RA at a younger age)

* This patient’s maternal grandmother (age at onset: 56) and genetic mother (age at onset 50) were both diagnosed with rheumatoid arthritis

The *medical history* and *family history* details are also recorded in the patient’s medical record.

Physical Examination:

*Anthropometric data*

* Height: 165 cm
* Weight: 79 kg
* BMI: 29 (overweight)

*Symptoms*

* Stiffness: morning stiffness lasting up to 1.5 hours and sometimes longer and improving later in the day; joints affected include the MCP and PIP joints and the wrist in this patient (e.g. joints of the hands, wrists, elbows, knees, ankles, and/or feet; larger joints, such as the shoulders, hips, and jaw, may be affected; vertebrae of the neck are sometimes involved in advanced disease).
* Pain: from inflammation or swelling of the joint and surrounding tissues or from working the joint too hard and muscle ache; intensity of pain varies among individuals. Patient indicates that the pain level experienced is about 5-8/10. Affected joints tender to palpation/touch.
* Malaise and Fatigue
* General weakness: especially the hands and wrists
* Mild loss of appetite: over the past 5-6 months
* Mood: patient complains of mild downswing of moods in the recent 2-3 weeks as the symptoms worsen
* Stress: patient self-rates stress level as moderate on DASS21 assessment scale

*Signs*

* Swelling: palpable synovial swelling of MCP (metacarpophalangeal) and PIP (proximal interphalangeal) joints of fingers of both hands; wrists (tenosynovitis of extensor compartment of wrists)
* Shape: the affected fingers are fusiform or spindle shaped at the PIP or MCP



* Deformity: no joint subluxation/obvious deformity detected at this early stage of disease
* Erythema and increased temperature at the affected joints
* Range of joint movement:
  + Pain, swelling associated with flexor tenosynovitis limit flexion of the fingers and grip strength
  + Tenosynovitis of dorsum of hands and wrists limit dorsi-flexion of the wrists
* Weight loss: approximately 2.5 kg in last 3-4 months
* Ocular inflammation: none

*Activity of daily living* functionality

Adversely affected by arthritis of hands, pain and general weakness

*Cardio-pulmonary examination*

* No pericardial friction rub
* No pleural friction rub
* Non-cardiac chest pain: negative

Skin

* Rash or psoriasis: none
* No other cutaneous/dermatological manifestation (e.g. no malar rash or discoid rash)

The GP/PCP **records** the physical examination findings in patient’s medical record.

**Clinical Assessment**:

*Clinical Reasoning*:

The GP/PCP evaluates and applies clinical reasoning on patient data including presenting complaints, medical history, family history and physical examination results.

The GP/PCP then applies the clinical reasoning process (which may also include the use of guideline-based diagnostic criteria or algorithms) on determining how the data lead to the establishment of provisional/working diagnosis, ruling out differential diagnoses, and where applicable, determining the patient’s clinical status:

* Constitutional symptoms such as: low grade fever, weight loss, malaise and fatigue
* Typical signs and symptoms such as: morning stiffness, swelling and pain of MCP, PIP joints, the spindle-shaped affected joints, the symmetry of joints affected (both hands), the changes of range of movement in affected joints (i.e. limit flexion of the fingers and grip strength, limited dorsi-flexion of the wrist)
* Family history: maternal grandmother and genetic mother have positive history of rheumatoid arthritis

*Clinical Impression*:

Result of analysis and clinical reasoning lead the GP/PCP to arrive at the following (clinical impression):

*Provision/working diagnosis*:

* Rheumatoid arthritis (most likely, supported by presence of the typical signs and symptoms)

*Differential diagnosis*:

* SLE (supporting evidence: presence of constitutional symptoms: fatigue, fever, arthralgia, weight change)
  + To rule out SLE (four or more of the SLE diagnostic criteria to make diagnosis of SLE)

Management Plan:

Based on this initial clinical assessment result and after discussion with the patient, the GP/PCP also decides on the following management plan:

*Diagnostic tests for rheumatoid arthritis*

* Laboratory/Blood Tests ordered:

Rheumatoid Factor (RF); Antinuclear Antibody (ANA); anti-cyclic citrullinated peptide (anti-CCP) antibodies; Anti-Cardiolipin (IgG); C-Reactive Protein (CRP); dsDNA, Erythrocyte Sedimentation Rate (ESR)

* Imaging Tests ordered:
* X-rays of both hands and wrists: to detect soft tissue swelling in early RA, any bone erosions or changes that may suggest other types of arthritis such as osteoarthritis
* X-ray of cervical spine: to detect early cervical spine involvement (after the MCP joints, the most common region to be involved in RA is the cervical spine)
* Ultrasound: to examine the affected joints and to detect abnormal collections of fluid in the soft tissues around joints

*Additional Diagnostic tests* (for ruling out SLE)

* FBE/CBC, urine x protein and microscopy
* Serum cardiac troponin
* ECG/EKG: to rule out epicardial/pericardial inflammation
* X-ray chest: to rule out pericardial infusion and pleural effusion

*Treatments*

* NSAIDs, e.g. naproxen, for pain control
* Diazepam for stress relief and help improve sleep
* Diet rich in omega-3-fatty acid and fish oil capsule supplement
* Heat application to tense and painful muscles and joints
* Refer to occupational therapy for specially devised gripping tools and cutlery
* Relaxation (e.g. music therapy, meditation) and rest
* Weight reduction: through exercise program (e.g. walking) and diet (BMI: 29 – overweight)

The treatment plan details are documented in patient’s medical record

*Follow-up*

The GP/PCP recommends the patient to make a follow-up appointment with the clinical registration desk to return for reassessment when the test results become available

**Follow-up GP/PCP visit** (3 weeks later)

The patient makes appointments with the diagnostic services and has the tests performed.

The results are sent to the patient’s GP/PCP within 3 days of completion of test procedures.

Review of diagnostic test results

The GP/PCP reviews the patient’s diagnostic tests (lab/blood and imaging) results (and note the abnormal findings) prior to seeing the patient at the follow-up appointment

*Laboratory test results*:

* ANA (homogeneous) = 640 titre (reference range <40)
* Rheumatoid Factor = 517 IU/mL (reference range <20)
* Anti-Cardiolipin (IgG) = 10 U/mL [low positive] (reference range <6)
* Anti CCP: >300 U/mL (reference range <6)
* Anti dsDNA = 9 IU/mL (reference range <7)
* C-reactive protein (CRP) = 73 mg/L (reference range <5.0)
* FBE/CBC
* Hb = 132 g/L (reference range – female: 120-150)
* WBC = 6.2 x109/L (reference range 4.0-10.0)
* Platelets = 307 x109/L (reference range 140-400)
* Haematocrit = 0.39 (reference range 0.33-0.47)
* RBC = 4.40 x1012/L (reference range – female: 4.0-5.0)
* ESR = 56mm (reference range – female under 50yo: <20mm/hour)
* Serum cardiac troponin I and T= not elevated
* Urine
* Protein = negative
* Cellular cast = hyaline casts: 0-5 hyaline casts/lpf; red cell casts: negative
* ECG/EKG: no ST-segment elevation and PR-segment depression, no T wave inversion (indicative of epicardial and pericardial inflammation or myocardial injury)

*Imaging test results*:

* X-ray hands: show fusiform and periarticular soft tissue swelling consistent with oedema, joint effusion and tenosynovitis of affected joints
* X-ray cervical spine: no radiological change detected
* CXR: clear lung fields, no cardiomegaly or pleural effusion
* Ultrasounds result
  + hyperaemic inflamed synovial tissues of the MCP joints consistent with active synovitis and tenosynovitis;
  + exudative tenosynovitis of the extensor tendons II and IV compartments on the dorsal aspect of the wrists

Review of physical examination findings

The review of diagnostic findings is followed by a repeat of interview of the patient and physical examination.

The review is also used to determine how the patient responses to the initial treatment and the progression of the condition since the first consultation. The clinical findings (including review of the diagnostic test results) are **documented**.

*Symptoms*:

* Stiffness: persistent with little change
* Pain: score of 1-3/10 with use of NSAIDs, rest and heat application
* Malaise and fatigue: slight improvement with better rest and relaxation
* General weakness:
* Appetite: no change since first consultation
* Mood: DSS21 stress scale = mild (improvement from moderate) with use of pain relief, relaxation and rest
* Sleep: slight improvement associated with pain relief and relaxation

Signs:

* Swelling of affected joints: no change since first consultation
* Range of joint movement: no change since first consultation

**Clinical Assessment**

*Clinical reasoning*:

The GP/PCP evaluates patient data including any new presenting complaints, new physical examination results and diagnostic test results.

The GP/PCP then applies the clinical reasoning process (which may involve the use of standard diagnostic guideline or algorithms) on determining how the data lead to the establishment of final diagnosis, ruling out differential diagnosis, and potentially, determining the patient’s clinical status:

* The persistence of constitutional symptoms: fever, weight loss, malaise and fatigue
* Physical examination findings on RA specific signs/symptoms: arthralgia, myalgias, joint swelling, joint range of movement
* Diagnostic test data: RA, ANA, anti- Cardiolipin (IgG), anti-CCP, c-reactive protein, ESR, x-ray hand, ultrasounds of affected joint
* Differentiating diagnostic data: ECG/EKG, echocardiogram (if done), CXR, cardio-pulmonary examinations (auscultation findings)

*Clinical Impression*:

The clinical evaluation and reasoning lead to the GP/PCP establishing:

*Final diagnosis*:

Rheumatoid arthritis

*Differential diagnosis*:

SLE: ruled out (guideline-based SLE diagnostic criteria requires the presence of 4 of the 11 diagnostic criteria. Patient’s clinical findings satisfied 2 of the 11 SLE diagnostic criteria: arthritis + positive haematological and serological results for immunologic disorders)

*Clinical status*:

Improvements on pain, sleep, mood/stress, joint movement and ability to perform affected activities of daily living

The GP/PCP **documents** the clinical findings and final diagnosis in the patient’s medical record

Treatment Plan:

Not included in this script

1. Sugiyama D, Nishimura K, Tmaki K, Tsui G, Nakazawa T, et al (2010) Impact of smoking as a risk factor for developing rheumatoid arthritis: a meta-analysis of observational studies. *Ann Rheum Dis* 69:70-81. [↑](#footnote-ref-1)